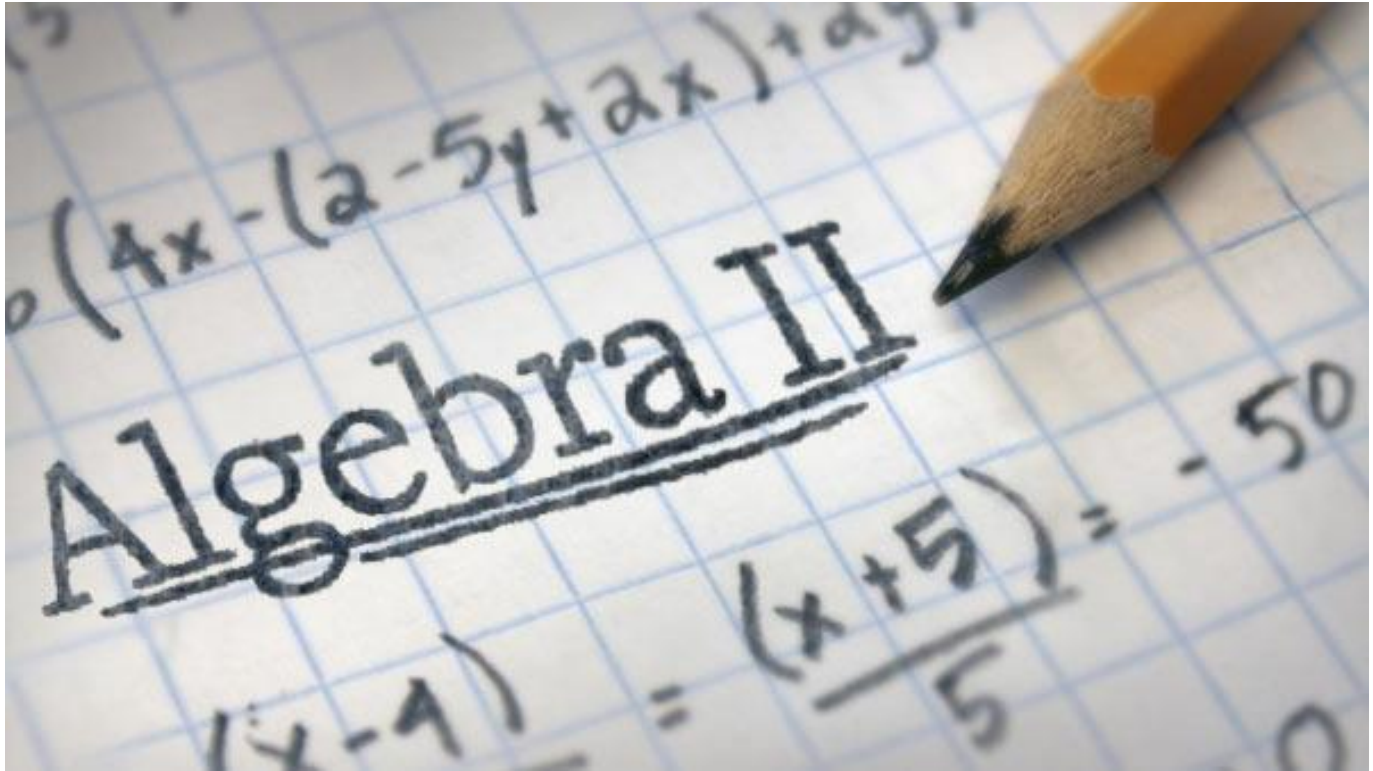


SUMMER PACKET PREPARING FOR ALGEBRA II



Moorestown High School Moorestown, New Jersey

This packet will be reviewed the first day of school. All work must be shown and final solutions should be circled.

You will be tested on the concepts covered in this packet during the 1st week of school. The test will be NO CALCULATORS!

Student's Name _____

HIGH SCHOOL Calculator Requirements

All High School Math courses require the use of a TI-84 Plus graphing calculator. This is the same calculator that was required for Geometry. If you need to purchase another one, many local stores carry this calculator, including [Staples](#), [Best Buy](#), and [Walmart](#). This calculator can also be purchased online (hyperlinks are included above for those stores). It costs approximately \$115.

You should NOT use a graphing calculator to complete this packet, unless the directions note that you can use one.

Preparing for Algebra II

The purpose of the packet is to help you review and reinforce concepts/topics that are necessary for Algebra II. This packet has been designed to provide a review of Algebra I skills that are essential for student success in Algebra II. Completion of this packet over the summer will be of great value to helping students successfully meet the academic challenges awaiting them in Algebra II.

Instructions:

Complete all sections of this packet. You will show this completed packet to your Algebra II teacher the first day of school. All work must be shown and final answers should be circled.

Students must show work that supports their understanding. Students will be tested on the concepts covered in this packet during the 1st week of school.

It may be necessary to seek assistance on some questions/concepts...that is fine!

