

PSSA Review: 7th Grade

CC.2.1.7.D.1: Analyze proportional relationships and use them to model and solve real-world and mathematical problems.

1. Dante is driving 638 miles to his cousin's house. His car has a 12-gallon tank and goes 22 miles for every gallon of gasoline. Dante started with a full tank of gasoline and will fill up the tank when it is empty. How many times will he have to stop for gasoline?
2. **Part A:** At the bakery, the daily ratio of cookie sales to donut sales is 3 to 4. Cookies and donuts cost the same amount. If the bakery earned \$225.00 on Tuesday from the sale of cookies, write a proportion that could be used to find the amount of money that came from the sale of donuts on Tuesday.

Part B: Use your proportion to find how much money the bakery earned from the sale of donuts on Tuesday.

3. There are 300 students in the eighth grade. The ratio of girls to boys is 3 to 2. What percent of the students are boys?
(A) $33\frac{1}{3}\%$ (B) 40% (C) $66\frac{2}{3}\%$ (D) 150%
4. Sweaters were on sale for 20% off of the original price. Kelly bought a sweater on sale that had an original price of \$32.00. The sales tax was 7.25%. How much did Kelly pay for the sweater?
5. **Part A:** In Randi's school, 5 out of every 7 students ride the bus to school. What percent of students ride the bus? Round your answer to the nearest tenth.

Part B: If there are 350 students in Randi's school, approximately how many students ride the bus?

6. Amid's bill at a restaurant was \$39.24. He plans to leave a 15% tip for the waiter. Explain how Amid can **ESTIMATE** the amount for the tip.

7. Tyler wants a pair of shoes that sells for \$60.00. He uses two coupons when he buys these shoes. One coupon is for a 30% discount and the other coupon is for \$10.00 off. The cashier takes the 30% discount first, and then subtracts \$10.00.



Coupon 1



Coupon 2

Part A: How much does Tyler pay for the pair of shoes?

Part B: Would the price be different if the cashier had subtracted the \$10.00 and then taken the 30% discount? In the space below, show your work or explain in words.

8. Silvia hiked a 30-mile trail in 3 days. The first day, she hiked 50% of the total distance. The second day, she hiked 25% of the distance that **remained**. How many miles did she hike the third day?
(A) $3\frac{3}{4}$ (B) $7\frac{1}{2}$ (C) $11\frac{1}{4}$ (D) $22\frac{1}{2}$
9. Marilyn's teacher allowed her to take a makeup test. She scored $\frac{24}{60}$ on the original test and $\frac{28}{40}$ on the makeup test. By what percentage did Marilyn increase her score?
(A) 4% (B) 20% (C) 30% (D) 52%
10. Tracy's dog eats 8 ounces of dog food every day. How many pounds of dog food will her dog eat in 40 days?
11. Xavier bought a shirt that was on sale for 20% off the original price. He also used a coupon that gave him an additional 15% off the sale price of the shirt. The original price of the shirt was \$37. What is the new price of the shirt before tax?
12. Tomás earns a 5% commission for each cellular phone he sells. On Tuesday, he sells a cellular phone for \$180. How much commission does Tomás earn on this sale?
(A) \$9 (B) \$36 (C) \$90 (D) \$189
13. During the summer, Breanna works at a coffee shop. She saves 75% of her earnings to buy new school clothes. If Breanna earns \$750, what is the **best** estimate for the amount of money she saves to buy clothes?
(A) \$100 (B) \$150 (C) \$300 (D) \$550

14. The table below shows the number of students who attended Walters Middle School each year during a five-year period.

Walters Middle School

Year	Number of Students
2000	511
2001	548
2002	587
2003	664
2004	705

What is the **approximate** percent increase in the number of students from 2000 to 2004?

- (A) 50% (B) 40% (C) 30% (D) 20%
15. A 14-gram serving of mayonnaise contains 11 grams of fat. What percent of the mayonnaise, to the *nearest tenth of a percent*, is fat?
16. Jessica went shopping for a new watch. She found a watch that was originally priced at \$50 on sale for \$40. By what percent had the watch been marked down?
- (A) 10% (B) 20% (C) 25% (D) 40%
17. The cost of Cynthia's dinner is \$15.20. She pays an additional tip that is 20% of the cost of the dinner. What is the **best** estimate for the amount of the tip?
- (A) \$2.00 (B) \$3.00 (C) \$4.00 (D) \$5.00
18. A store charges the same amount for each pair of socks. A customer can buy 3 pairs of socks for \$7.80. Henry bought 4 pairs of socks when they were each on sale for 10% off. He also bought a pair of shoelaces. Henry spent a total of \$11.58. How much was the pair of shoelaces?
- (A) \$1.13 (B) \$2.22 (C) \$2.34 (D) \$2.60
19. The price of a bottle of water at a store decreases from \$1.65 to \$1.40. Rounded to the nearest tenth of a percent, what is the percent decrease in the price of the bottle of water?
- (A) 15.2% (B) 17.9% (C) 45.9% (D) 54.1%
20. Coretta buys a pair of jeans that is on sale for 20% off. The regular price is marked as \$27.00. What is the sale price of the pair of jeans?
21. Anneke and her parents had dinner at their favorite restaurant. The dinner bill was \$50.00, and her parents tipped their server 20% of the bill. How much money did Anneke's parents leave as a tip?
- (A) \$1.00 (B) \$10.00 (C) \$20.00 (D) \$25.00
22. Sarah earned a 4% commission on all of her sales in March. Her total sales were \$80,000 in March. How much money did she earn from commissions?
- (A) \$320 (B) \$3,200 (C) \$32,000 (D) \$320,000

23. Sarah went on a one-day bus tour from Las Vegas to the Grand Canyon. The cost of the bus ticket was \$80. She also paid 15% of the cost of the ticket as a tip to the bus driver. What was the amount of the tip that Sarah paid the bus driver?

- (A) \$5 (B) \$12 (C) \$15 (D) \$19

24. Kenneth is making chocolate cakes. For each cup of milk he uses, he needs to use $1\frac{3}{4}$ cups of flour. For each cup of flour he uses, he needs to use $\frac{3}{7}$ cup of cocoa powder. Kenneth is making enough cakes that he needs to use 4 cups of milk. How many cups of cocoa powder does Kenneth need to use?

- (A) $\frac{3}{28}$ (B) $\frac{12}{7}$ (C) 3 (D) 7

25. A technician tests batteries for a battery manufacturer several times each week. She determines that the number of defective batteries is proportional to the number of batteries tested. The table below shows the numbers of batteries the technician tested at two different times during week 1 and the number of defective batteries she found each time.

Battery Test Results for Week 1

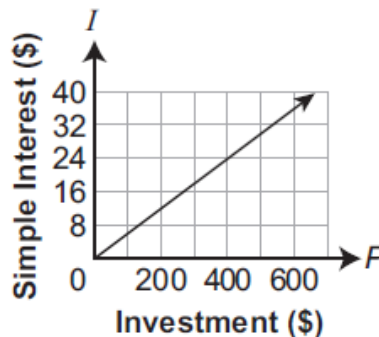
Number Tested	Number Defective
160	4
600	15

Between week 1 and week 2, the battery manufacturer changed its process. The number of defective batteries is still proportional to the number of batteries tested, but the constant of proportionality is greater. The technician tested 480 batteries during week 2 and found that 18 were defective. By what percent did the constant of proportionality increase?

- (A) $33\frac{1}{3}\%$ (B) 50% (C) $66\frac{2}{3}\%$ (D) 125%

26. The graph below represents the amount of simple interest (I), in dollars, earned on an investment of P dollars over one year. The interest rate is r .

Interest Earned over One Year



An investment of \$600 at a different interest rate (q) will earn \$24 in simple interest over one year. Which statement about interest rates r and q is true?

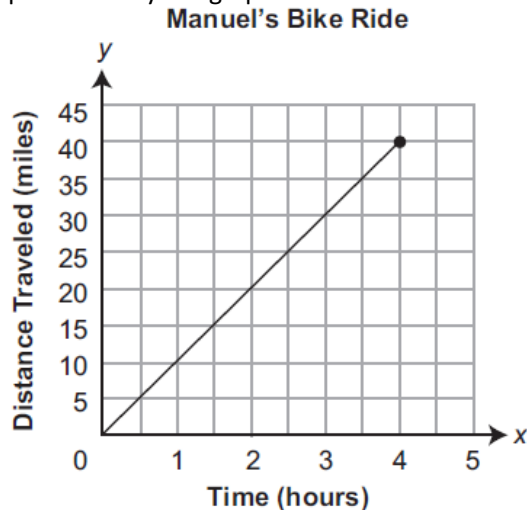
- (A) Interest rate r is 2% greater than interest rate q .
 (B) Interest rate r is 8% less than interest rate q .
 (C) Interest rate q is 12% less than interest rate r .
 (D) Interest rate q is the same as interest rate r .

27. Lloyd bought two pumpkins. On a coordinate grid, he plotted each pumpkin's weight (x), in ounces, and price (y), in dollars. He then drew a straight line that passed through both points and the origin. The line he drew also passed through the point $(1, n)$ for some number n . What does the number n represent?
- (A) the price, in dollars, per ounce of pumpkin
 (B) the price, in dollars, of one of the pumpkins
 (C) the weight, in ounces, of one of the pumpkins
 (D) the weight, in ounces, of a pumpkin with a price of \$1.00
28. The ratio of the number of students in the chess club to the number of students on the math team is 1:3. The ratio of the number of students on the math team to the number of students on the quiz bowl team is 1:2. There are 4 students in the chess club. How many students are on the quiz bowl team?
- (A) 7 (B) 9 (C) 12 (D) 24

Valery and Manuel ride their bikes 40 miles every Saturday. Valery rides at an average speed of 9.6 miles per hour (mph).

29. **Exactly** how many hours does it take Valery to ride her bike 40 miles? Show or explain all your work.

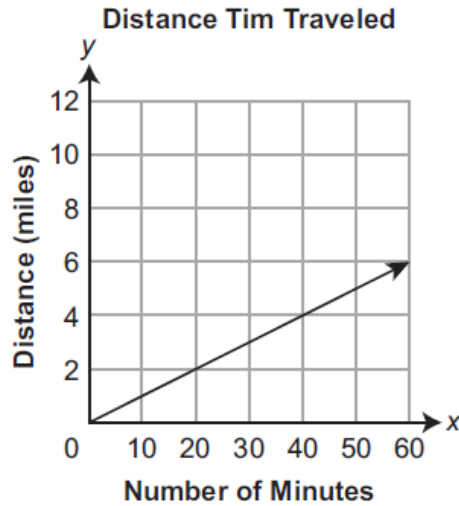
30. Manuel's bike ride is represented by the graph shown below.



Valery increases her speed by 4% the next time she rides her bike so she can ride faster than Manuel.

Explain why the 4% increase is **not** enough for Valery to ride faster than Manuel. As part of your explanation, find how many fewer miles Valery rides than Manuel does when he finishes his 40-mile bike ride.

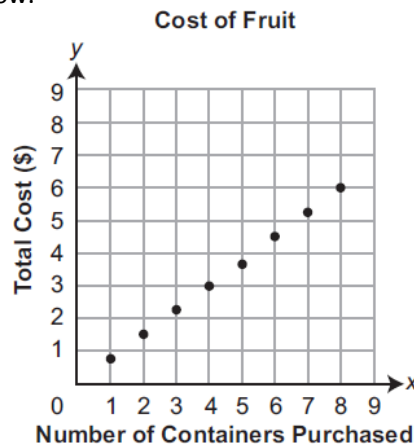
31. The graph shows the distances Tim traveled in a boat after different numbers of minutes.



What point on the graph represents Tim traveling 1 mile?

- (A) $(\frac{1}{10}, 1)$ (B) $(1, \frac{1}{10})$ (C) $(1, 10)$ (D) $(10, 1)$

32. Matt purchases containers of fruit at a grocery store. The costs for different numbers of containers are shown in the graph below.



What is represented by the point (4, 3) on Matt's graph?

- (A) The cost for 3 containers of fruit is \$4.
 (B) The cost for 4 containers of fruit is \$3.
 (C) Matt purchased 4 containers of fruit and has 3 left.
 (D) Matt purchased 4 containers of fruit and ate 3 of them.

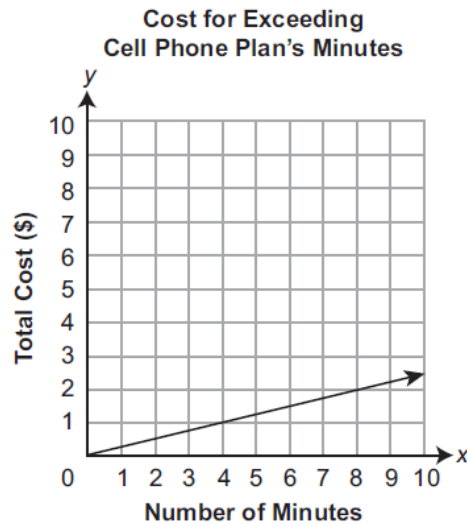
33. Ernesto made a graph of the distance (y), in miles, he can ride a bicycle in x hours. Ernesto can ride 5.5 miles in 0.5 hour. Which point on the graph represents Ernesto's rate of travel, in miles per hour?

- (A) $(0, 5.5)$ (B) $(0, 11)$ (C) $(1, 5.5)$ (D) $(1, 11)$

34. Sam typed 420 words in 10 minutes. If he continues to type at this rate, how many words will he have typed in 3 hours?

- (A) 756 (B) 1,260 (C) 2,520 (D) 7,560

35. When Rachel exceeds the number of minutes on her cell phone plan, she is charged an extra cost for each minute. The graph below shows the total cost (y), in dollars, for exceeding her cell phone plan's minutes by x minutes.



What does the y -coordinate represent when the x -coordinate has a value of 1?

- (A) Rachel pays \$0.25 for each minute she exceeds her cell phone plan's minutes.
 (B) Rachel pays \$0.50 for each minute she exceeds her cell phone plan's minutes.
 (C) Rachel pays \$1.00 for each minute she exceeds her cell phone plan's minutes.
 (D) Rachel pays \$4.00 for each minute she exceeds her cell phone plan's minutes.
36. The Suez Canal links the Mediterranean Sea to the Red Sea and is 108 miles long. If a ship is traveling the canal at a speed of 1.5 miles per hour, how many hours will it take to travel the length of the canal?
 (A) 72 (B) 90 (C) 110 (D) 162
37. A concert hall sells tickets in three different price ranges. For each price range, there are both adult and child rates.

Concert Hall Prices

Adult Tickets	Child Tickets
\$82.00	\$20.50
\$56.00	\$14.00
\$36.00	\$9.00

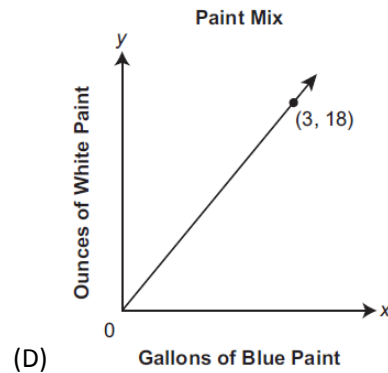
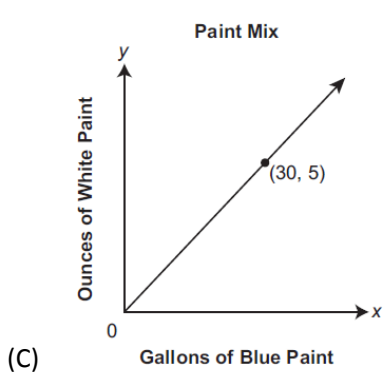
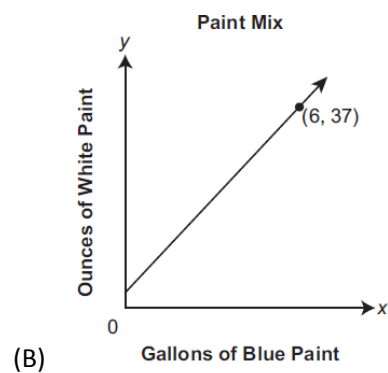
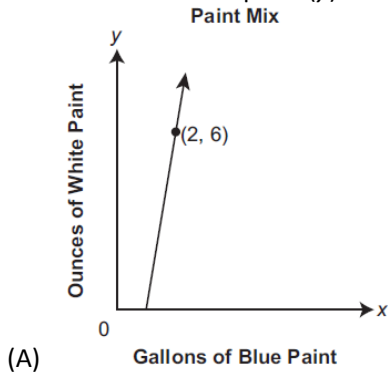
Which statement describes the relationship between the adult ticket prices (a), in dollars, and the child ticket prices (c), in dollars?

- (A) The relationship is proportional. It can be represented as $c = \frac{1}{4}a$.
 (B) The relationship is proportional. It can be represented as $c = 4a$.
 (C) The relationship is not proportional. The change in a is not constant, and therefore the relationship cannot be expressed as one equation.
 (D) The relationship is not proportional. The change in c is not constant, and therefore the relationship cannot be expressed as one equation.

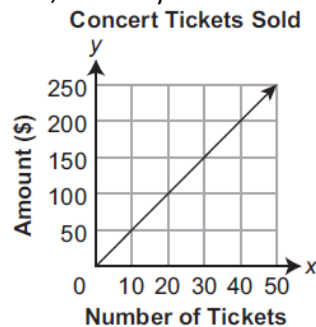
43. When playing a board game, players can exchange 1 gold coin for 3 silver coins. They can also exchange 1 silver coin for 9 copper coins. How many copper coins have the same value as 1 gold coin?
 (A) 3 (B) 6 (C) 12 (D) 27

44. Lamar has a bucket of baseballs. While practicing, he uses $\frac{1}{5}$ of the baseballs in the bucket in 15 minutes. At this rate, what fraction of the baseballs in the bucket will Lamar use in an hour?
 (A) $\frac{1}{20}$ (B) $\frac{9}{20}$ (C) $\frac{4}{5}$ (D) $\frac{5}{4}$

45. A student mixes 6 ounces of white paint into every gallon of blue paint he uses for a project. Which graph can be used to show this proportional relationship between gallons of blue paint (x) and ounces of white paint (y)?



46. The graph below shows the proportional relationship between the number of concert tickets sold and the amount of money, in dollars, raised by a musician.



What is the unit rate of the tickets sold?

