Western Cape Government
Education

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Accountability
We take responsibility.

MATHEMATICS GRADE 8	WISKUNDE GRAAD 8

DATE:	DATUM: .....

1. TOPIC: GEOMETRY OF SRAIGHT LINES

2. CONCEPTS & SKILLS TO BE ACHIEVED:
By the end of the lesson learners should know and be able to

- recognise and describe pairs of angles formed by perpendicular lines and intersecting lines and parallel lines cut by a transversal
- Solve geometric problems using the relationship between pairs of angles

1. ONDERWERP: MEETKUNDE VAN REGUIT LYNE

2. BEGRIPPE & VAARDIGHEDE WAT BEMEESTER MOET WORD:

- Identifiseer en beskryf hoekpare wat gevorm word deur loodlyne; snylyne; ewewydige lyne wat deur 'n dwarslyn gekruis word.
- Los meetkundige probleme op deur die verwantskappe tussen hoekpare te gebruik.

3. RESOURCES: DBE Workbook 1, Sasol-Inzalo book 1, Textbooks	**3. HULPBRONNE:** DBE Werkboek 1, Sasol-Inzalo boek 1, Handboek
ONLINE RESOURCES/ AANLYN BRONNE	https://drive.google.com/open?id=1Qw6gZzmSxQ-ypsHmqx1LHnVbA2HsKX79 https://www.thelearningtrust.org/asp-treasure-box

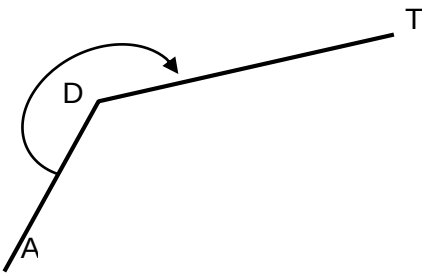
4. **INTRODUCTION:** **Allow learners to do the following activities** **Activity 1** Classify the following angles	**4.INLEIDING:** **Laat leerders toe om die volgende aktiwiteite te doen** **Akiwiteit 1** Klassifiseer die volgende hoeke

1.1

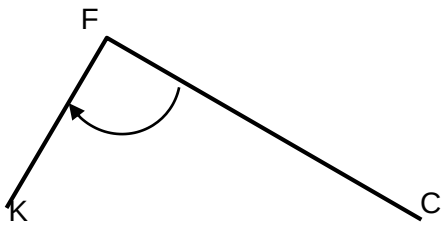
a) 115° b) 220° c) 180° d) 83°

1.2

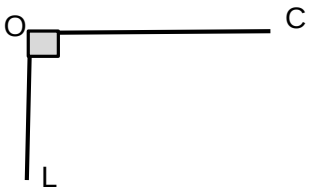
a)

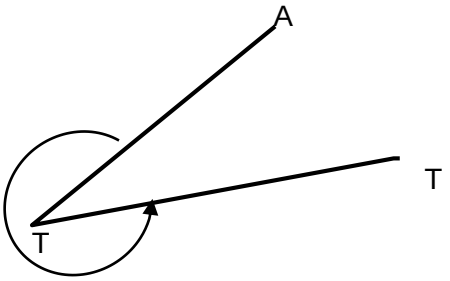


b)

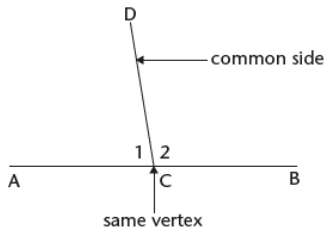
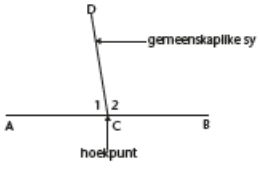


c)





5.CLASSWORK: Activity 1: Day 1:	5. Klaswerk: Aktiwiteit 1: Dag 1
ANGLES ON A STRAIGHT LINE: In the figures below, each angle is given a label from 1 to 5. **5.1** Use a protractor to measure the sizes of all the angles in each figure. Write down your answers.	**HOEKE OP 'N REGUIT LYN:** In die figure hier onder is die hoeke genommer van 1 tot 5. **5.1** Gebruik 'n gradeboog om die grootte van al die hoeke in elke figuur te meet. Skryf jou Antwoord neer.