Websites that may be of assistance:

www.mathforum.org/dr.math Use this web site if you have a math questions that you need answered.

www.allmath.com This website will provide you with links to games, reference, general math help and resources.

www.mathforum.com This online community includes teachers, students, researchers, parents and educators who have an interest in math and math education. The site includes Ask Dr. Math, Problems of the Week, discussion groups and much more.

www.AAAMath.com. Customized by grade level and topic, AAA Math features explanations of various mathematical topics, practice problems and fun, challenging games.

www.coolmath.com This fully interactive site and allows the user to sharpen basic math skills, play games and explore new math concepts.

www.figurethis.org Created by the National Council of Teachers of Mathematics, this site helps families enjoy mathematics outside school through a series of fun and engaging challenges.

The more math you explore the more prepared you will be in September!

Algebra I Topics

Equations

Variables and Expressions
Solving Equations by Adding or Subtracting
Solving Equations by Multiplying or Dividing
Solving Two-Step and Multi-Step Equations
Solving Equations with Variables on Both Sides
Solving for a Variable
Solving Absolute-Value Equations
Rates, Ratios, and proportions
Applications of Proportions
Precision and Accuracy

Inequalities

Graphing and Writing Inequalities
Solving Inequalities by Adding or Subtracting
Solving Inequalities by Multiplying or Dividing
Solving Two-Step and Multi-Step Inequalities
Solving Inequalities with Variables on Both Sides
Solving Compound Inequalities
Solving Absolute-Value Inequalities

Functions

Graphing Relationships
Relations and Functions
Writing Functions
Graphing Functions
Scatter Plots and Trend Lines
Arithmetic Sequences

Linear Functions

Identifying Linear Functions
Using Intercepts
Rate of Change and Slope
The Slope Formula
Direct Variation
Slope-Intercept Form
Point-Slope Form
Slopes of Parallel and Perpendicular Lines
Transforming Linear Functions

Systems of Equations and Inequalities

Solving Systems by Graphing
Solving Systems by Substitution
Solving Systems by Elimination
Solving Special Systems

Solving Linear Inequalities
Solving Systems of Linear Inequalities

Exponents and Polynomials

Integer Exponents
Rational Exponents
Polynomials
Special Products of Binomials
Multiplying Polynomials
Adding and Subtracting Polynomials

Factoring Polynomials

Factors and Greatest Common Factors
Factoring by GCF
Factoring $x^2 + bx + c$
Factoring $ax^2 + bx + c$
Factoring Special Products
Choosing a Factoring Method

Quadratic Functions and Equations

Solving Quadratic Equations by Factoring
Characteristics of Quadratic Functions
Graphing Quadratic Functions
Transforming Quadratic Functions
Solving Quadratic Equations by Graphing
Identifying Quadratic Functions
Solving Quad Equ by Using Square Roots
Nonlinear Systems
The Quad Formula and the Discriminant
Completing the Square

Exponential Functions

Geometric Sequences
Exponential Functions
Exponential Growth and Decay
Linear, Quadratic, and Exponential Models
Comparing Functions

Data Analysis and Probability

Organizing and Displaying Data
Frequency and Histograms
Data Distribution
Misleading Graphs and Statistics
Experimental Probability
Theoretical Probability
Independent and Dependent Events

Solve each equation.

1. $3d + 8 = 2d - 17$	2. $2n - 7 = 5n - 10$
3. $-v + 5 + 6v = 1 + 5v + 3$	4. $5(r - 1) = 2(r - 4) - 6$

Solve for the indicated variable.

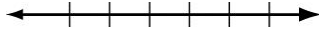
5. $4c = d$ for c	6. $2p + 5r = q$ for p
7. $-10 = xy + z$ for x	8. $\frac{h-4}{j} = k$ for j

Solve each equation.

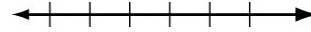
9. $ x = 12$	10. $ x - 1 = 2$
11. $3 x = 24$	12. $4 x - 5 = 12$
13. How many solutions does the equation $ x + 7 = 1$ have?	
14. How many solutions does the equation $ x + 7 = 0$ have?	
15. How many solutions does the equation $ x + 7 = -1$ have?	

Solve each inequality and graph the solutions.

16. $b + 8 > 15$



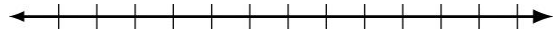
17. $-9 \geq m - 9$



18. $-7y < 21$



19. $2s \leq -3$



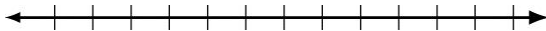
20. $-\frac{3}{8}c \geq 9$



21. $\frac{2k-3}{-5} > 7$



22. $-3a + 10 < -11$



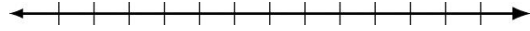
23. $6(n - 8) \geq -18$



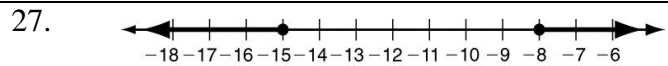
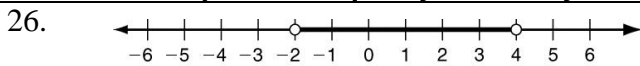
24. $2x + 30 \geq 7x$



25. $5s - 9 < 2(s - 6)$



Write the compound inequality shown by each graph.