- (A) \$0.20 per ticket (B) \$0.50 per ticket (C) \$5 per ticket (D) \$10 per ticket

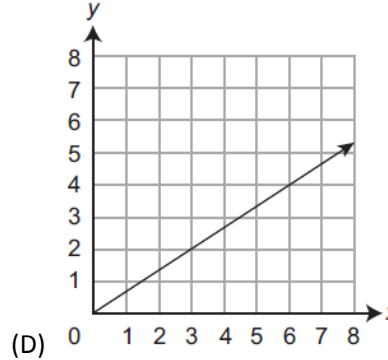
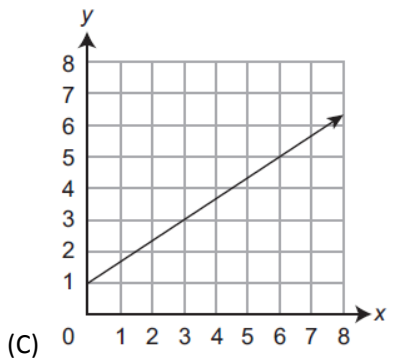
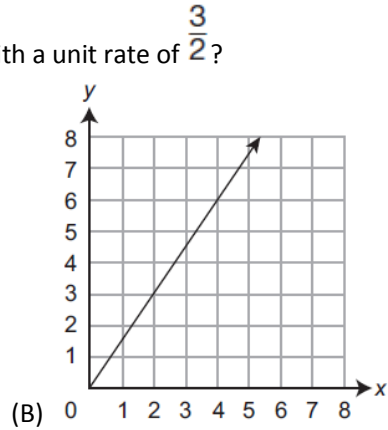
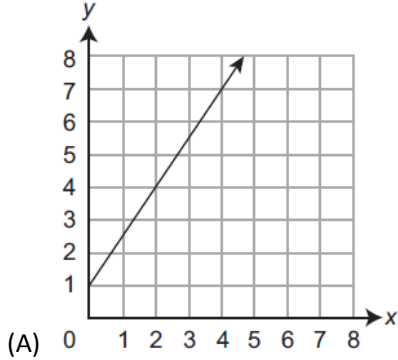
47. An equation is shown below.

$$\frac{1}{3}x + r = z$$

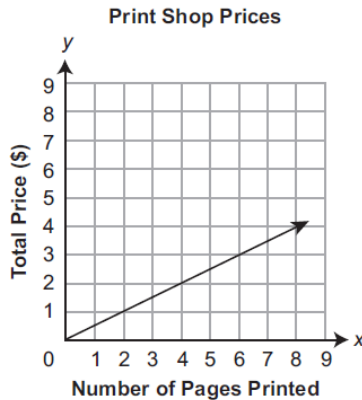
The difference between z and r is proportional to x . What is the constant of proportionality between x and the difference between z and r ?

- (A) $\frac{1}{3}$ (B) $\frac{2}{3}$ (C) 2 (D) 3

48. Which graph shows a proportional relationship with a unit rate of $\frac{3}{2}$?



49. The graph below shows the relationship between the number of pages printed (x) at a print shop and the total price (y), in dollars.



Based on the graph, what is the unit price at the print shop?

- (A) \$0.10 per page (B) \$0.20 per page (C) \$0.25 per page (D) \$0.50 per page
50. The table below shows the relationship between the number of water bottles at a park that are thrown away and the number of water bottles at the park that are recycled for each of five months.

Water Bottles at a Park

Month	Water Bottles Thrown Away	Water Bottles Recycled
1	40	12
2	50	15
3	80	24
4	110	33
5	140	42

Which statement correctly describes the relationship between the number of water bottles that are thrown away and the number of water bottles that are recycled at the park each month?

- (A) The relationship is proportional. For every 3 bottles that are thrown away each month, 10 bottles are recycled.
- (B) The relationship is proportional. For every 10 bottles that are thrown away each month, 3 bottles are recycled.
- (C) The relationship is not proportional. The number of water bottles that are thrown away increases more from month to month than the number of water bottles that are recycled.
- (D) The relationship is not proportional. The difference between the number of bottles that are thrown away and the number of bottles that are recycled is not the same for each month.

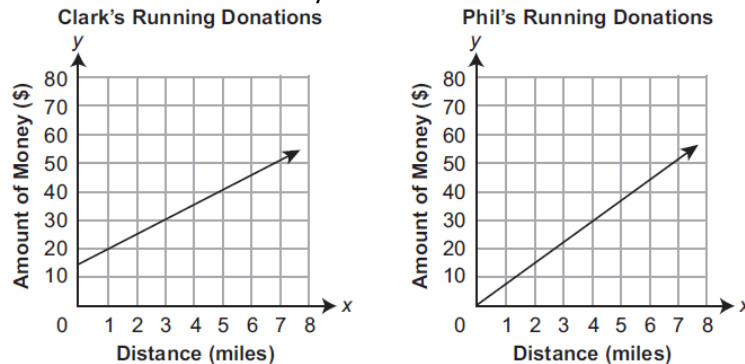
51. In Marta's class, the ratio of students who ate tacos for lunch to the students who ate burritos was 12:18. Which fraction is an equivalent form of this ratio?

- (A) $\frac{2}{8}$ (B) $\frac{4}{9}$ (C) $\frac{2}{3}$ (D) $\frac{3}{4}$

52. If x varies directly as y , and $x = 8$ when $y = 24$, what is the value of x when $y = 6$?

- (A) 1 (B) 2 (C) 3 (D) 4

53. Clark and Phil are each running to raise money. The amount of money (y), in dollars, they each raise is based on the distance (x), in miles, they each run. Clark has an initial donation that he has received regardless of how many miles he runs. The graphs shown below model the amount of money each will raise based on the distance they each run.



What is the unit rate for the person for whom the amount of money and the number of miles are proportionally related?

- (A) \$5.00 per mile (B) \$7.50 per mile (C) \$15.00 per mile (D) \$30.00 per mile

54. Joe has a picture that measures 8 centimeters by 12 centimeters. He creates four enlargements of the picture. The table below shows the width and the length of each enlargement.

Joe's Picture Enlargements

Width (cm)	Length (cm)
10	15
12	18
20	30
25	37.5

What is the constant of proportionality between the width and the length of the pictures?

- (A) 0.5 (B) 1.2 (C) 1.5 (D) 2.5
55. The tables below show the relationships between distances, in miles, and costs, in dollars, for two shipping companies.

Shipping Company X

Distance (miles)	Cost (\$)
100	20
400	80
800	160
1,300	260
1,900	380

Shipping Company Y

Distance (miles)	Cost (\$)
400	120
800	160
1,200	200
1,600	240
2,000	280

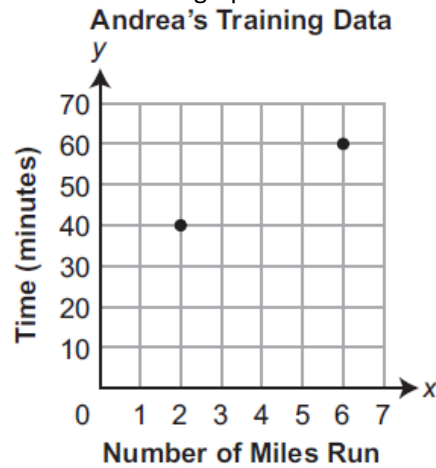
Which statement about the relationships between distances and costs is true?

- (A) Neither relationship is proportional.
 (B) Only the relationship for shipping company X is proportional.
 (C) Only the relationship for shipping company Y is proportional.
 (D) The relationships for both shipping company X and shipping company Y are proportional.
56. Raul's teacher purchases two rectangular paintings. The dimensions of the first painting are proportional to the dimensions of the second painting. The dimensions of the first painting are 8 inches by 20 inches. One of the dimensions of the second painting is 24 inches. Which length, in inches, could be the unknown dimension of the second painting?
- (A) 4 (B) $6\frac{2}{3}$ (C) $9\frac{3}{5}$ (D) 12

57. A car traveled 187 miles in 3 hours and 24 minutes. What was the average speed of the car in miles per hour?
- (A) 50 (B) 55 (C) 58 (D) 62

58. Hummingbirds migrate across the Gulf of Mexico. If the distance across the Gulf of Mexico is about 525 miles and hummingbirds fly at a speed of 25 miles per hour, how long does it take a hummingbird to cross the Gulf of Mexico?
- (A) 8.75 hours (B) 10.5 hours (C) 21.0 hours (D) 25.0 hour

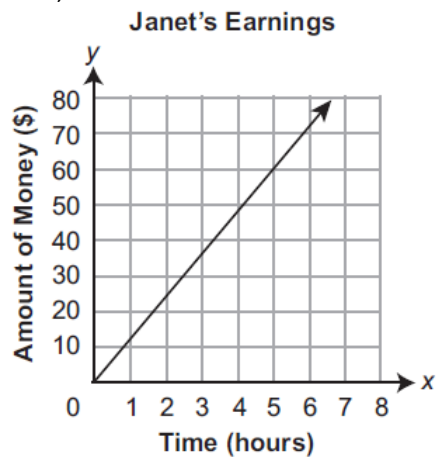
59. Andrea is training for a race. She records the total amount of time, in minutes, it takes her to run different numbers of miles as shown in the graph below.



Which statement correctly explains whether the number of miles Andrea has run and the total amount of time, in minutes, are proportionally related?

- (A) The two quantities are proportionally related because the two points on the graph can be connected by a straight line.
- (B) The two quantities are proportionally related because a straight line drawn through the two points has a slope that is a whole number.
- (C) The two quantities are not proportionally related because a straight line drawn through the two points does not pass through the origin.
- (D) The two quantities are not proportionally related because a straight line drawn through the two points has a slope that is not a whole number.

60. The graph below models the relationship between the time (x), in hours, Janet works and the amount of money (y), in dollars, she earns.



Which statement explains how Janet knows that the number of hours she works and the amount of money she earns are proportionally related?

- (A) The graph is a straight line with a positive slope.
- (B) The graph is a straight line that passes through $(0, 0)$.
- (C) The graph is a straight line that passes through $(1, 12.5)$.
- (D) The graph is a straight line with no negative x or y values.

61. The outboard engine on Jimmy's boat uses a fuel-to-oil mixture in a 50:1 ratio. If Jimmy puts 2.5 gallons of fuel in the tank, how many fluid ounces of oil does he need to add?
62. What is the speed, in meters per second, of a paper airplane that flies 24 meters in 6 seconds?
 (A) 144 (B) 30 (C) 18 (D) 4
63. It takes Tammy 45 minutes to ride her bike 5 miles. At this rate, how long will it take her to ride 8 miles?
 (A) 0.89 hour (B) 1.125 hours (C) 48 minutes (D) 72 minutes
64. A 20-ounce bag of popcorn costs \$2.80. If the unit price stays the same, how much does a 35-ounce bag of popcorn cost?
 (A) \$3.60 (B) \$4.00 (C) \$4.50 (D) \$4.90
65. Brian and Steve want to compare the prices of their favorite cereals to determine which is less expensive. The table below shows the price of each box of cereal and the number of ounces in each box.

BOXES OF CEREAL

	Total Weight (in ounces)	Total Price (per box)	Price (per ounce)
Brian's Cereal	24 oz.	\$3.84	
Steve's Cereal	32 oz.	\$4.48	

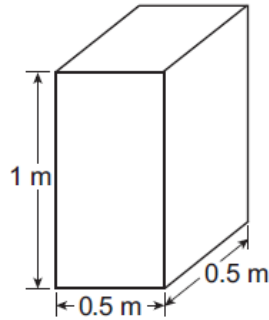
Part A: Complete the table above by calculating the price per ounce of each kind of cereal.

Part B: Whose cereal is less expensive per ounce?

66. Andy is 6 feet tall. If 1 inch equals 2.54 centimeters, how tall is Andy, to the *nearest centimeter*?
 (A) 15 (B) 30 (C) 183 (D) 213
67. If a United States dollar is worth \$1.41 in Canadian money, how much is \$100 in Canadian money worth in United States money, to the *nearest cent*?
68. The trip from Manhattan to Montauk Point is 120 miles by train or by car. A train makes the trip in 2 hours, while a car makes the trip in $2\frac{1}{2}$ hours. How much faster, in miles per hour, is the average speed of the train than the average speed of the car?

69. Tom drove 290 miles from his college to home and used 23.2 gallons of gasoline. His sister, Ann, drove 225 miles from her college to home and used 15 gallons of gasoline. Whose vehicle had better gas mileage? Justify your answer.
70. Consuelo is grocery shopping and sees that the price of 4 melons is \$7.00.
- A. Write a proportion that Consuelo can use to find the price of 1 melon.
- B. Use your proportion to find the price of 1 melon
71. The temperature, in degrees Fahrenheit ($^{\circ}\text{F}$), decreased at a constant rate from 0°F to -35°F in 5 hours. By how many degrees did the temperature decrease **per hour**?
- (A) 5° (B) 7° (C) 30° (D) 35°
72. In a recent town election, 1,860 people voted for either candidate A or candidate B for the position of supervisor. If candidate A received 55% of the votes, how many votes did candidate B receive?
- (A) 186 (B) 837 (C) 1,023 (D) 1,805
73. Steve ran a distance of 150 meters in $1\frac{1}{2}$ minutes. What is his speed in meters per hour?
- (A) 6 (B) 60 (C) 100 (D) 6,000
74. Joseph typed a 1,200-word essay in 25 minutes. At this rate, determine how many words he can type in 45 minutes?
75. Fran is making pancakes. The recipe for the pancakes calls for $\frac{1}{8}$ teaspoon of salt for every $\frac{3}{4}$ cup of flour. Fran makes an amount of pancakes that needs 1 cup of flour. How much salt, in teaspoons, does Fran need to use for the pancakes?
- (A) $\frac{3}{32}$ (B) $\frac{1}{6}$ (C) $\frac{7}{8}$ (D) $\frac{5}{8}$
76. A museum has a $\frac{1}{2}$ -ounce piece of a precious metal. When the museum first received the piece, it had a value of \$60. Its value has since decreased by 20%. What is the current value per ounce of the piece of metal?
- (A) \$24.00 (B) \$37.50 (C) \$96.00 (D) \$150.00
77. Toby pays \$21.45 for 5.6 **pounds** of potato salad. Rounded to the nearest cent, how much does Toby pay per **ounce** of potato salad? (Hint: 1 pound = 16 ounces)
- (A) \$0.24 (B) \$0.26 (C) \$0.99 (D) \$1.69

78. Simon is filling the water tank shown below.



After 2 minutes, the tank is filled up to $\frac{1}{5}$ of its height. What is the rate, in cubic meters per minute, at which Simon is filling up the water tank?

- (A) 0.025 (B) 0.050 (C) 0.100 (D) 0.125

79. For a science experiment, Annie removes a cold liquid from a refrigerator and measures its temperature every $\frac{1}{2}$ minute. Annie finds that the temperature increases by $1\frac{3}{4}$ degrees Fahrenheit ($^{\circ}\text{F}$) between each measurement for three minutes. What is the rate per minute of the temperature increase?

- (A) $\frac{7}{8}^{\circ}\text{F}$ per minute (B) $1\frac{1}{4}^{\circ}\text{F}$ per minute
(C) $2\frac{1}{4}^{\circ}\text{F}$ per minute (D) $3\frac{1}{2}^{\circ}\text{F}$ per minute

CC.2.1.7.E.1: Apply and extend previous understandings of operations with fractions to operations with rational numbers.

- To make 3 dozen cookies, a recipe calls for 4 eggs and $\frac{1}{2}$ cup of chocolate chips. Ben wants to make 12 dozen cookies for a class picnic. How many eggs and how many cups of chocolate chips does he need?

(A) 4 eggs, 1 cup chocolate chips (B) 4 eggs, 2 cups chocolate chips
 (C) 16 eggs, 1 cup chocolate chips (D) 16 eggs, 2 cups chocolate chips
- Tikka made bamboo fishing poles for her sister and herself. She used $\frac{3}{5}$ of a 10-foot stick of bamboo for her pole and the rest for her sister's. How long is her sister's fishing pole?

(A) 8 feet (B) 6 feet (C) 4 feet (D) 2 feet
- What is the value of the expression $7 + 5 \times (-3) - (6 - 2) \div 2$?

(A) -10 (B) -16 (C) -20 (D) -38
- The expression $\frac{1}{15} \div (\frac{4}{15} + \frac{1}{3})$ is equivalent to

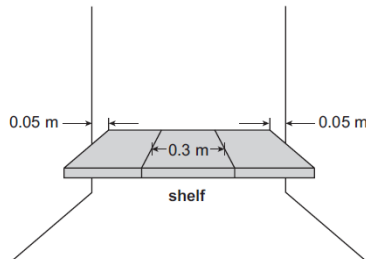
(A) $\frac{1}{9}$ (B) 9 (C) $\frac{1}{5}$ (D) 5
- Which expression is equivalent to $|-11| + |-3|$?

(A) $11 + 3$ (B) $11 - 3$ (C) $-11 + -3$ (D) $-11 + 3$
- Gary and Thomas are playing a game with number cards. At the end of the game, Thomas still has 5 cards. If the value of each card is -50 points, how many points does Thomas have?

(A) -250 (B) -10 (C) 10 (D) 250
- Karen stacks three boards on top of one another. The first board is $\frac{7}{8}$ inch thick. The second board is $\frac{1}{2}$ inch thick. The third board is $\frac{3}{4}$ inch thick. What is the total thickness, in inches, of all three boards?

(A) $\frac{7}{9}$ (B) $\frac{11}{14}$ (C) $1\frac{3}{8}$ (D) $2\frac{1}{8}$
- Kat purchases 4 theater tickets. The cost of each ticket is \$23.50. The theater charges an \$8.50 fee per order for shipping and handling. Kat uses a discount code to save \$6 on her entire order of 4 tickets. What is the final cost of Kat's purchase?

(A) \$79.50 (B) \$91.50 (C) \$96.50 (D) \$108.50
- Joslyn built the shelf shown below to fit into a narrow closet.



The shelf is made of 3 pieces of wood, each 0.3 meter wide. There is also 0.05 meter of space between the shelf and the wall on each side. What is the width, in meters, of Joslyn's closet?

- (A) 0.4 (B) 0.8 (C) 1 (D) 1.9

10. Evan, Brianna, Sue, and Luis painted the outside of a small building. Evan painted $\frac{1}{8}$ of the building. Brianna painted $\frac{3}{10}$ of the building. Sue and Luis painted the rest of the building, and they each painted the same amount of the building. What fraction of the building did Sue paint?

(A) $\frac{23}{80}$ (B) $\frac{7}{18}$ (C) $\frac{23}{40}$ (D) $\frac{7}{9}$

11. Dora has a pitcher with $\frac{11}{12}$ quart of apple juice. She pours an equal amount of the apple juice into 3 glasses. There is still $\frac{1}{3}$ quart of apple juice remaining in the pitcher. How much apple juice, in quarts, is poured into each glass?

(A) $\frac{1}{9}$ (B) $\frac{7}{36}$ (C) $\frac{11}{36}$ (D) $\frac{7}{12}$

12. Subtract: $-10 - 21$

(A) -31 (B) -11 (C) 11 (D) 31

13. Laura has a board that measures $6\frac{11}{12}$ feet in length. She will cut the board into pieces that are each $\frac{11}{12}$ foot long. How many full pieces can Laura cut from her board, and how much of her board will be remaining?

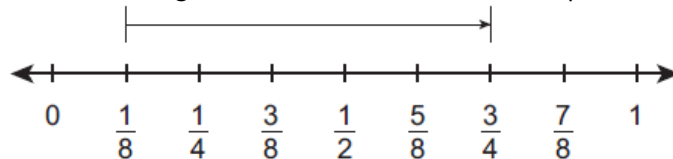
- (A) Laura can cut the board into 6 pieces with nothing remaining.
 (B) Laura can cut the board into 6 pieces with $\frac{11}{12}$ foot remaining.
 (C) Laura can cut the board into 7 pieces with $\frac{1}{12}$ foot remaining.
 (D) Laura can cut the board into 7 pieces with $\frac{1}{2}$ foot remaining.