5.2 Use your answers to determine the following sums: (a) ∠1 + ∠2 (b) ∠3 + ∠4 + ∠5	**5.2** Gebruik jou antwoorde om die hoekgroottes te bepaal. (a) ∠1 + ∠2 (b) ∠3 + ∠4 + ∠5
The sum of angles that are formed on a straight line is equal to 180°. (We can shorten this property as: ∠s on a straight line.) Two angles whose sizes add up to 180° are also called **supplementary** angles, for example ∠1 + ∠2. Angles that share a vertex and a common side are said to be **adjacent**. So ∠1 +∠ 2 are therefore also called **supplementary adjacent angles**  	Die som van die hoeke wat op 'n reguitlyn gevorm word is gelyk aan 180°. (afgekort: ∠*e* op reguit lyn). Twee hoeke wat optel na 180°, byvoorbeeld ∠1 + ∠2, word ook **supplementêre hoeke** genoem. Hoeke wat dieselfde hoekpunt en 'n gemeenskaplike sy het, is aangrensend. So word ∠1 + ∠2 dus ook **supplementêre aangresende hoeke** genoem. 

Learners respond

6. CONSOLIDATION / CONCLUSION & HOMEWORK

Emphasise the following:
Two angles whose sizes add up to 180° are also called **supplementary** angles

Recommended Homework:
Do the following:

6.1 Work out the sizes of the unknown angles below. Build an equation each time as you solve these geometric problems. Always give a reason for every statement you make.

6.KONSOLIDASIE / SLOT & HUISWERK

Beklemtoon die volgende:
Twee hoeke wat optel na 180°-word ook supplementêre hoeke genoem.

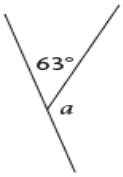
Aanbevele Huiswerk:
Doen die volgende:

6.1 Bereken die grootte van die onbekende hoeke hier onder.Stel in elke geval 'n gepaste vergelyking op om die meetkunde probleme op te los.
Verskaf altyd 'n rede vir elke stelling wat jy maak.

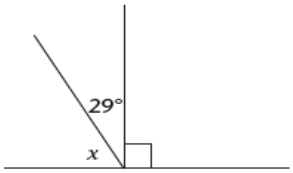
7.

Calculate the size of a, x and y	Bereken die hoekgroottes van a, x en y.

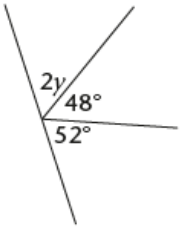
6.1.1

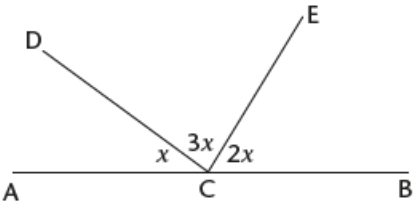
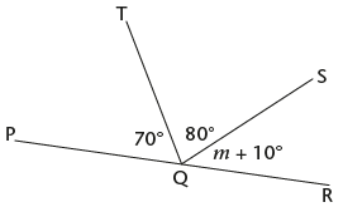


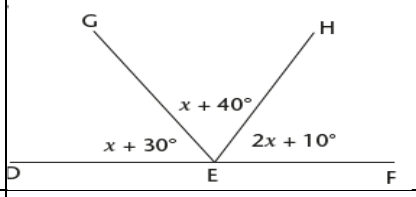
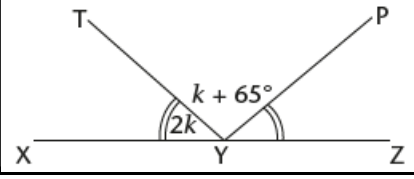
6.1.2