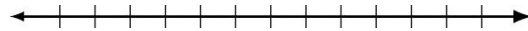


Solve each compound inequality and graph the solutions.

28. $12 \leq 4n < 28$



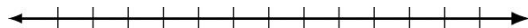
29. $x - 3 < -3$ OR $x - 3 \geq 3$



30. $-2 \leq 3b + 7 \leq 13$

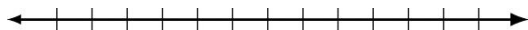


31. $5k \leq -20$ OR $2k \geq 8$

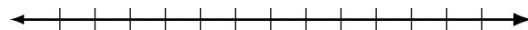


Solve each inequality and graph the solutions.

32. $|x| - 2 \leq 3$



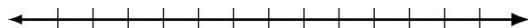
33. $|x + 3| - 1.5 < 2.5$



34. $|x| + 17 > 20$



35. $2|x - 2| \geq 3$



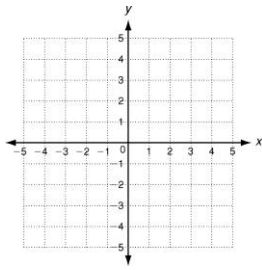
Evaluate each function for the given input values.

36. For $f(x) = 5x + 1$, find $f(x)$
when $x = 2$ and when $x = 3$.

37. For $h(x) = x - 3$, find $h(x)$
when $x = 3$ and when $x = 1$.

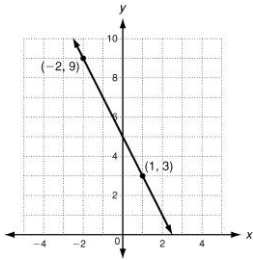
Use intercepts to graph the line described by each equation.

38. $3x + 2y = -6$

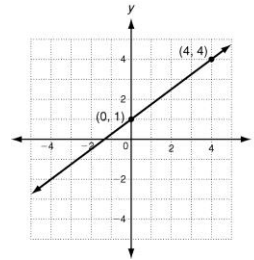


Find the slope of the line.

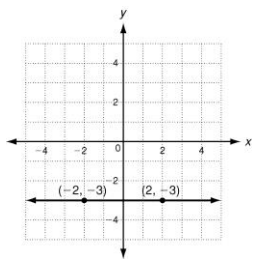
39.



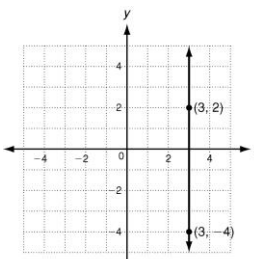
40.



41.



42.



Find the slope of the line that contains each pair of points.

43. $(2, 8)$ and $(1, -3)$

44. $(0, -2)$ and $(4, -7)$

Find the slope of the line described by each equation.

45. $3x + 4y = 24$

46. $8x + 48 = 3y$

Write the equation that describes each line in slope-intercept form.

47. slope = 4; y-intercept = -3

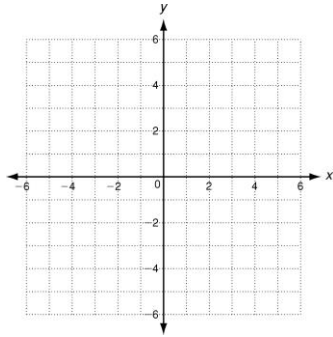
48. slope = $-\frac{1}{3}$; y-intercept = 6

49. slope = $\frac{2}{5}$, (10, 3) is on the line.

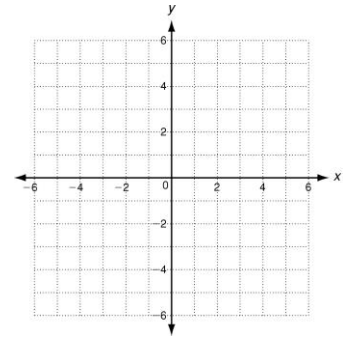
50. slope = $-\frac{1}{3}$, (-6, 0) is on the line.

Write each equation in slope-intercept form. Then graph the line described by the equation.

51. $y + x = 3$



52. $5x - 2y = 10$



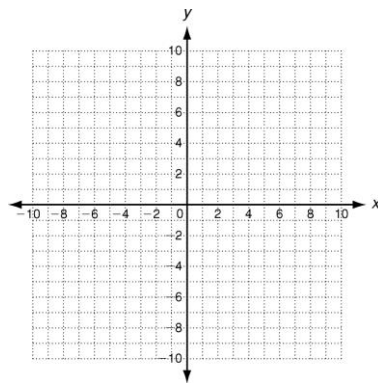
Write an equation in point-slope form for the line with the given slope that contains the given point.