14. Which number is equivalent to the expression below?

$$|-15 + 4|$$

(A) -19 (B) -11 (C) 11 (D) 19

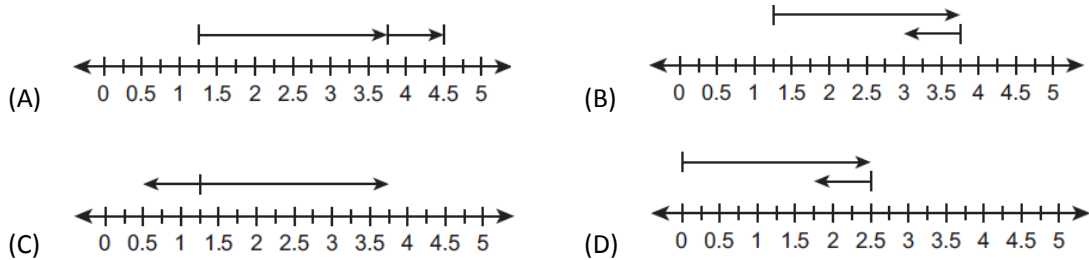
15. The gas tank in Phil's car was $\frac{1}{8}$ full. He put more gasoline in the car's gas tank. The number line below shows how full the car's gas tank was before and after Phil put in more gasoline.



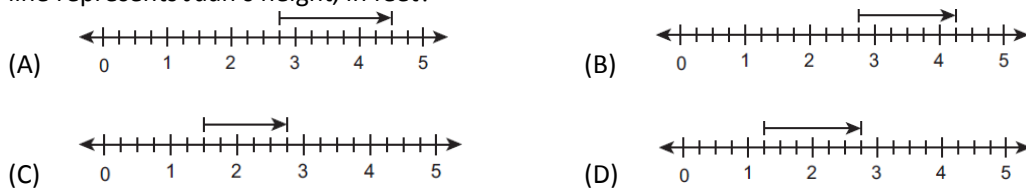
Which equation represents the change in the amount of gasoline in the car's tank?

- (A) $\frac{1}{8} + \frac{2}{4} = \frac{3}{4}$ (B) $\frac{1}{8} + \frac{5}{8} = \frac{3}{4}$
 (C) $\frac{1}{8} + \frac{3}{4} = \frac{7}{8}$ (D) $\frac{1}{8} + \frac{3}{4} = \frac{4}{12}$

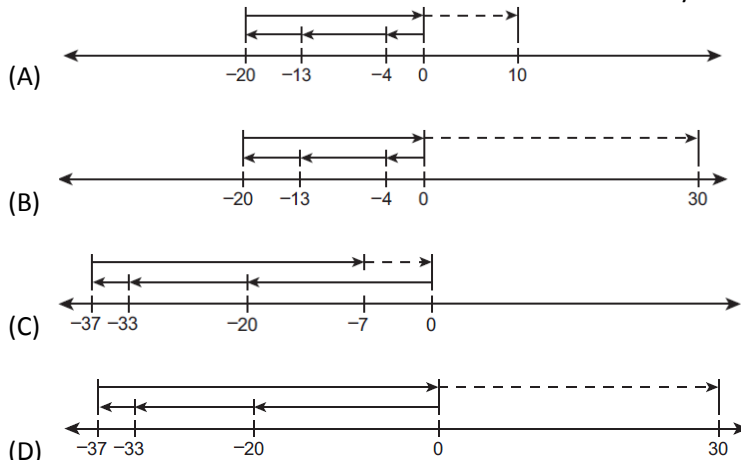
16. The temperature on the moon can vary from 243°F to -261°F . By how many degrees can the temperature vary on the moon?
17. The temperature on a winter night in Kansas is -6°C . The temperature decreases by 8°C . What is the new temperature, in degrees Celsius?
- (A) -2°C (B) 2°C (C) -14°C (D) 14°C
18. At noon on Monday in Minneapolis, the temperature, in degrees Fahrenheit (F), was -4°F . At noon on Tuesday, the temperature was 6 degrees higher. What was the temperature at noon on Tuesday?
- (A) 2°F (B) -2°F (C) 10°F (D) -10°F
19. A scientist had 1.25 ounces of a chemical. He bought 2.5 ounces more of the chemical and then used 0.75 ounce in an experiment. Which number line represents the number of ounces of the chemical that the scientist still has?



20. Juan's younger brother is $2\frac{3}{4}$ feet tall. Juan is $1\frac{1}{2}$ feet taller than his younger brother. Which number line represents Juan's height, in feet?



21. Corrine plans to spend \$20 on a new shirt, \$13 on dinner, and \$4 on a bus ticket. She knows that she will earn \$30 for baby-sitting. Which number line represents a strategy for determining how many more dollars Corrine needs to earn so that she earns exactly as much as she plans to spend?



22. Simplify the expression $(-4)(3)(-1)(-2)$.
- (A) 4 (B) -4 (C) 24 (D) -24
23. In the first race of the season, Carol swam her event in 5 minutes and 15 seconds. Her goal was to be able to swim the same distance in $\frac{2}{3}$ the time by the end of the season. If she reaches her goal, how long will it take her to swim the race at the end of the season?
- (A) 1 minute and 45 seconds (B) 2 minutes and 30 seconds
 (C) 3 minutes and 30 seconds (D) 3 minutes and 40 seconds
24. Jesse predicted that his batting average after the first 5 games of the season would be higher than .300.

The table below records Jesse's hits and times at bat during the first 5 games. Batting average is equal to hits divided by times at bat.

JESSE'S HITTING DURING HIS FIRST FIVE GAMES

Games	Times at Bat	Hits
1	4	0
2	5	1
3	4	2
4	3	1
5	4	2

How accurate was Jesse's prediction concerning his batting average?

- (A) It was lower than he predicted.
 (B) It was higher than he predicted.
 (C) It was equal to his predictions.
 (D) The batting average cannot be determined.
25. The perimeter of square F is $\frac{2}{3}$ meter less than the perimeter of square G. The side lengths of square F are each f meters, and the side lengths of square G are each $\frac{1}{4}(f - \frac{2}{3})$ meters. Which expression also represents the side lengths of square G?
- (A) $\frac{1}{4}f - \frac{1}{6}$ (B) $\frac{1}{4}f - \frac{2}{3}$ (C) $\frac{1}{4}f - \frac{3}{7}$ (D) $\frac{1}{4}f - \frac{11}{12}$
26. Angelo gave $\frac{2}{3}$ of a bag of pretzels to Ben. Ben ate a portion (x) of the pretzels and then gave $\frac{3}{4}$ of the remaining pretzels in the bag to Connor. The expression below represents Connor's portion of the bag of pretzels.

$$\frac{2}{3}\left(\frac{3}{4} - x\right)$$

Which expression is equivalent to Connor's portion of the bag of pretzels?

- (A) $\frac{1}{2} - x$ (B) $\frac{5}{7} - x$ (C) $\frac{1}{2} - \frac{2}{3}x$ (D) $\frac{5}{7} - \frac{2}{3}x$

27. Bill picked $\frac{1}{2}$ of the apples on his grandmother's tree. After Bill finished, Sally picked $\frac{1}{3}$ of the apples that were left on the tree. After Sally finished, there were 40 apples left on the tree. How many apples were on the tree before they picked apples?
 (A) 40 (B) 60 (C) 80 (D) 120
28. A man drove a car 183.75 miles. The car's gas mileage for the drive was 24.5 miles per gallon. How many gallons of gas did the car use?
 (A) $1\frac{1}{3}$ (B) $7\frac{1}{5}$ (C) $7\frac{1}{2}$ (D) $13\frac{1}{3}$
29. The size of a company's logo on an envelope is $\frac{1}{4}$ the size of the company's logo on a shirt. The logo on the shirt is $8\frac{1}{2}$ centimeters wide and 6 centimeters tall. What are the dimensions of the logo on the envelope?
 (A) $2\frac{1}{8}$ centimeters wide and $\frac{1}{24}$ centimeters tall (B) $2\frac{1}{8}$ centimeters wide and $1\frac{1}{2}$ centimeters tall
 (C) $2\frac{1}{2}$ centimeters wide and $1\frac{1}{2}$ centimeters tall (D) $4\frac{1}{2}$ centimeters wide and 2 centimeters tall
30. Kathy purchased cereal in bulk on two different trips to a grocery store. She paid \$5.79 per pound each time. She purchased 2.25 pounds the first time and 1.8 pounds the second time. Rounded to the nearest cent, what is the total amount Kathy paid for both cereal purchases?
 (A) \$9.84 (B) \$12.67 (C) \$14.83 (D) \$23.45
31. Multiply: $\frac{7}{8} \times 1\frac{2}{3}$
 (A) $1\frac{11}{24}$ (B) $1\frac{7}{12}$ (C) $1\frac{19}{21}$ (D) $2\frac{1}{3}$
32. Which value is equivalent to $0.45 \div \frac{9}{10}$?
 (A) $\frac{81}{200}$ (B) $\frac{1}{2}$ (C) 40.5 (D) 50
33. Keyana put 0.83 liter of water into a bucket. Matt put 0.98 liter of water into another bucket. When they combined their water into a bigger bucket, 10% of the water spilled out. The water they collected had a weight of 1.021 kilograms per liter of water. The expression shown below represents the weight, in kilograms, of the water in the bigger bucket.
 $[0.9(0.83 + 0.98)] \times 1.021$
 Rounded to the nearest thousandth, what is the weight, in kilograms, of the water in the bigger bucket?
 (A) 1.663 (B) 1.748 (C) 1.763 (D) 1.848
-

CC.2.2.7.B.1 Apply properties of operations to generate equivalent expressions.

1. Which expression is equivalent to $14a - 4a + 5a - 3a$?
(A) $2a$ (B) $8a$ (C) $12a$ (D) $20a$

2. Simplify the expression below.

$$3a^2b + 6a^2b$$

- (A) $9a^2b$ (B) $9a^4b^2$ (C) $18a^2b$ (D) $18a^4b^2$

3. Simplify the expression below.

$$12xy - 15x + 6xy$$

- (A) $-9xy$ (B) $3xy$ (C) $18xy - 15x$ (D) $6xy - 15x$

4. Simplify the expression below.

$$-4x - (-x)$$

- (A) $5x$ (B) $3x$ (C) $-3x$ (D) $-5x$

5. The perimeter of square F is $\frac{2}{3}$ meter less than the perimeter of square G. The side lengths of square F are each f meters, and the side lengths of square G are each $\frac{1}{4}(f - \frac{2}{3})$ meters. Which expression also represents the side lengths of square G?

- (A) $\frac{1}{4}f - \frac{1}{6}$ (B) $\frac{1}{4}f - \frac{2}{3}$ (C) $\frac{1}{4}f - \frac{3}{7}$ (D) $\frac{1}{4}f - \frac{11}{12}$

6. The bottles of juice that Craig usually buys each have x ounces of juice in them. Another company makes bigger bottles of juice that each have 10% more juice in them than the bottles that Craig usually buys. Craig buys 8 bottles of the bigger size. The total amount of juice, in ounces, he buys is represented by the expression shown below.

$$8(x + 0.1x)$$

Which expression also represents the total amount of juice, in ounces, Craig buys?

- (A) $0.8x$ (B) $1.8x$ (C) $8.1x$ (D) $8.8x$

7. Angelo gave $\frac{2}{3}$ of a bag of pretzels to Ben. Ben ate a portion (x) of the pretzels and then gave $\frac{3}{4}$ of the remaining pretzels in the bag to Connor. The expression below represents Connor's portion of the bag of pretzels.

$$\frac{2}{3}\left(\frac{3}{4} - x\right)$$

Which expression is equivalent to Connor's portion of the bag of pretzels?

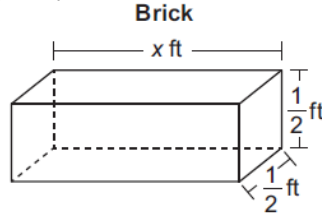
- (A) $\frac{1}{2} - x$ (B) $\frac{5}{7} - x$ (C) $\frac{1}{2} - \frac{2}{3}x$ (D) $\frac{5}{7} - \frac{2}{3}x$

8. Ryan, Darius, and Mason each have \$15.75. They each spend the same amount (d), in dollars, at the school fair. The total amount of money they still have can be expressed as $3(15.75 - d)$. Which expression is equivalent to the total amount, in dollars, they still have?

- (A) $-3d + 15.75$ (B) $-3d + 47.25$ (C) $18.75 - d$ (D) $47.25 - d$

9. Kathy purchased cereal in bulk on two different trips to a grocery store. She paid \$5.79 per pound each time. She purchased 2.25 pounds the first time and 1.8 pounds the second time. Rounded to the nearest cent, what is the total amount Kathy paid for both cereal purchases?
 (A) \$9.84 (B) \$12.67 (C) \$14.83 (D) \$23.45

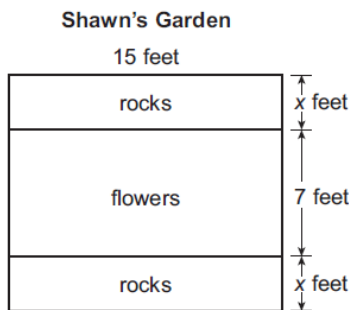
10. A brick in the shape of a rectangular prism is shown.



Which expression represents the surface area, in square feet, of the brick?

- (A) $2x + \frac{1}{4}$ (B) $2x + \frac{1}{2}$ (C) $2x + 1$ (D) $2x + 2$

Shawn designs a rectangular garden as shown below. He will design both rock sections to have the same width (x).



11. The expression shown below represents the perimeter, in feet, of Shawn's garden.

$$15 + 2x + 7 + 15 + 2x + 7$$

Use exactly two terms to write an equivalent expression to represent the perimeter, in feet, of Shawn's garden.

12. The area, in square feet, of Shawn's garden is found by calculating $15(2x + 7)$. Shawn incorrectly says the area can also be found using the expression $30x + 7$.

Describe the error in Shawn's expression. As part of your explanation, find the difference, in square feet, between the actual area of Shawn's garden and the area found using his expression.

13. Charlie designs a square garden. Each side length is $3x + 5$.

The perimeter of Charlie's garden is how much larger than the perimeter of Shawn's garden?

CC.2.2.7.B.3 Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.

1. If $x = -24$ and $y = 6$, what is the value of the expression $|x + y|$?
(A) 18 (B) 30 (C) -18 (D) -30

2. The table below shows the relationship between the hours Joe works and the money he earns.

JOE'S EARNINGS

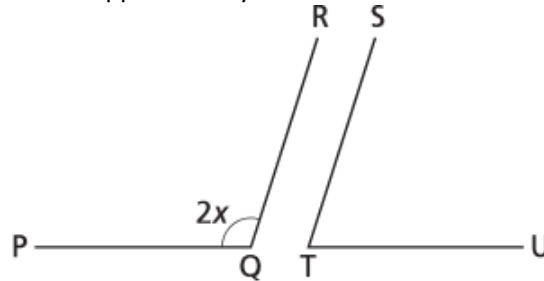
Hours Worked	Money Earned
2	\$12.50
4	\$25.00
6	\$37.50
8	
10	

How much money does Joe earn if he works 10 hours?

- (A) \$50.00 (B) \$62.50 (C) \$75.00 (D) \$100.00
3. At the end of week one, a stock had increased in value from \$5.75 a share to \$7.50 a share. Find the percent of increase at the end of week one to the *nearest tenth of a percent*.
- At the end of week two, the same stock had decreased in value from \$7.50 to \$5.75. Is the percent of decrease at the end of week two the same as the percent of increase at the end of week one? Justify your answer.
4. Kat purchases 4 theater tickets. The cost of each ticket is \$23.50. The theater charges an \$8.50 fee per order for shipping and handling. Kat uses a discount code to save \$6 on her entire order of 4 tickets. What is the final cost of Kat's purchase?
(A) \$79.50 (B) \$91.50 (C) \$96.50 (D) \$108.50
5. A high school teacher gives three regular exams during a semester and one final exam at the end of the semester. A student's final grade is found by taking $\frac{1}{5}$ of the student's three regular exam scores and then adding 40% of the student's final exam score. Sophia earned scores of 78, 92, and 80 on the three regular exams and a score of 90 on the final exam. What is Sophia's final grade?
(A) 83 (B) 85 (C) 86 (D) 90
6. A cube has a surface area of 96 square centimeters. A rectangular prism has a length and a width that are each 25% greater than the side lengths of the cube. The height of the rectangular prism is the same as the cube. What is the difference between the surface area, in square centimeters, of the cube and the rectangular prism?
(A) 4 (B) 24 (C) 34 (D) 54

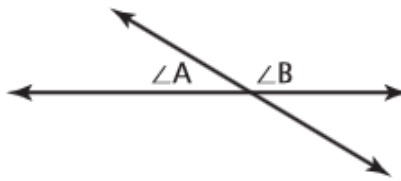
7. One side of a hexagon has a length of 8.75 centimeters. All the other sides of the hexagon are the same length as each other. The perimeter of the hexagon is 42.75 centimeters. What is the length, in centimeters, of each of the other sides of the hexagon?
 (A) 6.8 (B) 7.125 (C) 8.55 (D) 10.3
8. The original price of a stove was \$480. Its price has since increased by \$30. The stove is currently on sale for 10% off. What is the sale price for the stove?
 (A) \$459 (B) \$462 (C) \$477 (D) \$500
9. Rosa has \$16 in savings and will save all the money she earns from tutoring. She earns \$6 per hour for tutoring. Which equation could be used to find the number of hours (r) Rosa must tutor to save exactly \$100?
 (A) $6r - 16 = 100$ (B) $16 + 6r = 100$ (C) $\frac{r}{6} + 16 = 100$ (D) $6(r + 16) = 100$
10. At a baseball game, Jose buys a soda for \$1.25 and 3 hot dogs. He pays a total of \$8.00. What is the price of each hot dog?
 (A) \$2.25 (B) \$3.00 (C) \$4.25 (D) \$6.75
11. Ryan is training for a bicycle race.
- The distance he rides is $44\frac{1}{2}$ miles long.
 - He rides a portion of the distance at a slow speed both to warm up and to cool down.
 - Ryan rides $\frac{4}{5}$ of the distance at a fast speed for training.
 - Of the slow-speed portion, $\frac{1}{3}$ is for the warm-up.
- Which estimate is **closest** to the distance, in miles, Ryan rides to cool down?
 (A) 3 (B) 6 (C) 9 (D) 12
14. Mr. Adams will be serving 20 people at a barbeque. He plans to make two hamburgers for each person. Mr. Adams spent \$27.00 at the store on the meat, which sells for \$2.25 per pound. If Mr. Adams wants to make all the hamburgers the same size, what will be the size, in pounds, of each hamburger?
15. At the grocery store, Jerry spent \$24.75 for 3 pounds of chicken and 3 pounds of cheese. The cheese cost \$4.50 per pound. What was the cost of the chicken per pound?
 (A) \$2.75 (B) \$3.75 (C) \$5.75 (D) \$6.75
16. Anna works as a painter. She charges \$130 for paint supplies and \$25 for each hour, h , she works. Which expression represents the total amount of money Anna charges?
 (A) $(130 + 25)h$ (B) $130 + 25h$ (C) $130h + 25$ (D) $130 + (25 + h)$
17. Mr. Turner bought x boxes of pencils. Each box holds 25 pencils. He left 3 boxes of pencils at home and took the rest to school. Which expression represents the total number of pencils he took to school?
 (A) $22x$ (B) $25x - 3$ (C) $25 - 3x$ (D) $25x - 75$

18. The angles shown below are supplementary. The measure of $\angle PQR$ is $2x$.



What expression represents the measure of $\angle STU$?

- (A) $90 - 2x$ (B) $90 + 2x$ (C) $180 + 2x$ (D) $180 - 2x$
19. $\angle A = x + 2$ and $\angle B = 2x + 4$.



What is the measurement of $\angle A$?