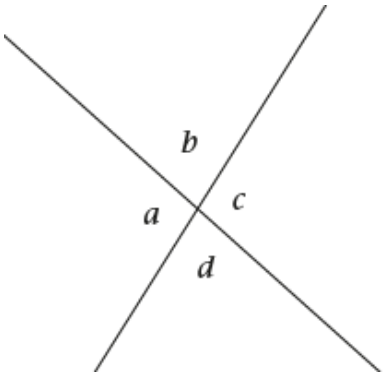
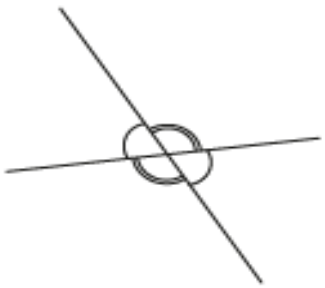
6.1.3

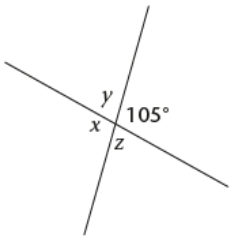
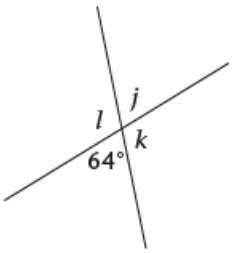


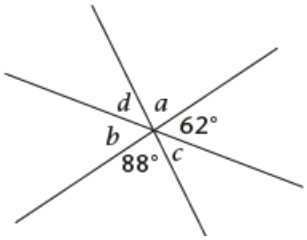
6.2 Calculate the size of: (a) x (b) ∠ ECB	**6.2** Bereken die hoekgrootte van: (a) x (b) ∠ ECB	
6.3 Calculate the size of: (a) m (b) ∠ SQR	**6.3** Bereken die hoekgrootte van: (a) m (b) ∠ SQR	

6.4 Calculate the size of: (a) x (b) ∠ HEF	**6.4** Bereken die hoekgrootte van: (a) x (b) ∠ HEF	
6.5 Calculate the size of: (a) k (b) ∠ TYP	**6.5** Bereken die hoekgrootte van: (a) k (b) ∠ TYP	

7.CLASSWORK: Approximately 45 mins **Activity 2: Day 2:**	**7. KLASWERK: Ongeveer 45 mins** **Aktiwiteit 2: Dag 2**

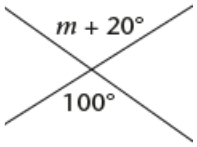
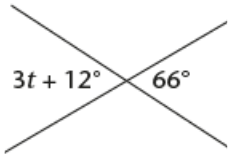
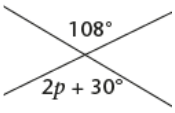
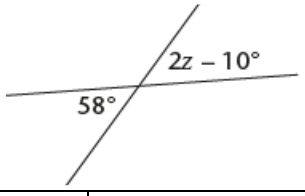
Vertically opposite angles: What are vertically opposite angles? **7.1**Use a protractor to measure the sizes of all the angles in the figure. Write down your answers. **7.2** Notice which angles are equal and how these equal angles are formed. **Vertically opposite angles** (**vert. opp. ∠s**) are the angles opposite each other when two lines intersect. Vertically opposite angles are **always equal**.	**Regoorstaande hoeke:** Wat is regoorstaande hoeke? **7.1**Gebruik 'n gradeboog om al die hoeke in die figuur te meet. Skryf jou antwoorde neer. **7.2** Let op watter hoeke ewe groot is, en hoe daardie gelyke hoeke gevorm is. **Regoorstande hoeke (regoorst. ∠e)** is die hoeke wat regoor mekaar is wanneer twee lyne sny. Regoorstaande hoeke is **altyd gelyk**.	 