53. slope = 3; (-4, 2)

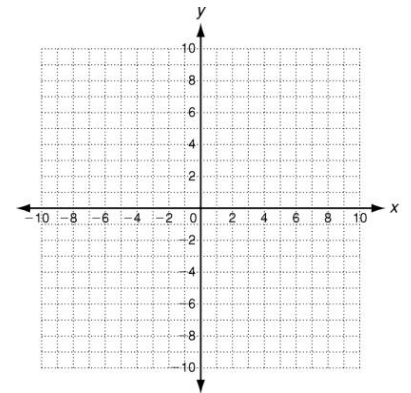
54. slope = -1; (6, -1)

Graph the line described by each equation.

55. $y + 2 = -\frac{2}{3}(x - 6)$



56. $y + 3 = -2(x - 4)$



Write the equation that describes the line in slope-intercept form.

57. slope = -4; (1, -3) is on the line

58. (2, 1) and (0, -7) are on the line

Find the intercepts of the line that contains each pair of points.

59. $(-1, -4)$ and $(6, 10)$

60. $(3, 4)$ and $(-6, 16)$

Identify which lines are parallel.

61. $y = 3x + 4$; $y = 4$; $y = 3x$; $y = 3$

Identify which lines are perpendicular.

62. $y = -2$; $y = -\frac{1}{2}x - 4$; $y - 4 = 2(x + 3)$; $y = -2x$

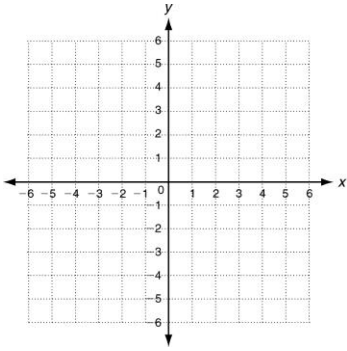
Tell whether the ordered pair is a solution of the given system.

63. $(3, 1)$; $\begin{cases} x + 3y = 6 \\ 4x - 5y = 7 \end{cases}$

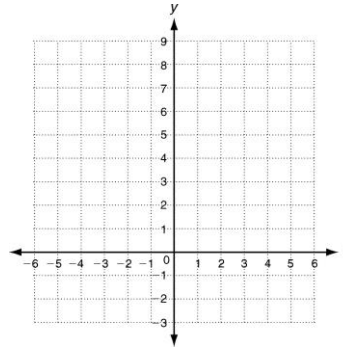
64. $(6, -2)$; $\begin{cases} 3x - 2y = 14 \\ 5x - y = 32 \end{cases}$

Solve each system by graphing.

65. $\begin{cases} y = x + 4 \\ y = -2x + 1 \end{cases}$ Solution: _____



66. $\begin{cases} y = x + 6 \\ y = -3x + 6 \end{cases}$ Solution: _____



Solve each system by substitution.

67. $\begin{cases} y = x - 2 \\ y = 4x + 1 \end{cases}$

68. $\begin{cases} y = x - 4 \\ y = -x + 2 \end{cases}$

69. $\begin{cases} 2x - y = 6 \\ x + y = -3 \end{cases}$

70. $\begin{cases} 2x + 3y = 0 \\ x + 2y = -1 \end{cases}$

71. $\begin{cases} -2x + y = 0 \\ 5x + 3y = -11 \end{cases}$

72. $\begin{cases} \frac{1}{2}x + \frac{1}{3}y = 5 \\ \frac{1}{4}x + y = 10 \end{cases}$

Solve each system by elimination.

73. $\begin{cases} 2x - 3y = 14 \\ 2x + y = -10 \end{cases}$	74. $\begin{cases} 3x + y = 17 \\ 4x + 2y = 20 \end{cases}$
75. $\begin{cases} x + 3y = -7 \\ -x + 2y = -8 \end{cases}$	76. $\begin{cases} x + 3y = -14 \\ 2x - 4y = 32 \end{cases}$
77. $\begin{cases} y - 3x = 11 \\ 2y - x = 2 \end{cases}$	78. $\begin{cases} -10x + y = 0 \\ 5x + 3y = -7 \end{cases}$

Solve each system of linear equations.

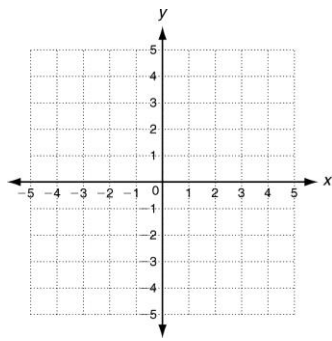
79. $\begin{cases} y = 2x - 3 \\ y - 2x = -3 \end{cases}$	80. $\begin{cases} y - x + 3 = 0 \\ x = y + 3 \end{cases}$
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Tell whether the ordered pair is a solution of the given inequality.