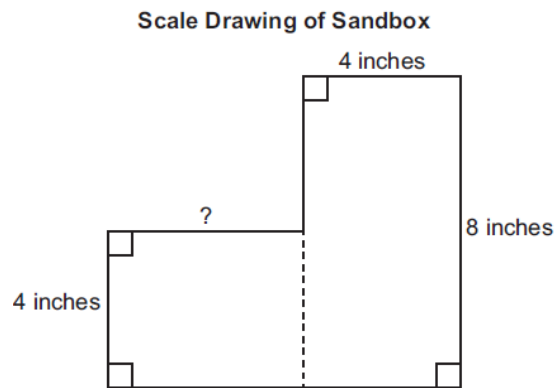
- (A) 30 degrees (B) 60 degrees (C) 90 degrees (D) 120 degrees
20. The square of a number, n , is equal to the sum of that number and 5. Which equation represents this relationship?
- (A) $2n = n + 5$ (B) $n^2 = n + 5$ (C) $2n = n - 5$ (D) $(n + 5)^2 = n + 5$
21. Erin shops at two stores for a new sweater. The sweater at the first store costs \$15 less than three times the cost, c , of the sweater at the second store. The sweater at the first store costs \$90. The equation below can be used to determine the cost of the sweater at the second store.

$$3c - 15 = 90$$

Solve the equation to find the cost of the sweater at the second store. **Show your work.**

22. Hector spent \$17 for a tube of paint and 5 brushes. The tube of paint cost \$8. Which equation can be used to find b , the cost of each brush?
- (A) $17 = 5b + 8$ (B) $17 = 8b + 5$ (C) $17b = 5 + 8$ (D) $17 = b + 5 + 8$
23. Stacy starts a savings account with \$15. Each month she deposits \$10 more into her account. Stacy now has saved \$75. Which equation can be used to determine how many months, m , Stacy has deposited money into her savings account?
- (A) $10m - 15 = 75$ (B) $15m - 10 = 75$ (C) $10m + 15 = 75$ (D) $15m + 10 = 75$

24. This month, Drew worked six hours less than twice the number of hours, h , he worked last month. What expression represents the number of hours Drew worked this month?
 (A) $2 - 6h$ (B) $2h - 6$ (C) $6 - 2h$ (D) $6h - 2$
25. Ms. Snyder wants to buy a television at an electronics store. All televisions at the store are $\frac{3}{4}$ of the original price, p . She has a \$40 discount coupon she will use during the sale. Which equation should Ms. Snyder use to find the final price, f , of a television?
 (A) $f = \frac{3}{4}(p - 40)$ (B) $f = \frac{1}{4}(p - 40)$ (C) $f = \frac{1}{4}p - 40$ (D) $f = \frac{3}{4}p - 40$
26. A store charges the same amount for each pair of socks. A customer can buy 3 pairs of socks for \$7.80. Henry bought 4 pairs of socks when they were each on sale for 10% off. He also bought a pair of shoelaces. Henry spent a total of \$11.58. How much was the pair of shoelaces?
 (A) \$1.13 (B) \$2.22 (C) \$2.34 (D) \$2.60
27. Kendall is designing a sandbox for the city park. His scale drawing is shown below. Not all of the dimensions are labeled.



In the scale drawing, 1 inch = 3 feet. The total area of the actual sandbox is 468 square feet. To determine the length of the side labeled with a question mark in the scale drawing, Kendall uses the equation $36x + 288 = 468$. What is the length, in feet, of the side of the actual sandbox that is labeled with the question mark in the scale sandbox?

- (A) 5 (B) 8 (C) 15 (D) 21
28. Kyle sold an antique through an online auction website. The website host charged Kyle \$15, plus 2.5% of the final selling price of the antique. After selling the antique, Kyle had to pay the website host \$32. What was the final selling price of the antique?
 (A) \$68 (B) \$600 (C) \$680 (D) \$1,280
29. An equation is shown below.

$$\frac{1}{3}x + r = z$$

The difference between z and r is proportional to x . What is the constant of proportionality between x and the difference between z and r ?

- (A) $\frac{1}{3}$ (B) $\frac{2}{3}$ (C) 2 (D) 3

37. A number, n , divided by 2 is less than or equal to the product of n and 3. What inequality represents this relationship?

- (A) $\frac{n}{2} \geq 3n$ (B) $\frac{n}{2} \leq 3n$ (C) $\frac{n}{2} \geq n + 3$ (D) $\frac{n}{2} \leq n + 3$

38. If x represents a given number, the expression "5 less than twice the given number" is written as

- (A) $5 < 2x$ (B) $5 < 2 + x$ (C) $2x - 5$ (D) $5 - 2x$

39. Roger is having a picnic for 78 guests. He plans to serve each guest at least one hot dog. If each package, p , contains eight hot dogs, which inequality could be used to determine how many packages of hot dogs Roger will need to buy?

- (A) $p \geq 78$ (B) $8p \geq 78$ (C) $8 + p \geq 78$ (D) $78 - p \geq 8$

40. Which inequality represents the statement: "One more than 2 times n is greater than 21".

- (A) $2n > 21$ (B) $n + 3 > 21$ (C) $2n + 21 > 1$ (D) $2n + 1 > 21$

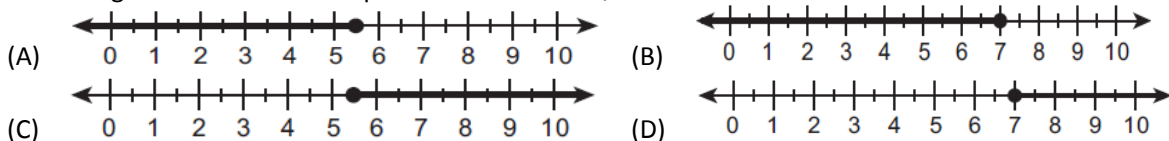
41. An animal at the zoo is fed the same amount of food each day during the week. The animal also gets a total of $\frac{1}{4}$ cup of treats throughout the week. The animal is not fed more than a combined total of $5\frac{1}{2}$ cups of food and treats during the week. Which inequality shows all the possible amounts (x), in cups, of food the animal is fed each day?

- (A) $x \leq \frac{3}{8}$ (B) $x \leq \frac{3}{4}$ (C) $x \leq 1$ (D) $x \leq \frac{1}{2}$

42. A new ramp from the sidewalk to the entrance of a building is being constructed. The ratio of the ramp's height to the ramp's length must not exceed 1:12. The height of the ramp will be 30 inches. Which inequality can be used to calculate the allowable length (r), in inches, of the ramp?

- (A) $\frac{1}{12} \leq \frac{r}{30}$ (B) $\frac{1}{12} \leq \frac{30}{r}$ (C) $\frac{1}{12} \geq \frac{r}{30}$ (D) $\frac{1}{12} \geq \frac{30}{r}$

43. The cost to print a poster is \$4 per square foot plus a \$3 flat fee. George's teacher wants to print a poster for less than \$25. Which graph shows all the poster sizes, in square feet, that George's teacher can have printed for less than \$25?



44. Mr. Hall has \$216 to spend on supplies for his classroom. He will buy a bookshelf and some books. The bookshelf costs \$81. He will buy books that cost \$3 each. Which inequality can be used to find all the possible numbers of books (x) that Mr. Hall can buy?

- (A) $x \leq 45$ (B) $x \geq 45$ (C) $x \leq 99$ (D) $x \geq 99$

45. A coach is purchasing some baseballs and a baseball bat. The baseballs cost \$7.50 each. The bat costs \$26. The coach has \$84. What is the **greatest** number of baseballs the coach can purchase?

- (A) 7 (B) 8 (C) 11 (D) 12

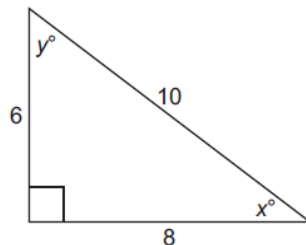
46. A real estate agent earns \$2,000 per month plus 5% of the selling price of each house sold. The agent wants to earn more than \$60,000 this year. Which inequality represents the possible combined selling price (x) of all the houses sold during the year for the real estate agent to meet his goal?
 (A) $x > 11,600$ (B) $x > 180,000$ (C) $x > 720,000$ (D) $x > 1,160,000$

47. Tasha sells gift boxes and cookies at her bakery.
- Gift boxes sell for \$26.00 each.
 - Cookies sell for \$1.50 each.
 - Tasha would like her total sales to be at least \$50.00 from the sale of one gift box and some cookies.

Which inequality describes all the numbers of cookies (x) that Tasha needs to sell?

- (A) $x \geq 2$ (B) $x \geq 8$ (C) $x \geq 16$ (D) $x \geq 24$
48. Heidi must correctly answer at least 80% of the questions on an exam to advance to the next level in her online course. Heidi has already correctly answered 26 questions and incorrectly answered 4 questions. How many of the 15 questions remaining must Heidi correctly answer to advance to the next level?
 (A) at least 10 (B) at least 11 (C) at least 12 (D) at least 13

49. A right triangle is shown below.



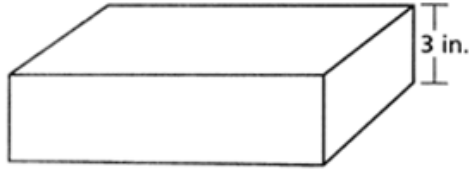
Which inequality is true?

- (A) $0^\circ < x^\circ < 45^\circ$ (B) $45^\circ < x^\circ < 60^\circ$ (C) $60^\circ < x^\circ < 90^\circ$ (D) $90^\circ < x^\circ < 180^\circ$
50. The school has a rectangular area behind a building that is 4 **yards** wide and 9 **yards** long. The students want to put 2 to 3 **inches** of soil in the area to create a garden. The students know that 2 **inches** is $\frac{1}{6}$ **foot** and 3 **inches** is $\frac{1}{4}$ **foot**. Based on that, the students estimate that they will need between 6 and 9 cubic **yards** of soil. Which statement correctly explains whether the students' estimated amount of soil needed is accurate?
 (A) The students' range is accurate since $36 \times \frac{1}{6} = 6$ **and** $36 \times \frac{1}{4} = 9$.
 (B) The students' range is not accurate because $4 \times 9 = 36$ square yards, which is already much greater than 6 and 9 cubic yards.
 (C) The students' range is not accurate because they should express 2 inches and 3 inches in fractions of a yard, not fractions of a foot.
 (D) The students' range is accurate because the high end of their estimate is equal to the width of the area for the garden and the low end of their estimate is greater than the length of the garden.

51. Which estimate is **closest** to the value of $3\frac{7}{8} \times 5\frac{1}{16}$?
 (A) 15 (B) 18 (C) 20 (D) 24

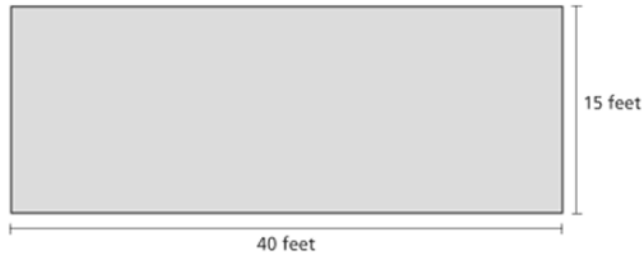
CC.2.3.7.A.1 Solve real-world and mathematical problems involving angle measure, area, surface area, circumference, and volume.

1. The volume of the rectangular solid below is 1,440 cubic inches.



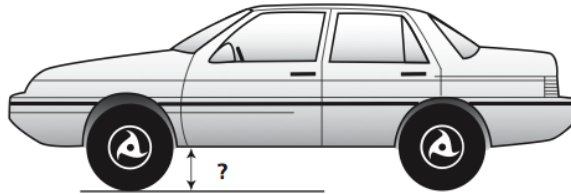
What could be the length and width of this rectangular solid?

- (A) 4 inches by 10 inches (B) 8 inches by 20 inches
(C) 10 inches by 48 inches (D) 30 inches by 40 inches
2. Joseph needs to calculate how much grass seed he needs to cover his lawn. A diagram of his lawn is shown below.



One pound of seed covers an area of 100 square feet and the seed is sold in five-pound bags. How many bags will he need?

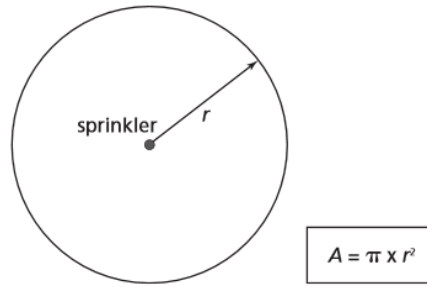
- (A) 1 (B) 2 (C) 3 (D) 5
3. In the diagram below, the distance from the ground to the bottom of the car is equal to half the height of the tire. Each tire has a circumference of 9.42 feet.



How far is the bottom of the car from the ground?

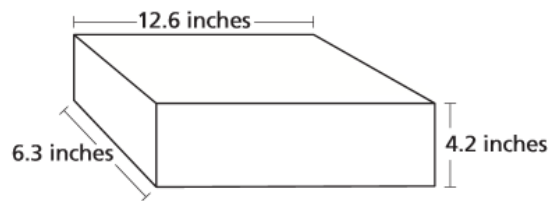
- (A) 0.75 foot (B) 1.00 foot (C) 1.50 feet (D) 3.00 feet
4. Jeremy has a box with a rectangular lid. The top of the lid has an area of 392 square centimeters. The ratio of the width to the length of the lid is 1:8. What are the dimensions of the lid?
- (A) 4 cm by 98 cm (B) 7 cm by 56 cm (C) 8 cm by 49 cm (D) 8 cm by 64 cm
5. Sarah builds a dollhouse. The floor of the dollhouse is square. Sarah covers the floor with 144 square inches of tile. How long, in inches, is one side of the dollhouse floor?
- (A) 12 (B) 38 (C) 72 (D) 144

6. Kevin designs a sprinkler system for his yard. One rotation of the sprinkler waters a circle with an area of 225π square feet. What is the radius, r , of the circle the rotating sprinkler waters?



- (A) 15 feet (B) 25 feet (C) 30 feet (D) 47 feet

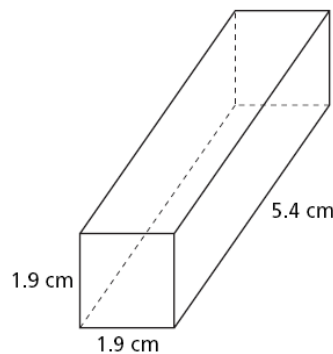
7. Keisha wants to paint the entire outside of her rectangular storage box shown in the diagram below.



[not drawn to scale]

Use **estimation** to calculate the total surface area, in square inches, of the storage box.

8. What is the best **estimation**, in square centimeters, for the surface area of the rectangular prism shown below?



[not drawn to scale]

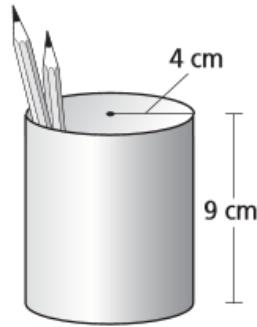
$$\text{Surface area} = 2wl + 2lh + 2wh$$

- (A) 14 (B) 20 (C) 32 (D) 48

9. Lenny made a cube in technology class. Each edge measured 1.5 cm. What is the volume of the cube in cubic centimeters?

- (A) 2.25 (B) 3.375 (C) 9.0 (D) 13.5

10. Mary wants to cover the bottom and outside of a can with material to make a pencil holder. She needs to know the surface area of the outside of the can shown below.

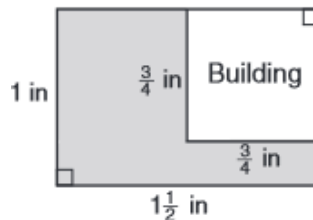


[not drawn to scale]

Part A: Calculate the surface area, in square centimeters, of the outside of Mary's pencil holder using the formula $\pi r^2 + 2\pi rh$. Round your answer to the nearest tenth.

Part B: On the lines below, explain why the formula $\pi r^2 + 2\pi rh$ is used to find the surface area of Mary's pencil holder instead of $2\pi r^2 + 2\pi rh$.

12. The accompanying diagram represents a scale drawing of the property where Brendan's business is located. He needs to purchase rock salt to melt the ice on the parking lot (shaded area) around his building. A bag of rock salt covers an area of 1,500 square feet. How many bags of rock salt does Brendan need to purchase to salt the entire parking lot?



Scale: $\frac{1}{4}$ in = 18 ft

13. A block of wood is 5 inches long, 2 inches wide, and 3 inches high. What is the volume of this block of wood?
- (A) 10 in^3 (B) 25 in^3 (C) 30 in^3 (D) 38 in^3

14. What is the surface area, in square centimeters, of a rectangular prism that has a length of 10 centimeters, a width of 5 centimeters, and a height of 6 centimeters?

$$\text{Surface Area} = 2wl + 2lh + 2wh$$

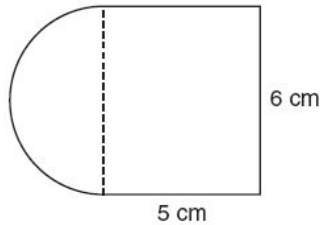
- (A) 140 (B) 160 (C) 280 (D) 300

15. The length of each side of a cube is 2.05 centimeters long. What is the best **estimation** of the surface area of the cube in square centimeters?

$$\text{Surface Area} = 6s^2$$

- (A) 16 (B) 24 (C) 32 (D) 48

16. A figure is made up of a rectangle and a semicircle as shown in the diagram below.



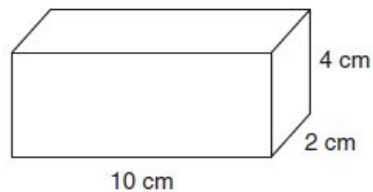
What is the area of the figure, to the *nearest tenth of a square centimeter*?

- (A) 39.4 (B) 44.1 (C) 48.8 (D) 58.3

17. Angela wants to purchase carpeting for her living room. The dimensions of her living room are 12 feet by 12 feet. If carpeting is sold by the square yard, determine how many square yards of carpeting she must purchase.

$$\begin{aligned} 3 \text{ feet} &= 1 \text{ yard} \\ 9 \text{ square feet} &= 1 \text{ square yard} \end{aligned}$$

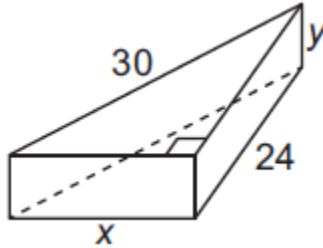
18. Find the volume, in cubic centimeters, and the surface area, in square centimeters, of the rectangular prism shown below.



19. A cube has a surface area of 96 square centimeters. A rectangular prism has a length and a width that are each 25% greater than the side lengths of the cube. The height of the rectangular prism is the same as the cube. What is the difference between the surface area, in square centimeters, of the cube and the rectangular prism?

- (A) 4 (B) 24 (C) 34 (D) 54

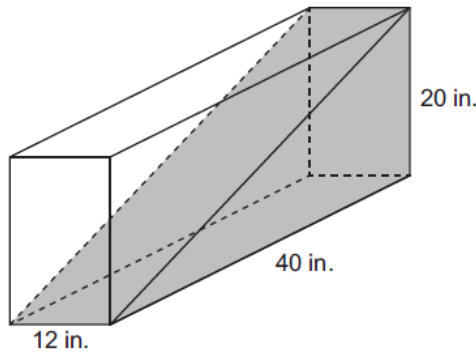
20. A triangular prism is shown below. The base of the prism is a right triangle.



The volume of the prism is 720 cubic units. What is the product, in square units, of the width (x) and the height (y) of the prism?