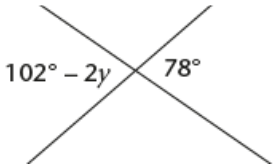
8.CONSOLIDATION / CONCLUSION & HOMEWORK	**8.KONSOLIDASIE / SLOT & HUISWERK**
Emphasise that: Vertically opposite angles (vert. opp. ∠s) are the angles opposite each other when two lines intersect. Vertically opposite angles are always equal **Recommended Homework:** **Do the following** 8.1 Calculate the sizes of the unknown angles in the following figures. Always give a reason for every statement you make. or every statement you make.	**Beklemtoon:** Regoorstande hoeke (regoorst. ∠e) is die hoeke wat regoor mekaar is wanneer twee lyne sny. Regoorstaande hoeke is altyd gelyk. **Aanbevele Huiswerk:** **Doen die volgende:** 8.1Bereken die onbekende hoeke in die volgende figure. Verskaf 'n rede vir elke stelling.
8.1.1 Calculate x, y and z.	**8.1.1** Bereken x, y *en* z
	
8.1.2 Calculate j, k and l.	**8.1.2** Bereken j, k *en* l
	
8.1.3 Calculate a, b, c and d.	**8.1.3** Bereken a, b, c *and* d

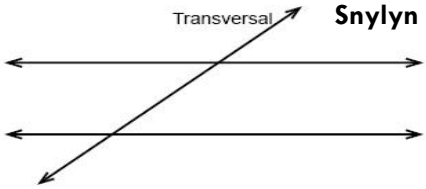
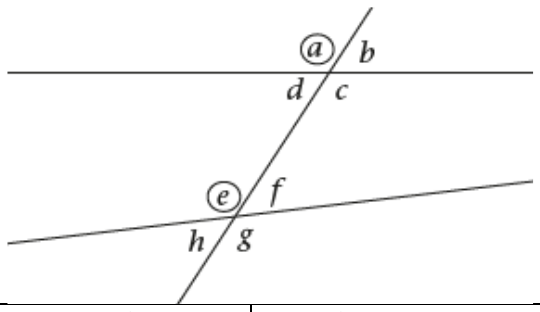


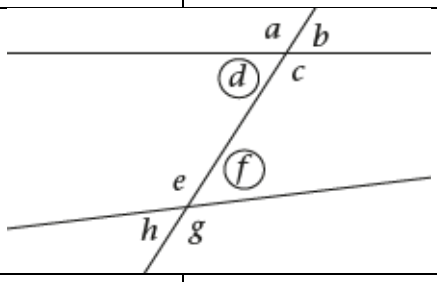
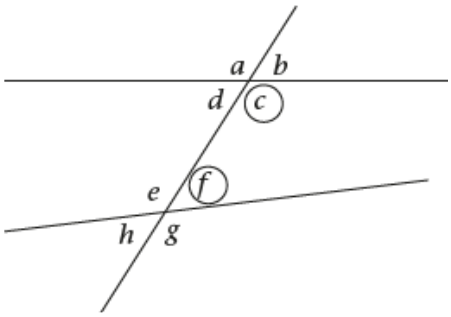
11.