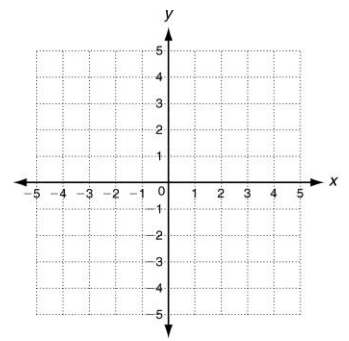
81. $(1, 6); y < x + 6$	82. $(5, -3); y \leq -x + 2$
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Graph the solutions of each linear inequality.

83. $y \leq x + 4$

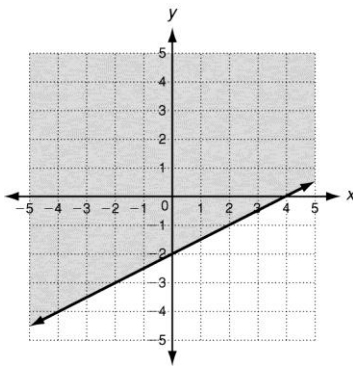


84. $2x + y > -2$

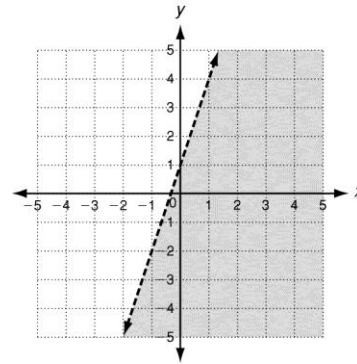


Write an inequality to represent each graph.

85.



86.



Tell whether the ordered pair is a solution of the given system.

87. $(2, -2); \begin{cases} y < x - 3 \\ y > -x + 1 \end{cases}$

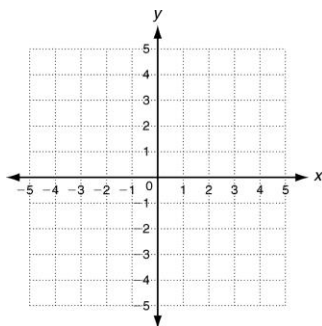
88. $(1, 3); \begin{cases} y \leq x + 2 \\ y > 4x - 1 \end{cases}$

Graph the system of linear inequalities.

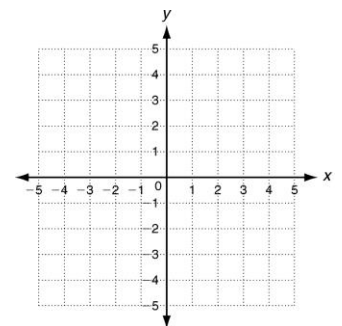
a. Give two ordered pairs that are solutions.

b. Give two ordered pairs that are not solutions.

89. $\begin{cases} y \leq x + 4 \\ y \geq -2x \end{cases}$



90. $\begin{cases} y \leq \frac{1}{2}x + 1 \\ x + y < 3 \end{cases}$



Simplify.

91. 3^0	92. 3^{-3}
93. -8^{-3}	94. $(4.2)^0$

Evaluate each expression for *the given value(s) of the variable(s)*.

95. $(2t)^{-4}$ for $t = 2$	96. $2x^0y^{-3}$ for $x = 7$ and $y = -4$
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Simplify.

97. $3k^{-4}$	98. $\frac{x^{10}}{d^{-3}}$
99. $\frac{f^{-4}}{g^{-6}}$	100. p^7q^{-1}

Simplify each expression.

101. $8^{\frac{1}{3}}$

102. $0^{\frac{1}{6}}$

103. $81^{\frac{1}{2}}$

104. $1^{\frac{1}{9}}$

105. $36^{\frac{1}{2}} + 1^{\frac{1}{3}}$

106. $81^{\frac{1}{4}} + 8^{\frac{1}{3}}$

107. $81^{\frac{3}{4}}$

108. $125^{\frac{2}{3}}$

109. $36^{\frac{3}{2}}$

110. $1^{\frac{3}{4}}$

Simplify. All variables represent nonnegative numbers.

111. $\sqrt{x^4 y^2}$

112. $\sqrt{x^6 y^6}$

113. $\left(a^{\frac{1}{2}}\right)^2 \sqrt{a^2}$	114. $\frac{\left(z^{\frac{1}{3}}\right)^3}{\sqrt{z^2}}$
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Add or subtract.

115. $13x^2 + 9y^2 - 6x^2$	116. $-8m + 5 - 16 + 11m$
117. $(9x^4 + x^3) + (2x^4 + 6x^3 - 8x^4 + x^3)$	118. $(3.7q^2 - 8q + 3.7) + (4.3q^2 - 2.9q + 1.6)$
119. $(2r + 5) - (5r - 6)$	120. $(-7k^2 + 3) - (2k^2 + 5k - 1)$

Multiply.

121. $(-5mn^3)(4m^2n^2)$	122. $(2pq^3)(5p^2q^2)(-3q^4)$
123. $-3x(x^2 - 4x + 6)$	124. $(y - 3)(y - 5)$

125. $(m^2 - 2mn)(3mn + n^2)$	126. $(3x + 4)(x^2 - 5x + 2)$
127. $(-4x + 6)(2x^3 - x^2 + 1)$	128. $(a + b)(a - b)(b - a)$
129. $(2 + x)^2$	130. $(2x + 6)^2$
131. $(2a + 7b)^2$	132. $(x - 2)^2$

Find the GCF of each pair of monomials.