- (A) 15 (B) 30 (C) 48 (D) 60

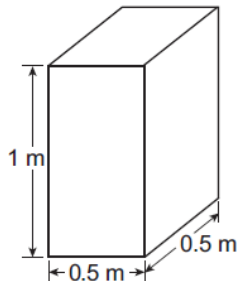
21. A student has two identical triangular prisms that, when placed together, form a rectangular prism as shown below.



What is the surface area, in square inches, of the outside parts of the shaded triangular prism?

- (A) 1,520 (B) 3,040 (C) 4,800 (D) 9,600

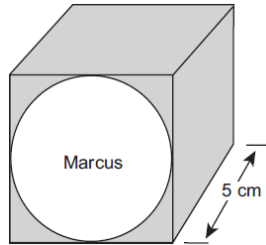
22. Simon is filling the water tank shown below.



After 2 minutes, the tank is filled up to $\frac{1}{5}$ of its height. What is the rate, in cubic meters per minute, at which Simon is filling up the water tank?

- (A) 0.025 (B) 0.050 (C) 0.100 (D) 0.125

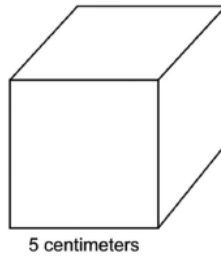
23. Marcus wants to decorate his box that is in the shape of a cube. He decides to cover the entire box with red colored paper except the circle with his name on it. The box is shown below.



Rounded to the nearest square centimeter, how much red paper is needed to cover Marcus's box?

- (A) 72 (B) 105 (C) 130 (D) 150

Justin has a wooden cube. Each edge of the cube is 5 centimeters long, as shown below.

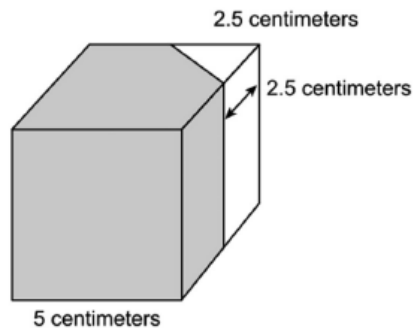


24. Justin paints every face of the wooden cube. What is the total surface area, in square centimeters, of the cube Justin paints?

25. After the paint dries, Justin cuts the cube in half. He makes the cut along the diagonal of one pair of parallel faces. Rounded to the nearest thousandth, the diagonal has a length of 7.071 centimeters. Once the cut is made, Justin has two identical triangular prisms.

What is the combined area, in square centimeters, of the surfaces of the two prisms that were **not** painted?

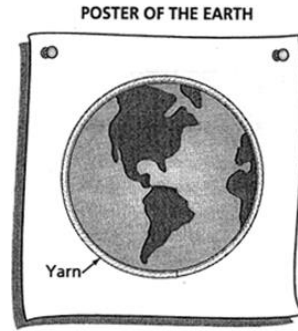
26. Justin has a second wooden cube identical to the first. He cuts off the triangular prism as shown below and throws it away.



What is the volume, in cubic centimeters, of the remaining solid?

27. Shannon has several cubes. Each cube is 3 feet high. Shannon covers all but one face of each cube with foil. She uses a total of 360 square feet of foil to cover the faces. How many cubes does Shannon have?
(A) 8 (B) 10 (C) 24 (D) 40

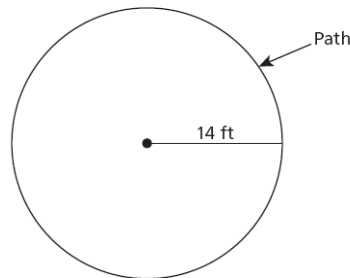
28. Julie is making a poster of the Earth. She wants the Earth to be a circle with a *diameter* of 10 inches. She wants to outline the Earth with yarn.



How many inches of yarn will Julie need to outline the Earth in her poster?(You may use $\pi = 3.14$.)

29. A wheel has a radius of 5 feet. What is the minimum number of *complete* revolutions that the wheel must make to roll at least 1,000 feet?

34. The workers at Johnson Farm are creating a circular path that will be used to give pony rides. A diagram of the path is shown below.



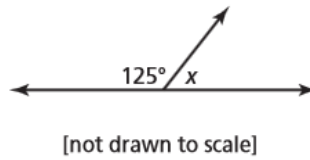
[not drawn to scale]

$$C = 2\pi r$$

What is the circumference of the path? Leave π in your answer.

- (A) 7π feet (B) 14π feet (C) 28π feet (D) 56π feet

30. What is the measure of $\angle X$ in the diagram below?

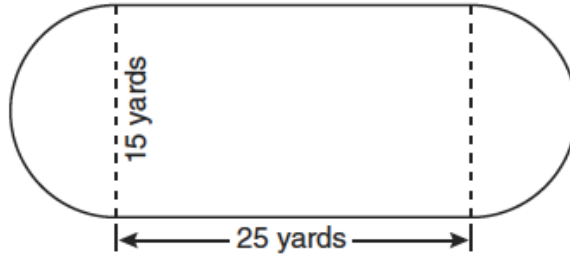


- (A) 45° (B) 55° (C) 125° (D) 180°

35. If the circumference of a circle is doubled, how does the diameter of the circle change?

- (A) The diameter stays the same. (B) The diameter becomes half as long.
(C) The diameter becomes twice as long. (D) The diameter becomes four times as long.

36. A playground in a local community consists of a rectangle and two semicircles, as shown in the diagram below.



Which expression represents the amount of fencing, in yards, that would be needed to completely enclose the playground?

- (A) $15\pi + 50$ (B) $15\pi + 80$ (C) $30\pi + 50$ (D) $30\pi + 80$

37. If the circumference of a circle is 16π , what is the radius?

$$C = 2\pi r$$

- (A) 4 (B) 8 (C) 16 (D) 32

38. Jordan sews a lace border 50π inches long around the edge of a circular tablecloth.

What is the length of the radius from the inside edge of the lace to the center of the circular tablecloth?

- (A) 5 inches (B) 25 inches (C) 50 inches (D) 100 inches

39. A circle has a radius of 18 inches. What is the circumference of the circle in terms of π ?

$$C = 2\pi r$$

- (A) 36π (B) 20π (C) 18π (D) 9π

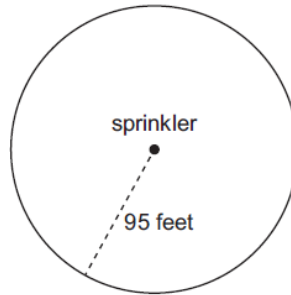
40. Gunther drew a circle. The radius of his circle is 20 inches. He uses the formula below to determine the area of his circle.

$$A = \pi r^2$$

What is the area, in square inches, of Gunther's circle? Leave your answer in terms of π .

- (A) 10π (B) 40π (C) 100 (D) 400π
41. A farmer uses a rotating sprinkler that sprays water in a circular area with a 95-foot radius from the sprinkler as shown in the diagram below.

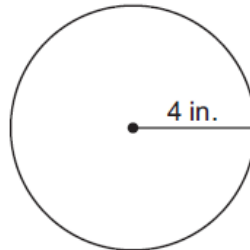
Rotating Sprinkler



Which value is **closest** to the area, in square feet, that the rotating sprinkler sprays with water?

- (A) 597 (B) 1,194 (C) 28,353 (D) 113,411
42. Rounded to the nearest inch, what is the circumference of a circle with a radius of 15 inches?
- (A) 47 (B) 94 (C) 707 (D) 2,827

43. A city is building a new pool. A scale drawing of the pool is shown below.

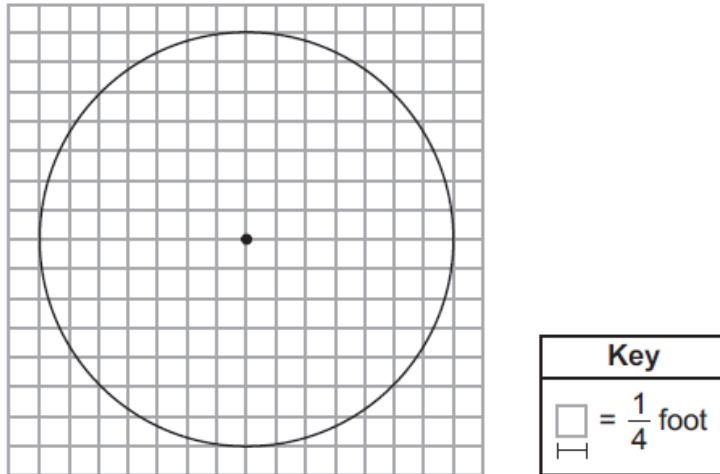


Scale
1 in. : 3 ft

What is the area, in square feet, of the pool?

- (A) 16π (B) 24π (C) 48π (D) 144π
44. A circular lampshade with a diameter of 14 inches has a length of wire that goes around it exactly one time. How many inches of wire are needed to go around the lampshade exactly one time?
- (A) 7π (B) 14π (C) 49π (D) 196π

45. The figure below represents a circular fountain.



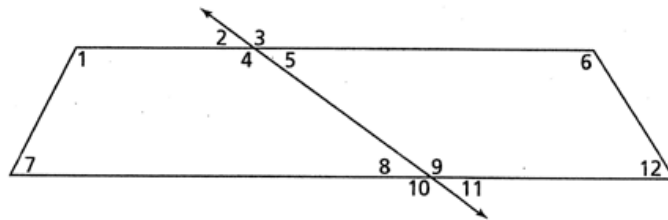
Rounded to the nearest square foot, what is the area of the fountain?

- (A) 10 (B) 11 (C) 38 (D) 44

46. The diameter of Jacob's circular tabletop is 6 feet. What is the area, in square feet, of Jacob's tabletop?

- (A) 6π (B) 9π (C) 12π (D) 36π

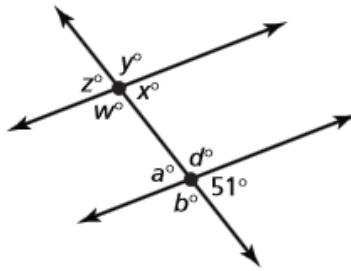
47. The figure below shows a trapezoid intersected by a line. The angles formed are represented by the numbers 1 through 12.



On the line below, list two angles in the figure that are congruent to $\angle 5$.

On the line below, list two angles in the figure that are supplementary to $\angle 5$.

52. The figure below shows parallel lines cut by a transversal.



[not drawn to scale]

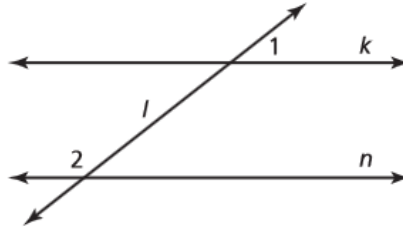
Part A: Based on the information in the figure, complete the table below with the measures for each angle.

Angle	a°	b°	d°	w°	x°	y°	z°
Degree Measure							

Part B: Name one pair of supplementary angles in the figure.

Answer _____

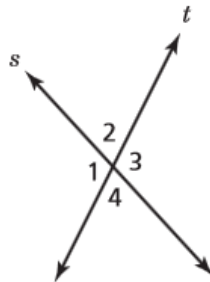
53. In the diagram below, line k and line n are parallel. Line l is a transversal.



What is the relationship between $\angle 1$ and $\angle 2$?

- (A) complementary (B) corresponding (C) supplementary (D) vertical

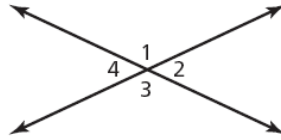
54. Line s and line t intersect, as shown below.



Which angles are vertical?

- (A) $\angle 2$ and $\angle 3$ (B) $\angle 2$ and $\angle 1$ (C) $\angle 3$ and $\angle 4$ (D) $\angle 3$ and $\angle 1$

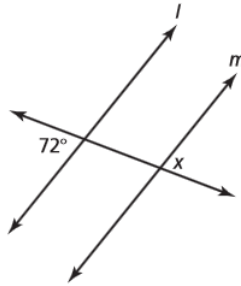
55. In the diagram below, which pair of angles has the same measure?



[not drawn to scale]

- (A) $\angle 1$ and $\angle 2$ (B) $\angle 1$ and $\angle 4$ (C) $\angle 2$ and $\angle 3$ (D) $\angle 2$ and $\angle 4$

56. In the diagram below, line l and line m are parallel.

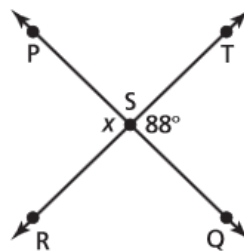


[not drawn to scale]

What is the measure of $\angle x$?

- (A) 18° (B) 72° (C) 108° (D) 162°

57. In the diagram below, \overleftrightarrow{PQ} intersects \overleftrightarrow{RT} at point S, and the measure of $\angle TSQ$ is 88° .

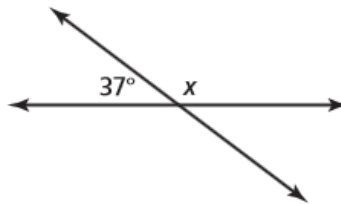


[not drawn to scale]

What is the measure, in degrees, of $\angle x$?

- (A) 88 (B) 92 (C) 178 (D) 268

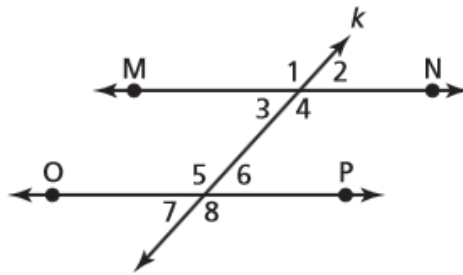
58. In the diagram below, what is the measure of angle x ?



[not drawn to scale]

- (A) 37° (B) 53° (C) 127° (D) 143°

59. In the diagram below, $\overleftrightarrow{MN} \parallel \overleftrightarrow{OP}$, and transversal k intersects both lines.

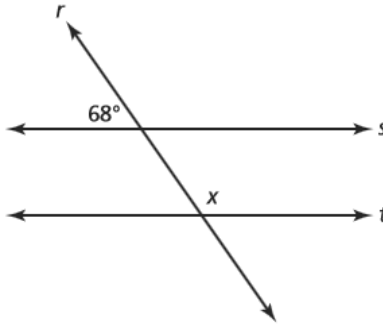


[not drawn to scale]

Name two angles in the diagram that are congruent to $\angle 4$.

Answer \angle _____ and \angle _____

60. In the diagram below, line s is parallel to line t , and line r is a transversal.

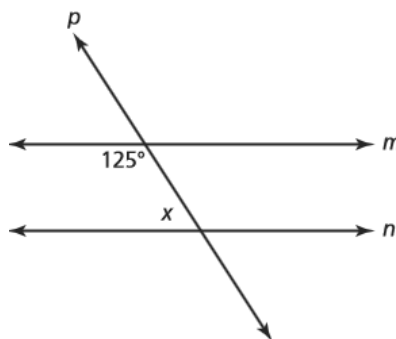


[not drawn to scale]

What is the measure of $\angle x$?

- (A) 158° (B) 112° (C) 68° (D) 22°

61. In the diagram below, line m and line n are parallel, and line p is a transversal.

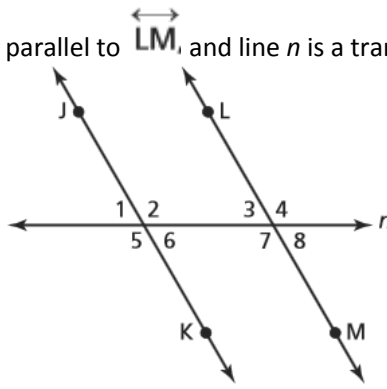


[not drawn to scale]

What is the measure of $\angle x$?

- (A) 35° (B) 55° (C) 125° (D) 215°

62. In the diagram below, \overleftrightarrow{JK} is parallel to \overleftrightarrow{LM} , and line n is a transversal.

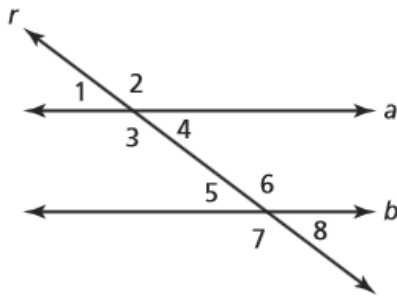


[not drawn to scale]

Which two angles must be congruent to $\angle 4$ in the diagram?

- (A) $\angle 1$ and $\angle 2$ (B) $\angle 1$ and $\angle 6$ (C) $\angle 2$ and $\angle 7$ (D) $\angle 6$ and $\angle 7$

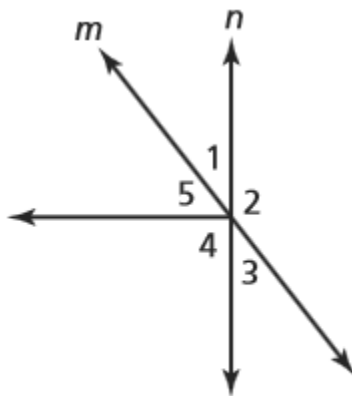
63. In the diagram below, line a is parallel to line b , and line r is a transversal. Which pair of angles must have the same measure?



[not drawn to scale]

- (A) $\angle 1$ and $\angle 6$ (B) $\angle 1$ and $\angle 7$ (C) $\angle 2$ and $\angle 7$ (D) $\angle 3$ and $\angle 5$

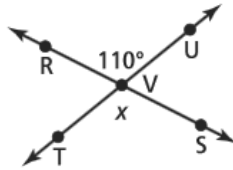
64. In the diagram below, line m intersects line n . Which pair of angles must be congruent?



[not drawn to scale]

- (A) $\angle 1$ and $\angle 3$ (B) $\angle 1$ and $\angle 5$ (C) $\angle 2$ and $\angle 3$ (D) $\angle 3$ and $\angle 5$

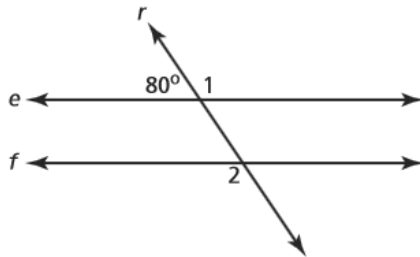
65. In the diagram below, \overleftrightarrow{RS} intersects \overleftrightarrow{TU} at point V, and the measure of $\angle RVU$ is 110° .



[not drawn to scale]

What is the measure of $\angle x$?

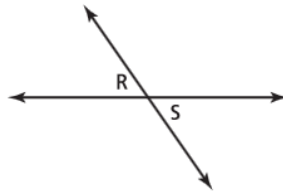
- (A) 20° (B) 70° (C) 110° (D) 200°
66. In the diagram below, line e and line f are parallel, and line r is a transversal.



[not drawn to scale]

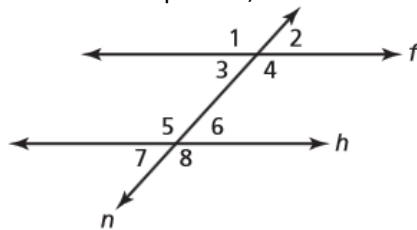
What is the sum of the measures of $\angle 1$ and $\angle 2$?

- (A) 100° (B) 160° (C) 180° (D) 200°
67. In the figure below, $\angle R$ and $\angle S$ are formed by two intersecting lines.



If $\angle R$ measures 55° , what is the measure of $\angle S$?