133. $6x^2$ and $5x^2$	134. $13q^4$ and $2p^2$
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Factor each polynomial. (GCF)

135. $10g^3 - 3g$	136. $-4x^2 - 6x$
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137. $3x^2 - 9x + 3$

138. $14n^3 + 7n + 7n^2$

Factor each expression.

139. $5(m-2) - m(m-2)$

140. $4(x-3) - x(y+2)$

Factor each polynomial by grouping.

141. $6x^3 + 4x^2 + 3x + 2$

142. $2m^3 + 4m^2 + 6m + 12$

143. $3r - r^2 + 2r - 6$

144. $6a^3 - 9a^2 - 12 + 8a$

Factor.

145. $x^2 + 13x + 36$

146. $x^2 + 10x + 16$

147. $x^2 - 11x + 24$	148. $x^2 - 7x + 6$
149. $x^2 + 3x - 88$	150. $x^2 + 6x - 27$
151. $x^2 - x - 2$	152. $x^2 - 4x - 45$
153. $2x^2 + 9x + 10$	154. $5x^2 + 7x - 6$
155. $7x^2 - 3x - 10$	156. $2y^2 - 11y + 14$
157. $-4n^2 - 16n + 9$	158. $-6x^2 + 13x - 2$

159. $x^2 - 4x + 4$	160. $9x^2 - 12x + 4$
161. $x^2 + 2x + 1$	162. $x^2 - 6x - 9$
163. $1 - 4x^2$	164. $81x^2 - 1$
165. $4x^4 - 9y^2$	166. $x^8 - 50$

Factor each polynomial completely. Check your answer.

167. $2(4x^3 - 3x^2 - 8x)$	168. $4(4p^4 - 1)$
169. $3x^5 - 12x^3$	170. $8pq^2 + 8pq + 2p$

171. $mn^5 - m^3n$

172. $6x^4 - 3x^3 - 9x^2$

173. $p^5 + 3p^3 + p^2 + 3$

174. $2z^2 + 11z + 6$

Tell whether each function is quadratic. Explain.

175. $y + 6x = -14$

176. $2x^2 + y = 3x - 1$

177.

x	-4	-3	-2	-1	0
y	39	18	3	-6	-9

178. $\{(-10,15),(-9,17),(-8,19),(-7,21),(-6,23)\}$

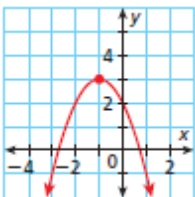
Tell whether the graph of each quadratic function opens upward or downward. Explain.

179. $y = -3x^2 + 4x$

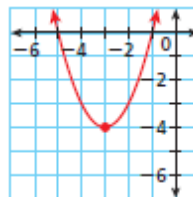
180. $y + 2 = x^2$

Identify the vertex of each parabola. Then give the minimum or maximum value of the function.

181.

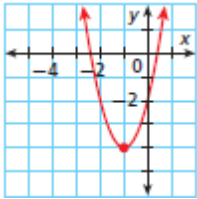


182.

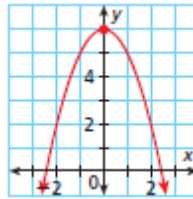


Find the domain and range.

183.

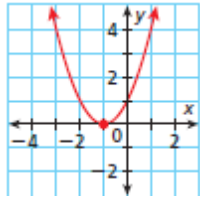


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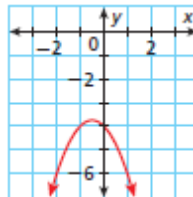


Find the zeros of each quadratic function from its graph. Check your answer.

185.

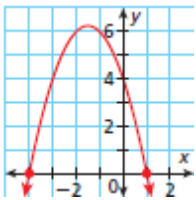


186.

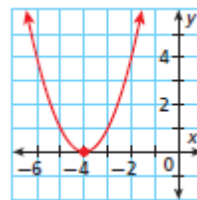


Find the axis of symmetry of each parabola.

187.



188.



For each quadratic function, find the axis of symmetry of its graph.

189. $y = 3x^2 - 18x + 1$

190. $y = 2x^2 + 3x - 4$

Find the vertex.

191. $y = -5x^2 + 10x + 3$

192. $y = \frac{1}{2}x^2 + 2x$

Order the functions from narrowest graph to widest.

193. $f(x) = \frac{3}{4}x^2$, $g(x) = -2x^2$, $h(x) = -8x^2$

194. $f(x) = 5x^2$, $g(x) = -5x^2$

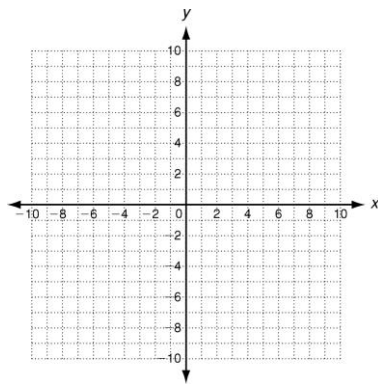
Compare the graph of each function with the graph of $f(x) = x^2$.

195. $g(x) = x^2 + 6$

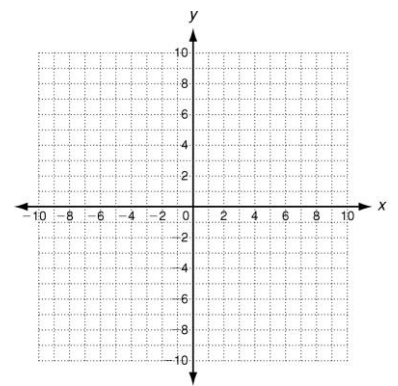
196. $g(x) = -\frac{1}{4}x^2 - 2$

Solve by graphing.

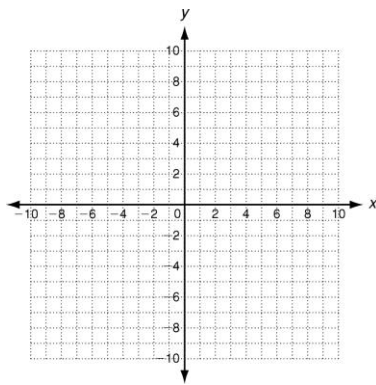
197. $y = x^2 - 2x - 3$



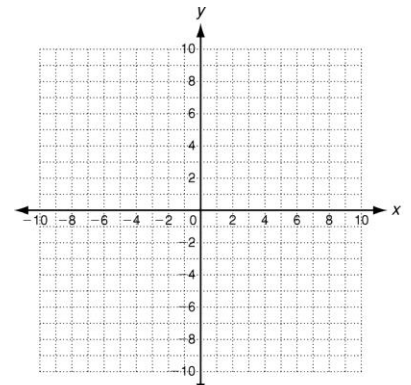
198. $y = 2x^2 + 2x - 4$



199. $8x = -4x^2 - 4$



200. $x^2 - 6x = 7$



Use the Zero Product Property to solve each equation. Check your answer.

201. $(x-6)(x-5) = 0$

202. $x(x+11) = 0$

Solve each quadratic equation by factoring. Check your answer.

203. $x^2 + 4x - 12 = 0$

204. $x^2 - 5x + 6 = 0$

205. $x^2 + 10x = -16$

206. $x^2 - 8x + 16 = 0$

207. $x^2 + 36 = 12x$

208. $2x^2 + 7x + 6 = 0$

Solve using square roots. Check your answer.

209. $x^2 = 49$

210. $x^2 = 400$

211. $16x^2 + 10 = 131$

212. $0 = 81x^2 - 25$

213. $3x^2 = 81$

214. $(x-9)^2 = 25$

Solve by completing the square.

215. $x^2 + 6x = -5$

216. $x^2 + x = 30$

217. $x^2 - 10x = -9$

218. $-x^2 - 5x = -5$

219. $-6x = 3x^2 + 9$

220. $-x^2 + 8x - 6 = 0$

Solve using the Quadratic Formula.

221. $x^2 - 5x + 4 = 0$

222. $x^2 - 6x - 7 = 0$

223. $x^2 - 7x + 2 = 0$

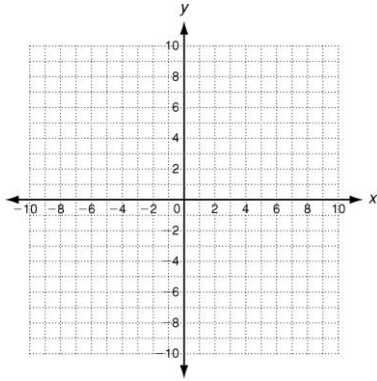
224. $x^2 - 4x - 7 = 0$

225. $3x^2 - 2x = 8$

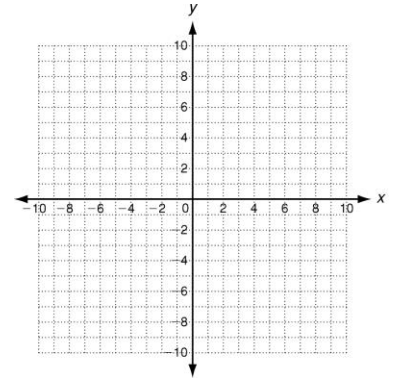
226. $2x^2 - 6 = 0$

Solve each system by graphing. Check your answers.

227.
$$\begin{cases} y = 2x^2 - 7x + 6 \\ y = x \end{cases}$$



228.
$$\begin{cases} y = x^2 - 2x - 5 \\ y = 2x - 8 \end{cases}$$



Solve each system by substitution. Check your answers.