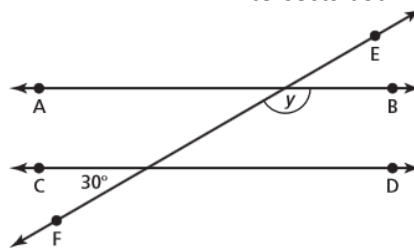
- (A) 35° (B) 55° (C) 110° (D) 125°
68. In the diagram below, line f and line h are parallel, and line n is a transversal.



Which term expresses the relationship between $\angle 1$ and $\angle 8$?

- (A) adjacent (B) congruent (C) supplementary (D) complementary

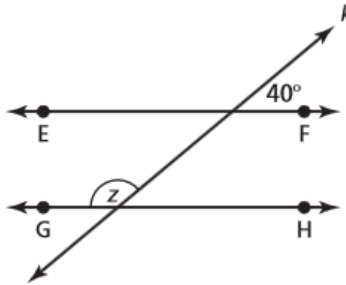
69. In the diagram below, $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$, and \overleftrightarrow{EF} intersects both lines.



[not drawn to scale]

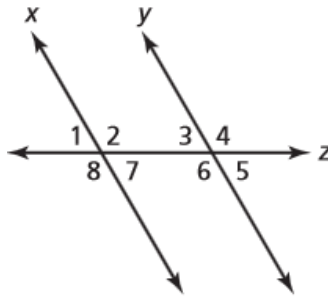
What is the measure of $\angle y$?

- (A) 30° (B) 60° (C) 120° (D) 150°
70. In the diagram below, $\overleftrightarrow{EF} \parallel \overleftrightarrow{GH}$, and line k intersects both lines.



What is the measure of $\angle z$?

- (A) 40° (B) 50° (C) 130° (D) 140°
71. In the diagram below, line x is parallel to line y , and line z is a transversal.

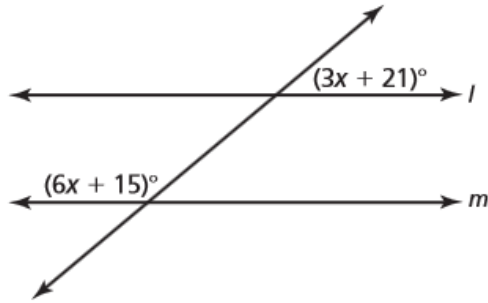


[not drawn to scale]

Which angles are alternate interior angles?

- (A) $\angle 1$ and $\angle 7$ (B) $\angle 3$ and $\angle 7$ (C) $\angle 2$ and $\angle 3$ (D) $\angle 4$ and $\angle 8$

72. In the diagram below, line l and line m are parallel.



[not drawn to scale]

Which equation could be used to solve for x ?

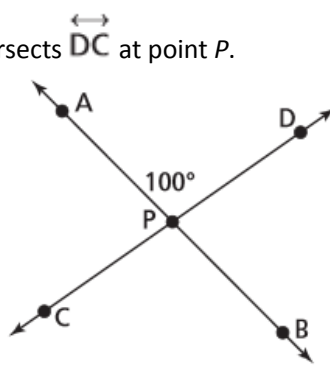
(A) $6x + 3x = 15 + 21$

(B) $6x + 15 = 3x + 21$

(C) $6x + 15 + 3x + 21 = 90$

(D) $6x + 15 + 3x + 21 = 180$

73. In the diagram below, \overleftrightarrow{AB} intersects \overleftrightarrow{DC} at point P .



[not drawn to scale]

What is the measure of $\angle CPB$ in the figure?

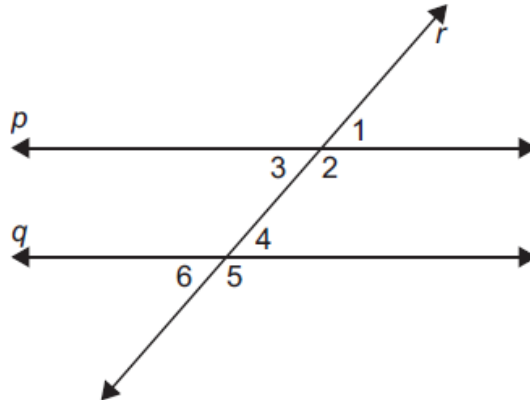
(A) 80°

(B) 90°

(C) 100°

(D) 105°

74. In the figure below, line p and line q are parallel and are cut by transversal line r .



Which pair of angles are supplementary?

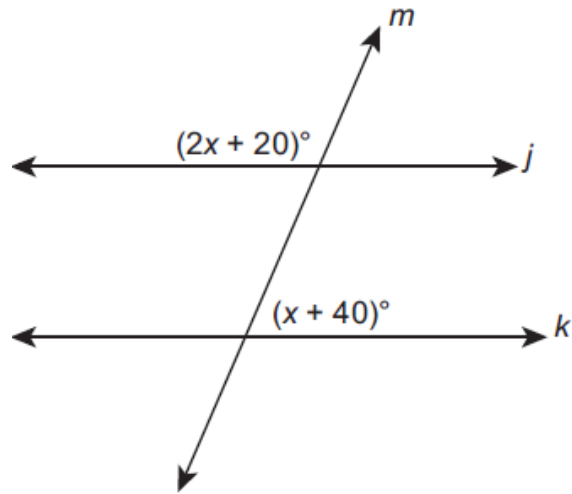
(A) 4 and 6

(B) 2 and 5

(C) 3 and 4

(D) 1 and 5

75. In the figure shown below, lines j and k are parallel.



Which equation can be used to find the value of x in the figure?

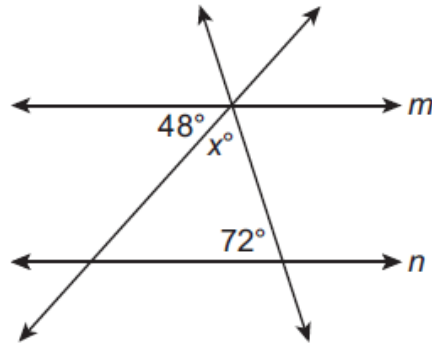
(A) $(x + 40) = (2x + 20)$

(B) $2(x + 40) = 2x + 20$

(C) $(x + 40) + (2x + 20) = 90$

(D) $(x + 40) + (2x + 20) = 180$

76. Two lines intersect parallel lines m and n as shown below.



What is the value of x ?

(A) 24

(B) 48

(C) 60

(D) 66

77. Angle A and angle B are complementary. In addition, angle A is supplementary to angle C. What are the measures of angle A and angle C if angle B measures 37° ?

Angle A _____ degrees

Angle C _____ degrees

78. A dinner plate has a diameter of 7 inches. Approximately how many inches is the circumference of the plate?

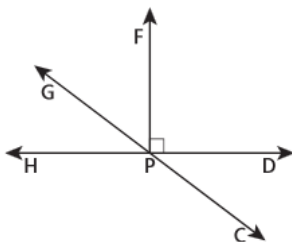
(A) 14 inches

(B) 22 inches

(C) 44 inches

(D) 154 inches

79. In the diagram below, $\overrightarrow{PF} \perp \overleftrightarrow{HD}$.



Which angles are complementary?

- (A) $\angle GPH$ and $\angle DPC$
- (C) $\angle GPD$ and $\angle DPC$

- (B) $\angle GPF$ and $\angle GPH$
- (D) $\angle GPF$ and $\angle FPC$

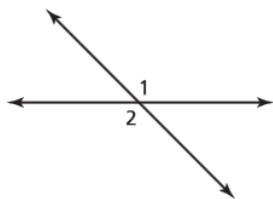
80. Two angles are complementary. One angle measures 60 degrees. What is the measure of the other angle?

- (A) 30 degrees
- (B) 60 degrees
- (C) 90 degrees
- (D) 120 degrees

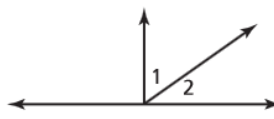
81. Two angles are complementary. The measure of one angle is 15° more than twice the other. What is the measure of the *smaller* angle?

- (A) 25°
- (B) 35°
- (C) 55°
- (D) 65°

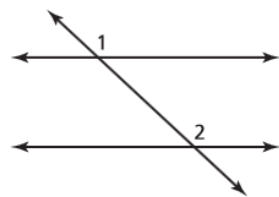
82. In which diagram are $\angle 1$ and $\angle 2$ supplementary?



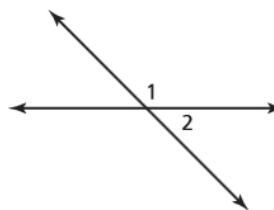
(A)



(B)

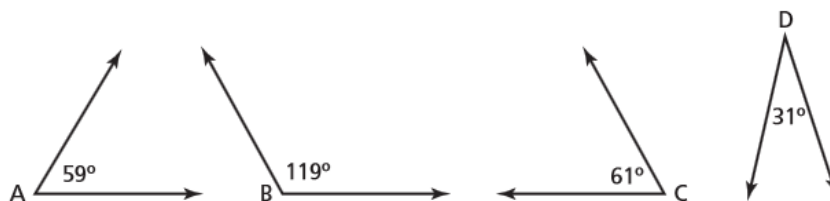


(C)



(D)

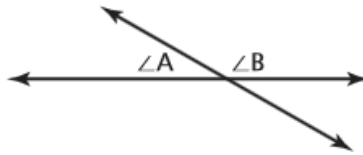
83. Bryce drew the four angles shown below.



Which pair of angles are complementary? _____

Which pair of angles are supplementary? _____

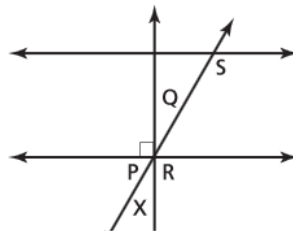
84. $\angle A = x + 2$ and $\angle B = 2x + 4$.



What is the measurement of $\angle A$?

- (A) 30 degrees (B) 60 degrees (C) 90 degrees (D) 120 degrees

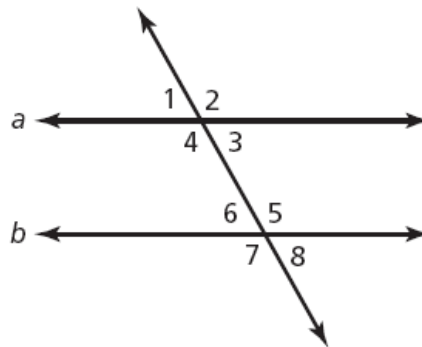
85. Michael drew the diagram below.



Which angle is complementary to $\angle X$?

- (A) $\angle P$ (B) $\angle Q$ (C) $\angle R$ (D) $\angle S$

86. In the diagram below, lines a and b are parallel.

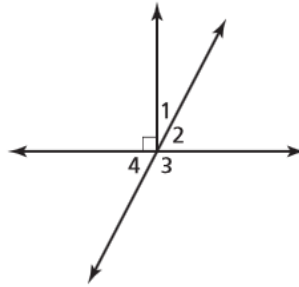


[not drawn to scale]

Which angle is supplementary to $\angle 2$?

- (A) $\angle 3$ (B) $\angle 4$ (C) $\angle 5$ (D) $\angle 7$

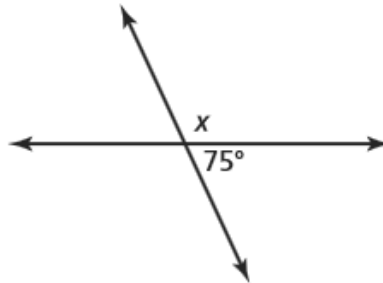
87. In the diagram below, which pair of angles is complementary?



[not drawn to scale]

- (A) $\angle 1$ and $\angle 2$ (B) $\angle 2$ and $\angle 3$ (C) $\angle 2$ and $\angle 4$ (D) $\angle 3$ and $\angle 4$

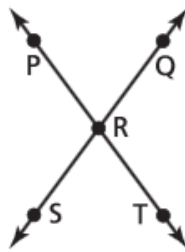
88. In the diagram below, what is the measure of $\angle x$?



[not drawn to scale]

- (A) 15° (B) 75° (C) 105° (D) 165°

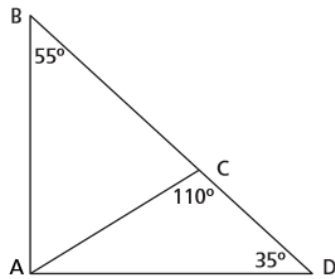
89. In the diagram below, $\angle PRQ$ measures 73° .



[not drawn to scale]

What is the measure of $\angle QRT$?

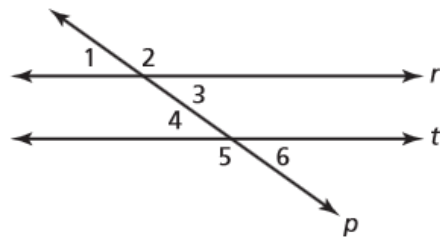
90. Which two angles in the triangles below are complementary?



[not drawn to scale]

- (A) $\angle BAC$ and $\angle CAD$ (B) $\angle CDA$ and $\angle CAD$ (C) $\angle ABC$ and $\angle BAC$ (D) $\angle BCA$ and $\angle ACD$

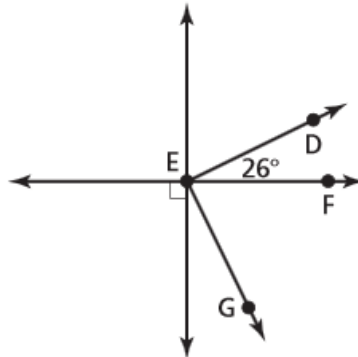
91. In the diagram below, line r and line t are parallel, and line p is a transversal.



Which angles are supplementary?

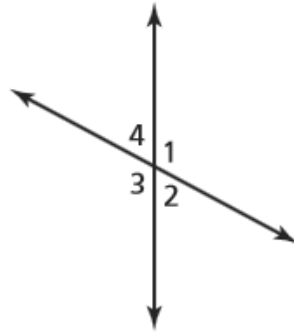
- (A) $\angle 1$ and $\angle 3$ (B) $\angle 1$ and $\angle 2$ (C) $\angle 3$ and $\angle 6$ (D) $\angle 3$ and $\angle 4$

92. In the diagram below, $\angle DEF$ and $\angle FEG$ are complementary. What is the measure of $\angle FEG$?



[not drawn to scale]

93. The measure of $\angle 1$ in the diagram below is 113° .

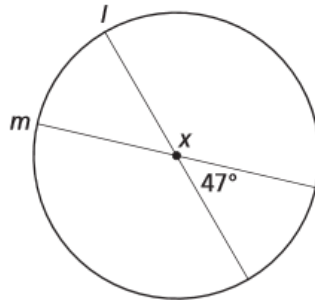


[not drawn to scale]

What is the measure of $\angle 4$?

- (A) 67° (B) 77° (C) 113° (D) 203°

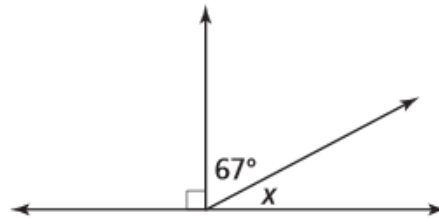
94. In the diagram below, line segment l and line segment m intersect at the center of the circle. What is the measure of $\angle x$?



[not drawn to scale]

- (A) 120° (B) 133° (C) 137° (D) 143°

95. What is the measure of $\angle x$ in the diagram shown below?

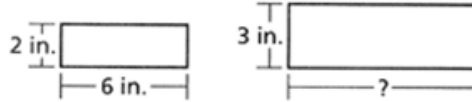


[not drawn to scale]

- (A) 23° (B) 33° (C) 113° (D) 157°

CC.2.3.7.A.2 Visualize and represent geometric figures and describe the relationships between them.

1. A drawing of the Greensburg Airport uses a scale of 1 centimeter = 300 meters. Runway A is drawn 12 centimeters long. How many meters is the actual length of the runway?
(A) 300 (B) 360 (C) 3,000 (D) 3,600
2. Melissa is creating a geometric design using similar rectangles. One of her rectangles is 2 inches wide and 6 inches long. She wants to have another rectangle that is 3 inches wide. To follow her design, how long must the second rectangle be?



- (A) 3 inches (B) 6 inches (C) 9 inches (D) 12 inches

3. Look at the drawing of the statue below.



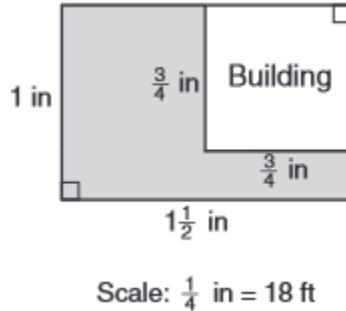
Andre knows that the signpost next to the statue is 6 feet tall. He wants to measure the height of the statue, but cannot reach the top to do so. This scale drawing of the statue is the only thing he has to help him.

On the lines below, describe a method Andre can use to measure the height of the statue.

Using the method you described above, find the height of the statue.

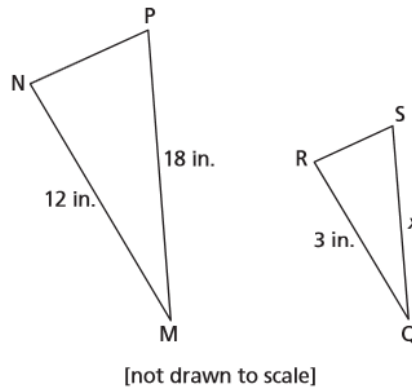
Height _____ feet

8. The accompanying diagram represents a scale drawing of the property where Brendan's business is located. He needs to purchase rock salt to melt the ice on the parking lot (shaded area) around his building. A bag of rock salt covers an area of 1,500 square feet. How many bags of rock salt does Brendan need to purchase to salt the entire parking lot?



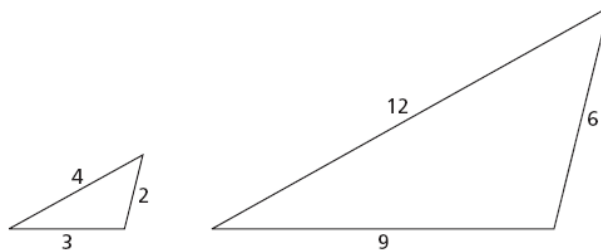
9. The scale on a map of Audrey's home state indicates that 1 centimeter is equivalent to 30 miles. On this map, the distance between Davenport and Vansburg is 12 centimeters. What is the actual distance between Davenport and Vansburg?
- (A) 90 miles (B) 180 miles (C) 360 miles (D) 720 miles

Triangle MNP is similar to triangle QRS.



What is the length of side x in triangle QRS?

- (A) 4 inches (B) 5 inches (C) 4.5 inches (D) 5.5 inches
10. The triangles below are similar.



Which fraction represents the ratio of the lengths of the sides of the small triangle to the lengths of the sides of the large triangle?

- (A) $\frac{1}{3}$ (B) $\frac{4}{9}$ (C) $\frac{1}{2}$ (D) $\frac{2}{3}$

11. The scale on a road map is shown below.

SCALE
1 cm = 75 mi

Sam measures the distance on the map between Rockland and Newbury as 5 centimeters. What is the actual distance, in miles, between Rockland and Newbury?

- (A) 15 (B) 80 (C) 375 (D) 575

12. The scale of a map is $\frac{1}{4}$ inch = 12 miles. The distance between two cities on the map is $3\frac{1}{4}$ inches. What is the actual distance, in miles, between the two cities?