229.
$$\begin{cases} y = x^2 - 4x + 3 \\ y = x - 3 \end{cases}$$

230.
$$\begin{cases} y = 2x^2 - 5x + 3 \\ y = -3x + 15 \end{cases}$$

Solve each system by elimination. Check your answers.

231.
$$\begin{cases} y = x^2 - 3 \\ 4x - y = 6 \end{cases}$$

232.
$$\begin{cases} y = x^2 + 7x + 12 \\ 3x - y = 5 \end{cases}$$

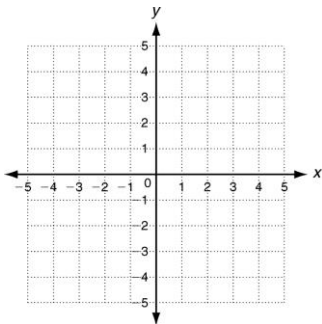
Tell whether each set of ordered pairs satisfies an exponential function. Explain your answer.

233. $\{(-1,-1),(0,0),(1,-1),(2,-4)\}$

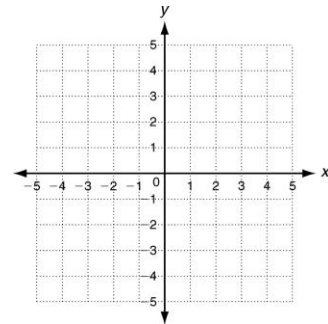
234. $\{(0,1),(1,4),(2,16),(3,64)\}$

Graph each exponential function.

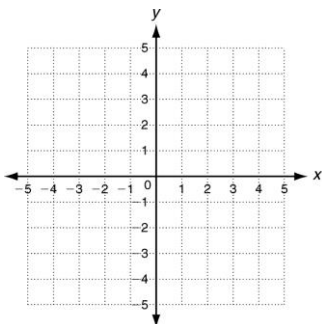
235. $y = 5^x$



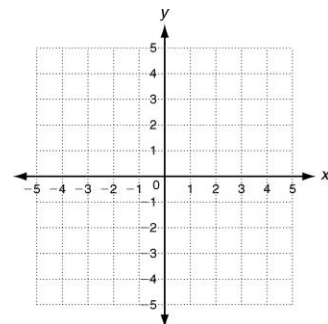
236. $y = 5(2)^x$



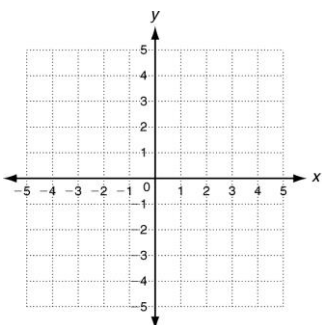
237. $y = -4(2)^x$



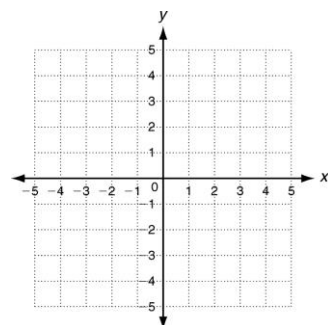
238. $y = 2(3)^x$



239. $y = \left(\frac{1}{3}\right)^x$



240. $y = -2(0.25)^x$



Write an exponential growth function to model the situation. Then find the value of the function after the given amount of time.

241. The cost of tuition at a college is \$12,000 and is increasing at a rate of 6% per year; 4 years.

Write a compound interest function to model the situation. Then find the balance after the given number of years.

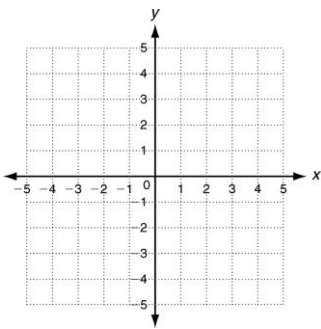
242. \$1500 invested at a rate of 3.5% compounded annually; 4 years.

Write an exponential decay function to model the situation. Then find the value of the function after the given amount of time.

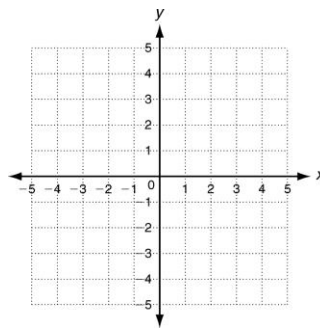
243. The value of a car is \$18,000 and is depreciating at a rate of 12% per year; 10 years.

Graph each data set. Which kind of model best describes the data?

244. $\{(-1, 4), (-2, 0.8), (0, 20), (1, 100), (-3, 0.16)\}$



245. $\{(2, -7), (-2, -9), (0, -8), (4, -6), (6, -5)\}$



FORMULAS

Exponential Function: $f(x) = ab^x$

Exponential Growth: $y = a(1+r)^t$

Exponential Decay: $y = a(1-r)^t$

Compound Interest: $A = P\left(1 + \frac{r}{n}\right)^{nt}$

Half-Life: $A = P(0.5)^t$

Quadratic Formula: $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$