- (A) 37 (B) 39 (C) 144 (D) 156

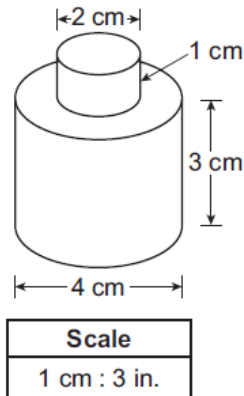
13. The distance between two cities on a map is 2 inches. The map was drawn using the scale shown below.

1 inch = 344 miles

What is the actual distance, in miles, between the two cities?

- (A) 86 (B) 344 (C) 688 (D) 1,032

14. A machine part consists of two cylinders aligned along the same vertical axis. A scale drawing of the part is represented below.



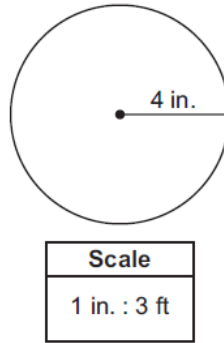
The part is cut in half through the vertical axis. What is the total area, in square inches, of the actual two-dimensional cross-section that is the result of the cut?

- (A) 42 sq in. (B) 72 sq in. (C) 126 sq in. (D) 216 sq in.

15. A new ramp from the sidewalk to the entrance of a building is being constructed. The ratio of the ramp's height to the ramp's length must not exceed 1:12. The height of the ramp will be 30 inches. Which inequality can be used to calculate the allowable length (r), in inches, of the ramp?

- (A) $\frac{1}{12} \leq \frac{r}{30}$ (B) $\frac{1}{12} \leq \frac{30}{r}$ (C) $\frac{1}{12} \geq \frac{r}{30}$ (D) $\frac{1}{12} \geq \frac{30}{r}$

16. A city is building a new pool. A scale drawing of the pool is shown below.



What is the area, in square feet, of the pool?

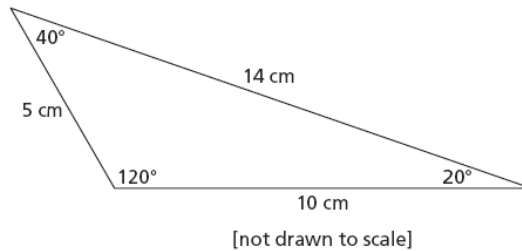
- (A) 16π (B) 24π (C) 48π (D) 144π

17. Nora measured the angles of a triangle. Two of the angles measured 20° each. What was the measure of the third angle of Nora's triangle?

- (A) 20° (B) 50° (C) 140° (D) 180°

18. The perimeter of an isosceles triangle is 71 centimeters. The measure of one of the sides is 22 centimeters. What are all the possible measures of the other two sides?

19. What type of triangle is shown below?



- (A) It is a scalene triangle because all the lengths of the sides are different.
(B) It is an isosceles triangle because the lengths of two sides are the same.
(C) It is an acute triangle because each of the three angles measures less than 90° .
(D) It is a right triangle because two of the sides are perpendicular.

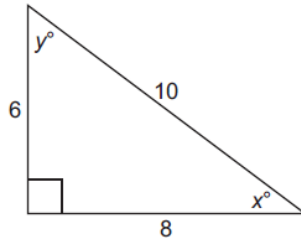
20. Phillip's mathematics teacher drew a triangle that had a 60° angle and a 20° angle. What is the measure of the third angle in the triangle?

- (A) 280° (B) 100° (C) 60° (D) 10°

21. Penn draws a triangle with one 90° angle. What could be the measures of the other two angles in Penn's triangle?

- (A) 30° and 60° (B) 90° and 90° (C) 60° and 120° (D) 90° and 180°

22. A right triangle is shown below.



Which inequality is true?

- (A) $0^\circ < x^\circ < 45^\circ$ (B) $45^\circ < x^\circ < 60^\circ$ (C) $60^\circ < x^\circ < 90^\circ$ (D) $90^\circ < x^\circ < 180^\circ$

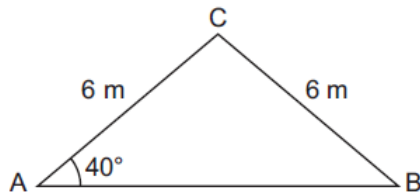
23. Triangle T and triangle U both have angles of 36° and 44° . Two of the side lengths of triangle T are 6 cm and 15 cm. Which lengths could be side lengths of triangle U?

- (A) 2 cm and 5 cm (B) 3 cm and 12 cm (C) 8 cm and 13 cm (D) 9 cm and 10 cm

24. Joan has a piece of fabric in the shape of a triangle. She measures two of the angles of the triangle, and each one is 60° . She creates two new triangles by cutting the fabric into two identical pieces with a single, straight cut through one of the vertices. Which word describes each of the two new triangles created by Joan's cut?

- (A) acute (B) equilateral (C) isosceles (D) scalene

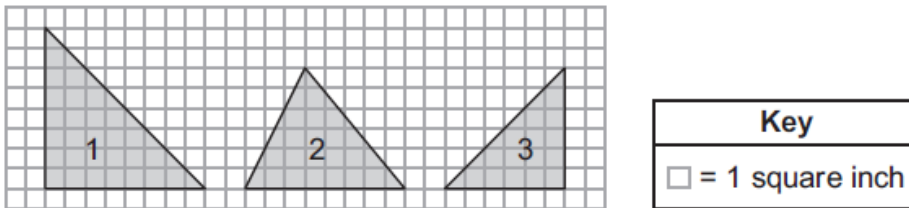
25. Triangle ABC is shown below.



What is the measure of angle C?

- (A) 40° (B) 90° (C) 100° (D) 140°

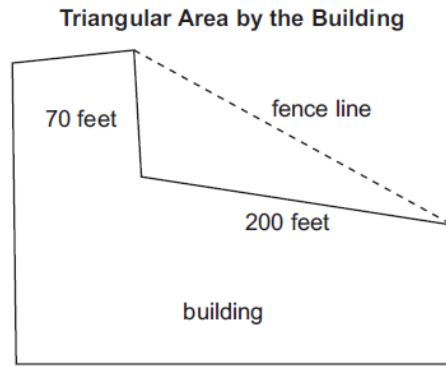
26. Mika will use copies of one of the triangles shown in the diagram below to cover a rectangular poster as completely as possible.



The poster is 12 inches wide and has an area of 480 square inches. The triangle Mika will use is isosceles. The copies are all full size and do not overlap on the poster. Which set of statements identify the triangle Mika should use to cover the poster as completely as possible and the area of the poster that will remain uncovered?

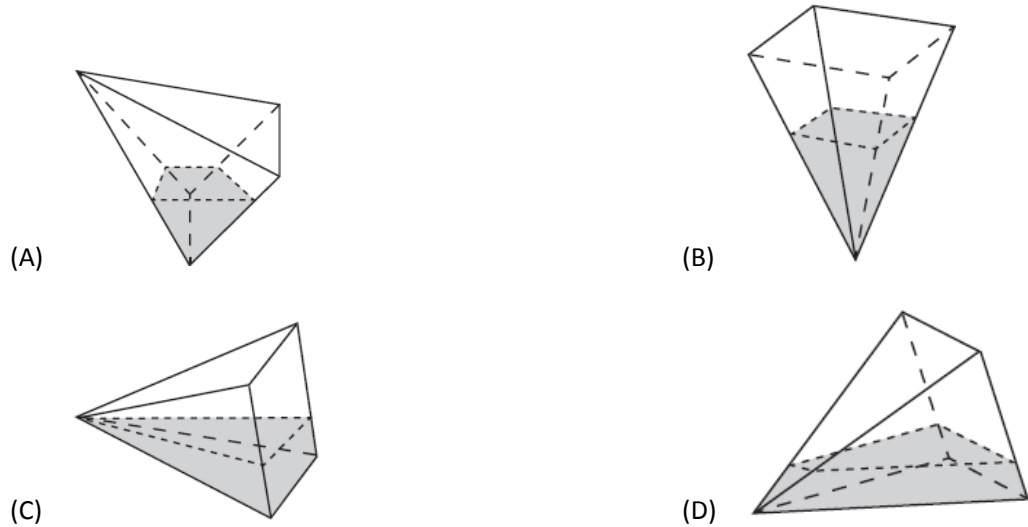
- (A) Mika should use triangle 1, and no portion of the poster will remain uncovered.
 (B) Mika should use triangle 2, and no portion of the poster will remain uncovered.
 (C) Mika should use triangle 3, and 48 square inches of the poster will remain uncovered.
 (D) Mika should use triangle 3, and 12 square inches of the poster will remain uncovered.

27. The mayor of a town proposes to fence off a triangular area of a building that includes two sides of the building as shown below.



Which distance, in feet, could be the length of the proposed fence line?

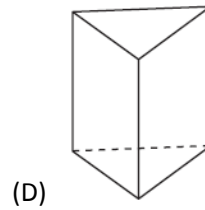
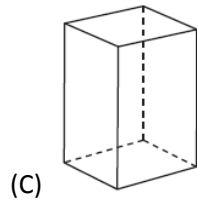
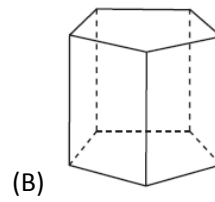
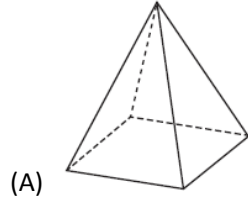
- (A) 100 (B) 130 (C) 220 (D) 280
28. A triangle has one side that is 5 inches long and another side that is 7 inches long. The last side of the triangle is a whole number of inches long. How many different lengths, in inches, are possible for the last side of the triangle?
- (A) 2 (B) 4 (C) 9 (D) 11
29. A square pyramid is partly filled with water. Which pyramid is positioned so that the water level inside the pyramid is in the shape of a triangle?



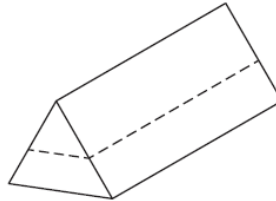
30. A cook has a cylindrical can of jellied cranberry sauce. When the cranberry sauce is removed from the can it maintains the same shape as the can. The cook makes a straight cut that passes through both circular faces of the cranberry sauce. Which shape could be created by the cross section made by the cook's cut through the cranberry sauce?

- (A) circle (B) oval (C) rectangle (D) triangle

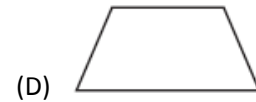
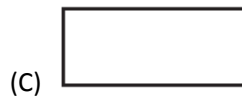
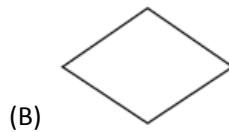
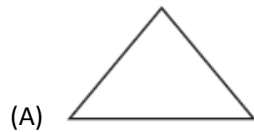
31. A three-dimensional solid is sliced by a plane perpendicular to a base of the solid. The result of the slice is an isosceles trapezoid. Which figure could be the three-dimensional solid?



32. Melinda's candy bar is in the shape of a triangular prism. She cuts her candy bar parallel to its bottom. The dotted line in the picture below represents Melinda's cut.



What is the shape of the cross section of Melinda's cut?



CC.2.4.7.B.1 Draw inferences about populations based on random sampling concepts.

1. There are 500 students in Andrew's school. Andrew wants to survey a sample of students to determine the most popular school subject. Which sampling method is the **best** to use to predict the most popular school subject?
 - (A) randomly select 50 students from the student list of 500
 - (B) randomly select 10 students having lunch in the cafeteria
 - (C) select the first 50 girls entering the auditorium for an assembly
 - (D) select the first 25 students leaving the building after school
2. A reporter for a teen magazine surveys teenagers leaving Hot Shots clothing store to determine which brand of clothing teens like best. Which statement best explains why the results of this survey may **not** be valid?
 - (A) The survey should have been conducted online.
 - (B) The group surveyed consisted only of teenagers.
 - (C) The survey was conducted by a reporter from only one magazine.
 - (D) The group surveyed consisted only of teenagers who shopped at the same store.
3. Brandon wants to conduct a survey as to whether mushrooms should be added to the pizzas sold in the school cafeteria. Which sampling method will offer Brandon the **best** results?
 - (A) interview every vegetarian student
 - (B) interview every student at a pizza parlor
 - (C) interview every student who brings lunch from home
 - (D) interview every student who eats lunch in the cafeteria
4. For a class assignment, Tyler will conduct a survey to find out what students like to do after school. He asks the first 10 people he sees in the gymnasium before school what they like to do after school. Which statement correctly explains whether Tyler's sample is a random sample?
 - (A) Tyler's sample is not random because he only asks 10 people.
 - (B) Tyler's sample is not random because he asks people in a gymnasium.
 - (C) Tyler's sample is random because he asks the first 10 people he sees.
 - (D) Tyler's sample is random because he asks each person the same question.
5. Eva surveys a large number of students at a movie theater about their favorite weekend activity. The table below shows the results of her survey.

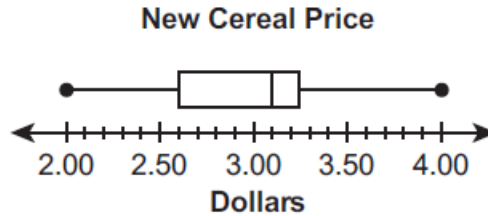
FAVORITE WEEKEND ACTIVITY

Activity	Number of Students
Reading books	16
Playing sports	24
Playing video games	30
Watching movies	130

Based on the results of her survey, Eva concludes that the favorite weekend activity of most students is watching movies. Which statement **best** describes Eva's conclusion?

- (A) Eva's conclusion is **not** valid because she surveyed only students.
- (B) Eva's conclusion is valid because she surveyed a large number of students.
- (C) Eva's conclusion is valid because she surveyed students from many schools.
- (D) Eva's conclusion is **not** valid because she surveyed students at a movie theater.

6. Andre wants to survey a random sample of the student body in his school to find out which day after school would work best for students to do volunteer work for a local charity. Which sample would best represent the student body?
- (A) asking twenty students waiting in line for lunch
 (B) asking twenty students on their way to the bus after school
 (C) asking one person from the seventh grade daily for twenty days
 (D) asking one person each from twenty different classrooms during the first class period
7. A grocery store manager selected 100 customers at random to ask each customer what the maximum price is that he or she would pay for a box of a new cereal. The box-and-whisker plot below summarizes the data.



The manager wants to set the price so 75% of the customers are willing to pay for the new cereal. Based on the information shown in the box-and-whisker plot, what is the maximum amount the manager should set as the price for the new cereal?

- (A) \$2.60 (B) \$3.00 (C) \$3.25 (D) \$3.50
8. Four candidates are running for school president. A random sample of students at the school are surveyed about which of the candidates they are likely to choose. The chart below shows the number of students from the random sample who chose each candidate.

School Election Survey

Deb	Janelle	Rasheed	Terry
10	20	12	8

A total of 800 students are expected to vote in the election for school president. Based on the information shown in the chart, which election outcome is **most likely**?

- (A) Rasheed will win with 192 votes.
 (B) Rasheed will win with 189 more votes than he had in the survey.
 (C) Janelle will win with 8 more votes than the second-place finisher, Rasheed.
 (D) Janelle will win with 128 more votes than the second-place finisher, Rasheed.
-

CC.2.4.7.B.2 Draw informal comparative inferences about two populations.

1. Isabella and Mateo each collect polished rocks. The weights, in ounces, of their rocks are listed below.

Isabella's rocks: 3.75 4 4.75 6 8.75 8.75 17.5

Mateo's rocks: 4 $5\frac{1}{2}$ $5\frac{3}{4}$ 6 8 8 $18\frac{3}{4}$

Which statistical measure could be used to support the claim that Mateo's rocks generally weigh more than Isabella's rocks?

- (A) mean (B) median (C) mode (D) range

2. The numbers of runs scored per game by this year's school baseball team and softball team are listed below.

baseball: 0 0 1 1 1 2 3 4 5 6 6 7

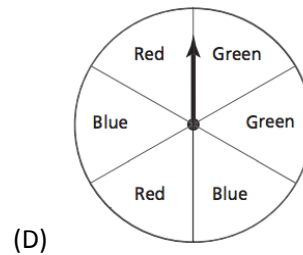
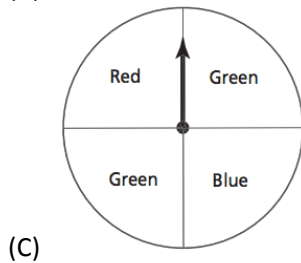
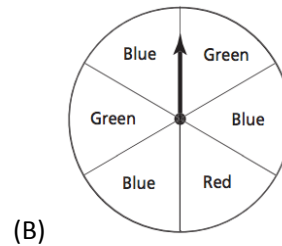
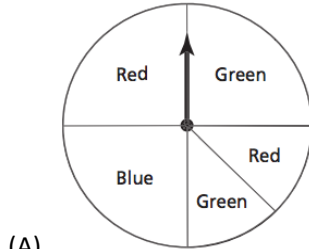
softball: 0 0 1 2 4 4 4 5 7

Which statement correctly uses a measure of center to compare the two teams?

- (A) The teams scored the same number of runs per game because the median is the same for both teams.
- (B) The teams scored the same number of runs per game because the mean runs scored for each team is the same.
- (C) The baseball team scored more runs per game than the softball team scored because the baseball team played more games than the softball team played.
- (D) The softball team scored more runs per game than the baseball team scored because the mode for the softball team is greater than the mode for the baseball team.
-

CC.2.4.7.B.3 Investigate chance processes and develop, use, and evaluate probability models.

- Devon, Tony, and Nate were playing a board game. Devon wins when the spinner lands on green. Nate wins when the spinner lands on blue. Tony wins when the spinner lands on red. Which spinner should be used to make the game fair?



- Which event has a probability of zero?
 - choosing a letter from the alphabet that has line symmetry
 - choosing a number that is greater than 6 and is even
 - choosing a pair of parallel lines that have unequal slopes
 - choosing a triangle that is both isosceles and right
- Each of the hats shown below has colored marbles placed inside. Hat A contains five green marbles and four red marbles. Hat B contains six blue marbles and five red marbles. Hat C contains five green marbles and five blue marbles.



Part A: If a student were to randomly pick one marble from each of these three hats, determine from which hat the student would most likely pick a green marble. Justify your answer.

Part B: Determine the fewest number of marbles, if any, and the color of these marbles that could be added to each hat so that the probability of picking a green marble will be one-half in each of the three hats.

4. Veronica has a box that contains 24 pictures of her family, 6 pictures of her dog, and 12 pictures of her friends. Veronica randomly chooses one picture from the box. Which statement **best** describes what will likely occur?
- (A) She will definitely pick a picture of her family.
 (B) She will most likely pick a picture of her family.
 (C) She is equally likely to pick a picture of her family or of her dog.
 (D) She is equally likely to pick a picture of her family, of her dog, or of her friends.
5. The faces of a cube are numbered from 1 to 6. If the cube is rolled once, which outcome is *least* likely to occur?
- (A) rolling an odd number (B) rolling an even number
 (C) rolling a number less than 6 (D) rolling a number greater than 4
9. A computer scientist writes a program to generate single-digit and double-digit numbers using the digits 1 and 2. The probabilities the scientist used in the program are shown in the table below.

Numbers Generated

Description	Probability
single-digit number containing only 1	$\frac{3}{10}$
single-digit number containing only 2	$\frac{3}{10}$
double-digit number containing only 1s	$\frac{1}{10}$
double-digit number containing only 2s	$\frac{1}{10}$
double-digit number containing a 1 and a 2	$\frac{1}{5}$

Which statement about the likelihood of a number being generated by the program is true?

- (A) The program is unlikely to generate a double-digit number.
 (B) The program is more likely to generate a single-digit number than a double-digit number.
 (C) The program is equally likely to generate a single-digit number as a double-digit number.
 (D) The program is more likely to generate a double-digit number containing only 1s or only 2s than a double-digit number containing a 1 and a 2.
10. A bag contains 40 jellybeans. The jellybeans are described below.
- There are exactly 10 blue jellybeans in the bag.
 - Of the jellybeans in the bag, $\frac{1}{5}$ are red.
 - Of the jellybeans in the bag, 20% are yellow.
 - The rest of the jellybeans in the bag are green.

A jellybean is selected at random from the bag. Which outcome is most likely?

- (A) A blue jellybean is selected. (B) A red jellybean is selected.
 (C) A yellow jellybean is selected. (D) A green jellybean is selected.

15. Dylan has a bag containing 15 marbles. The table below shows the number of marbles of each color in the bag. As part of a probability experiment for his science class, Dylan randomly picks a marble from the bag and then replaces it. He repeats this 300 times.

DYLAN'S BAG OF MARBLES

Marble Color	Number of Marbles
White	3
Red	8
Blue	3
Black	1

Part A: Dylan randomly picks a marble from the bag. What is the probability the marble will be red?

Part B: Predict the number of times out of 300 Dylan will pick a red marble.

16. Kasim's Video Store has received a shipment of DVDs. The table below shows the number of each type of DVD in the shipment.

DVD SHIPMENT

Type	Number of DVDs
Action	12
Science Fiction	3
Comedy	6
Western	9

Kasim selects a DVD at random from the shipment. What is the probability that he chooses a western?

(A) $\frac{1}{4}$

(B) $\frac{1}{9}$

(C) $\frac{9}{21}$

(D) $\frac{9}{30}$

17. The table below shows the bowling scores of 125 students.

BOWLING SCORES

Scores	Number of Students
Under 100	28
100–125	52
126–150	30
151 and up	15

What is the experimental probability that the next student who bowls will have a score that is 126 or more?

(A) $\frac{15}{125}$

(B) $\frac{30}{125}$

(C) $\frac{45}{125}$

(D) $\frac{80}{125}$

18. Jessie performs an experiment by spinning the arrow on a spinner. The spinner has four equal sections. The results of his experiment are shown in the table below.

**JESSIE'S SPINNER
EXPERIMENT**

Outcome	Frequency
Blue	11
Green	11
Orange	12
Red	8

Based on the data in the table, what is the **experimental** probability that the arrow will land on red?

- (A) $\frac{1}{8}$ (B) $\frac{8}{42}$ (C) $\frac{8}{34}$ (D) $\frac{1}{4}$
19. Based on Rudy's baseball statistics, the probability that he will pitch a curveball is $\frac{1}{4}$. If Rudy throws 20 pitches, how many pitches **most likely** will be curveballs?
 (A) 1 (B) 2 (C) 5 (D) 10
20. Robin has a bag with 12 erasers in it. There are 6 green erasers, 3 yellow erasers, 2 blue erasers, and 1 pink eraser. She randomly selects an eraser, records the color, and puts the eraser back into the bag. She does this 120 times. About how many times should Robin expect to select a blue eraser?
 (A) 2 (B) 20 (C) 24 (D) 30
21. The number of paper clips of each color in a box is shown in the table below.

Paper Clips in a Box

Color	Number of Paper Clips
red	50
blue	75
green	100

Margo randomly selects 1 paper clip from the box, records its color, and returns it to the box. She does this 10 times. Which table shows experimental results from Margo's selections that are closest to the expected results when based on the probabilities of selecting a paper clip of each color from the box?

Margo's Selections

Color	Number of Times Selected
red	3
blue	3
green	4

(A)

Margo's Selections

Color	Number of Times Selected
red	1
blue	4
green	5

(B)

Margo's Selections

Color	Number of Times Selected
red	0
blue	2
green	8

(C)

Margo's Selections

Color	Number of Times Selected
red	1
blue	5
green	4

(D)

22. In a deck of 16 colored cards, 4 are red, 4 are blue, 4 are green, and 4 are yellow. Each set of colored cards also has a number on it from 1 to 4. What is the probability that one card selected at random from the deck is a blue card with an odd number on it?

(A) $\frac{1}{8}$ (B) $\frac{1}{6}$ (C) $\frac{1}{4}$ (D) $\frac{1}{2}$

23. Zack is playing a board game. On his next turn he can move his piece to any of the 8 shaded squares on the board shown below.

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36

What are the chances that he will move his piece to an odd-numbered square?

(A) 2 out of 8 (B) 3 out of 8 (C) 4 out of 8 (D) 6 out of 8

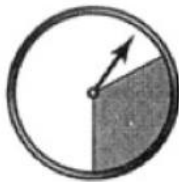
24. A block has 2 red sides, 2 green sides, 1 blue side, and 1 yellow side. What is the probability that when the block is rolled it will land green side up?

(A) $\frac{1}{5}$ (B) $\frac{1}{6}$ (C) $\frac{2}{5}$ (D) $\frac{2}{6}$

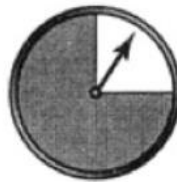
25. Four students are playing a game using the spinners below



Joy's Spinner



Colin's Spinner



Desmond's Spinner



Yvonne's Spinner

Which spinner has a 1 out of 4 probability of landing on white?

(A) Joy's spinner (B) Colin's spinner (C) Desmond's spinner (D) Yvonne's spinner

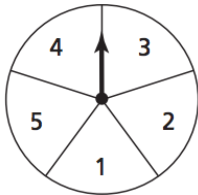
26. Marilyn has a bag of coins. The bag contains 25 wheat pennies, 15 Canadian pennies, 5 steel pennies, and 5 Lincoln pennies. She picks a coin at random from the bag. What is the probability that she picked a wheat penny?

(A) 10% (B) 25% (C) 30% (D) 50%

27. Mr. Bell's class is playing a math game. Mr. Bell randomly names an integer from the set of integers -15 to 15.

Part A: What is the probability that Mr. Bell names a positive integer?

28. Colin put some buttons on a table. There were 4 blue buttons, 5 red buttons, 7 tan buttons, and 8 white buttons. Colin's cat jumped up and knocked 1 button onto the floor. What is the probability that the button on the floor was blue?
29. In a group of 40 people, 32 are over 5 feet 7 inches in height, and the others are under 5 feet 7 inches. If one person is selected at random from this group, what is the probability the person's height will be under 5 feet 7 inches?
 (A) 0.80 (B) 0.56 (C) 0.44 (D) 0.20
30. Mary chooses an integer at random from 1 to 6. What is the probability that the integer she chooses is a prime number?
 (A) $\frac{5}{6}$ (B) $\frac{3}{6}$ (C) $\frac{2}{6}$ (D) $\frac{4}{6}$
31. A spinner is divided into 6 equal sections numbered from 1 to 6. If the arrow is spun once, what is the probability that it will land on a section numbered 4 or 5 ?
 (A) $\frac{1}{6}$ (B) $\frac{2}{6}$ (C) $\frac{4}{6}$ (D) $\frac{5}{6}$
32. Ms. Brown will randomly choose a student in Justin's class to erase the board. There are 26 students in the class. What is the probability that Ms. Brown will choose Justin to erase the board?
 (A) 1 out of 25 (B) 1 out of 26 (C) 13 out of 26 (D) 25 out of 26
33. Rosa is playing a game with the spinner shown below. The parts of the spinner are equal in area. She needs the spinner arrow to land on an even number to win.



What is the probability the arrow will land on an even number?

- (A) $\frac{1}{5}$ (B) $\frac{2}{5}$ (C) $\frac{3}{5}$ (D) $\frac{4}{5}$
34. Ray's teacher assigns classroom jobs by having students pick job tickets out of a box. There are 31 tickets for Line Leader, 10 tickets for Paper Passer and 19 tickets for Book Collector. If Ray randomly selects a ticket from the box, what is the probability that he will pull out a ticket for Line Leader?
 (A) $\frac{1}{31}$ (B) $\frac{29}{31}$ (C) $\frac{1}{60}$ (D) $\frac{31}{60}$
35. A box contains 6 dimes, 8 nickels, 12 pennies, and 3 quarters. What is the probability that a coin drawn at random is *not* a dime?
 (A) $\frac{6}{29}$ (B) $\frac{8}{29}$ (C) $\frac{12}{29}$ (D) $\frac{23}{29}$

36. As captain of his football team, Jamal gets to call heads or tails for the toss of a fair coin at the beginning of each game. At the last three games, the coin has landed with heads up. What is the probability that the coin will land with heads up at the next game?
37. A six-sided number cube has faces with the numbers 1 through 6 marked on it. What is the probability that a number less than 3 will occur on one toss of the number cube?
- (A) $\frac{1}{6}$ (B) $\frac{2}{6}$ (C) $\frac{3}{6}$ (D) $\frac{4}{6}$
38. When a fair coin was tossed ten times, it landed heads up the first seven times. What is the probability that on the eighth toss the coin will land with tails up?
- (A) $\frac{3}{10}$ (B) $\frac{1}{2}$ (C) $\frac{7}{10}$ (D) $\frac{3}{7}$
39. Seth tossed a fair coin five times and got five heads. The probability that the next toss will be a tail is
- (A) 0 (B) $\frac{1}{6}$ (C) $\frac{5}{6}$ (D) $\frac{1}{2}$
40. A set of five quadrilaterals consists of a square, a rhombus, a rectangle, an isosceles trapezoid, and a parallelogram. Lu selects one of these figures at random. What is the probability that both pairs of the figure's opposite sides are parallel?
- (A) 1 (B) $\frac{4}{5}$ (C) $\frac{3}{4}$ (D) $\frac{2}{5}$
41. A box contains 4 chocolate chip muffins, 2 blueberry muffins, and 1 corn muffin. A muffin is randomly chosen from the box. What is the probability that a blueberry muffin or a corn muffin is chosen?
- (A) $\frac{1}{3}$ (B) $\frac{1}{4}$ (C) $\frac{3}{7}$ (D) $\frac{4}{7}$
42. The dogs in an animal parade are grouped by size. There are 12 small dogs, 8 medium-sized dogs, and 13 large dogs. If one dog is randomly chosen to lead the parade, what is the probability that a large dog will be chosen?
- (A) $\frac{1}{3}$ (B) $\frac{1}{33}$ (C) $\frac{13}{20}$ (D) $\frac{13}{33}$
43. Cruz has collected some marbles. The colors of the marbles are listed below.
- 8 red marbles
 - 2 blue marbles
 - 7 yellow marbles
 - 3 green marbles
- Cruz mixes all the marbles in a bag and then turns the bag upside-down so that only one marble falls out at a time. What is the probability that the **first** marble to fall out will be a blue marble?

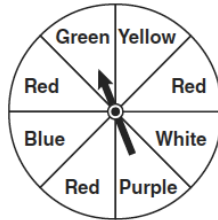
What is the probability that the **first** marble to fall out will be red, yellow, or green?

44. A bag contains eight green marbles, five white marbles, and two red marbles. What is the probability of drawing a red marble from the bag?

- (A) $\frac{1}{15}$ (B) $\frac{2}{15}$ (C) $\frac{2}{13}$ (D) $\frac{13}{15}$

45. Some books are laid on a desk. Two are English, three are mathematics, one is French, and four are social studies. Theresa selects an English book and Isabelle then selects a social studies book. Both girls take their selections to the library to read. If Truman then selects a book at random, what is the probability that he selects an English book?

46. The spinner below is divided into eight equal regions and is spun once. What is the probability of *not* getting red?

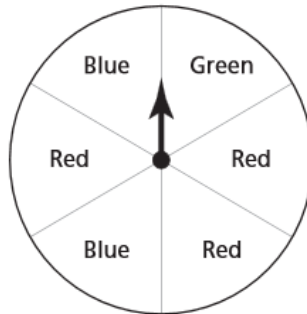


- (A) $\frac{3}{5}$ (B) $\frac{3}{8}$ (C) $\frac{5}{8}$ (D) $\frac{7}{8}$

47. Jon is buying tickets for himself for two concerts. For the jazz concert, 4 tickets are available in the front row, and 32 tickets are available in the other rows. For the orchestra concert, 3 tickets are available in the front row, and 23 tickets are available in the other rows. Jon is randomly assigned one ticket for each concert.

Determine the concert for which he is more likely to get a front-row ticket.

48. The spinner below is divided into 6 equal sections. Isabel spins the arrow on the spinner once.



What is the probability the arrow will land on green?

- (A) $\frac{5}{6}$ (B) $\frac{3}{6}$ (C) $\frac{2}{6}$ (D) $\frac{1}{6}$

49. Three high school juniors, Reese, Matthew, and Chris, are running for student council president. A survey is taken a week before the election asking 40 students which candidate they will vote for in the election. The results are shown in the table below.

Candidate's Name	Number of Students Supporting Candidate
Reese	15
Matthew	13
Chris	12

Based on the table, what is the probability that a student will vote for Reese?

- (A) $\frac{1}{3}$ (B) $\frac{3}{5}$ (C) $\frac{3}{8}$ (D) $\frac{5}{8}$

50. Mr. Ashton is a basketball coach. He will randomly pick 1 of the 10 basketball players on the team to accept an award for the team. Mr. Ashton puts the players into three groups based on the first letter of each player's last name. The distribution of the first letters is shown in the table below.

First Letter of First Names of Players

First Letter	Number of Players
A-I	6
J-R	3
S-Z	1

What is the probability Mr. Ashton will pick a player whose first name does **not** have a first letter of J-R to accept the award?

- (A) $\frac{3}{10}$ (B) $\frac{3}{7}$ (C) $\frac{2}{3}$ (D) $\frac{7}{10}$

51. Ernie has 4 yellow straws, 3 green straws, and 1 blue straw in a kitchen drawer. Each straw is the same size and shape. Ernie pulls out one straw from the drawer without looking. What is the probability of Ernie pulling out a green straw?

- (A) $\frac{1}{8}$ (B) $\frac{3}{8}$ (C) $\frac{5}{8}$ (D) $\frac{7}{8}$

52. The table below shows the numbers of game chips of different colors in a bag.

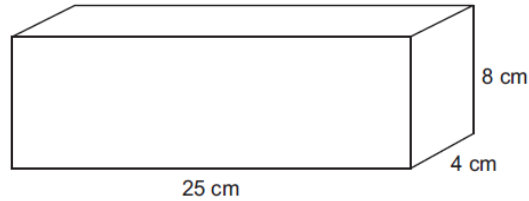
Chips in a Bag

Chip Color	Number of Chips
yellow	8
green	5
blue	4
red	3

Danielle randomly selects one chip from the bag. Which statement about the selection is true?

- (A) The probability of selecting a red chip is $\frac{1}{3}$.
 (B) Selecting a yellow, green, or blue chip is certain.
 (C) The probability of selecting a green chip is $\frac{1}{20}$.
 (D) Selecting a blue or red chip is less likely than selecting a yellow chip.

53. A carpenter will make a single, straight cut through the rectangular prism shown below by randomly choosing a face and cutting parallel to that face. The cut will be a whole number of centimeters from the chosen face.



What is the probability that the area, in square centimeters, of the cross section created by the cut will **not** be a multiple of 100?

- (A) 0 (B) $\frac{1}{3}$ (C) $\frac{2}{3}$ (D) 1

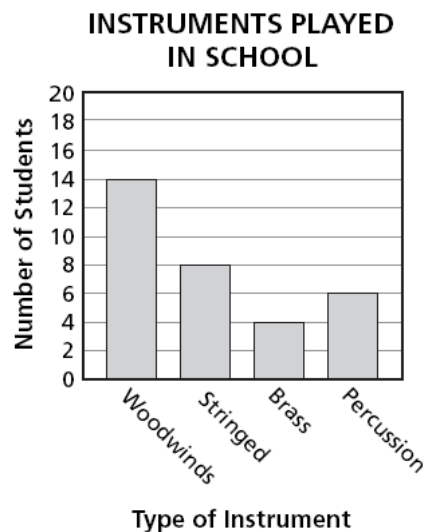
54. Carla uses a special 12-sided number polyhedron for some experiments. Some information about the polyhedron is listed below.

- There is a $\frac{1}{3}$ probability that Carla will roll a number that is a multiple of 3.
- There is a $\frac{5}{12}$ probability that Carla will roll a prime number.

Carla rolls her 12-sided number polyhedron two times. What is the probability that Carla rolls a multiple of 3 on her first roll, and a number that is **not** a prime number on her second roll?

- (A) $\frac{5}{36}$ (B) $\frac{7}{36}$ (C) $\frac{5}{18}$ (D) $\frac{7}{18}$

55. The graph below shows the type of instruments played by students in the school.



Janelle is chosen to perform a solo. What is the probability that she plays a stringed instrument?

- (A) $\frac{6}{24}$ (B) $\frac{8}{24}$ (C) $\frac{6}{32}$ (D) $\frac{8}{32}$

56. Charlene has 12 plastic cups. Of the 12 plastic cups, 3 are green, 4 are red, and 5 are blue. She stacks the cups into a single stack in random order. What is the probability that the cup on top of the stack is **not** green?

- (A) $\frac{1}{4}$ (B) $\frac{2}{5}$ (C) $\frac{2}{3}$ (D) $\frac{3}{4}$

57. Jacob stood in line to pick up a souvenir postcard at the museum. All the postcards were either blue, white, or green, with a picture of a fish, insect, or bird. There was an equal number of each type of postcard. What is the probability that Jacob was randomly handed a green postcard with a fish on it?

- (A) $\frac{1}{2}$ (B) $\frac{1}{3}$ (C) $\frac{1}{6}$ (D) $\frac{1}{9}$

58. Rachel has 5 silver bracelets and 2 gold bracelets in her jewelry box. Rachel randomly picks one bracelet. Which statement **best** describes which bracelet she will probably pick?

- (A) She probably will pick a gold bracelet.
(B) She definitely will pick a gold bracelet.
(C) She probably will pick a silver bracelet.
(D) She definitely will pick a silver bracelet.

59. Randy spins the arrow on a spinner with 5 equal sections labeled A, B, C, D, and E. Then, he rolls a 6-sided number cube with sides numbered 1 through 6. What is the probability that the arrow will stop on the letter A and the number cube will show the number 4?

- (A) $\frac{1}{30}$ (B) $\frac{1}{11}$ (C) $\frac{1}{6}$ (D) $\frac{1}{5}$

60. Jasmine and Charles play two rounds of a game with a six-sided number cube. They each roll the number cube, and the person with the highest number wins. Rolling the same number results in a tie. Jasmine rolls a 2 in the first round and a 5 in the second round. What is the probability Charles wins both rounds?

- (A) $\frac{1}{9}$ (B) $\frac{5}{18}$ (C) $\frac{1}{3}$ (D) $\frac{5}{6}$

61. Keisha has a bag containing blue, green, orange, and red marbles. The number of marbles of each color is shown in the table below.

Marble Colors

Color	Number of Marbles
blue	75
green	50
orange	100
red	25

Keisha randomly selects 1 marble from the bag, records its color, and returns the marble to the bag. She does this three times. What is the probability Keisha selects a red marble, then a green marble, and then a blue or orange marble?

- (A) $\frac{3}{500}$ (B) $\frac{7}{500}$ (C) $\frac{7}{108}$ (D) $\frac{4}{25}$