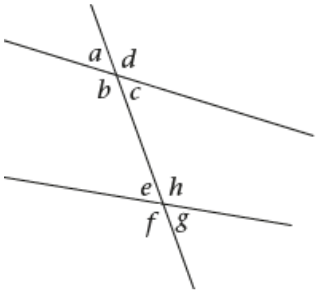
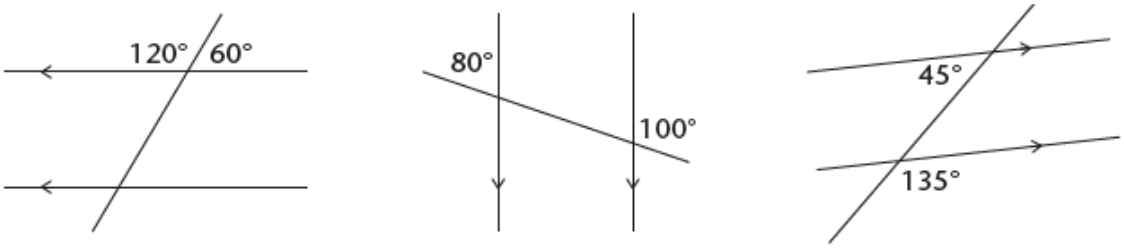
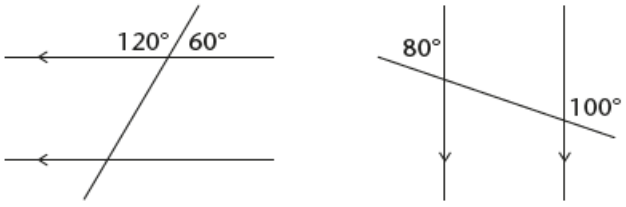
9.CLASSWORK: Approximately 45 mins **Activity 3: Day 3:**	**9.KLASWERK: Ongeveer 45mins** **Aktiwiteit 3: Dag 3**
EQUATIONS USING VERTICALLY OPPOSITE ANGLES: **REVISE:** **9.1Vertically opposite angles** (**vert. opp. ∠s**) are the angles opposite each other when two lines intersect. Vertically opposite angles are **always equal**. We can use this property **to build an equation**. Then we **solve the equation** to find the **value** of the **unknown variable** **(Prior Knowledge)** **9.2 Solving equations using the additive and multiplicative inverses – as its necessary for solving angles** Use approximately 20 mins to revise the topic by using the following examples: a) $8b = 72$ b) $\frac{2f}{5} = 2$ c) $2m + 5 = 21$ d) $30 + 2p = 40$ e) $5k + 4 = 3k + 10$	**VERGELYKINGS MET REGOORSTAANDE HOEKE:** **HERSIEN:** **9.1Regoorstande hoeke (regoorst. ∠e)** is die hoeke wat regoor mekaar is wanneer twee lyne sny. Regoorstaande hoeke is **altyd gelyk**.Ons kan hierdie eienskap gebruik om **vergelykings op te stel**, wat dan opgelos kan word om die **waarde** van 'n **onbekende veranderlike** te bereken. **(Prior Knowledge)** **9.2 Los vergelykings op deur optellings- en vermenigvuldingsinverses te gebruik – dis noodsaaklik om hoekgroottes op te los.** Gebruik ongeveer 20-minute om onderwerp te hersien deur middel van die volgende voorbeelde: a) $8b = 72$ b) $\frac{2f}{5} = 2$ c) $2m + 5 = 21$ d) $30 + 2p = 40$ e) $5k + 4 = 3k + 10$
10.CONSOLIDATION / CONCLUSION & HOMEWORK	**10.KONSOLIDASIE / SLOT & HUISWERK**

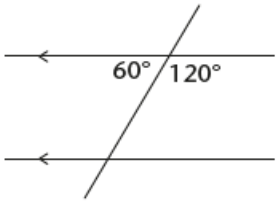
Emphasise that: The property of opposite angles always being equal can be used to solve equations (problem solving) **Recommended Classwork /Homework:** **Do the following**	**Beklemtoon :** Regoorstaande hoeke is altyd gelyk.Ons kan hierdie eienskap gebruik om vergelykings op te los. (Probleemoplossing) **Aanbevele Klaswerk/ Huiswerk:** **Doen die volgende**
10.1 Calculate the value of m.	**10.1** Bereken die waarde van m.
	
10.2 Calculate the value of t.	**10.2** Bereken die waarde van t.
	
10.3 Calculate the value of p.	**10.3** Bereken die waarde van p.
	
10.4 Calculate the value of z	**10.4** Bereken die waarde van z.
	
10. 5 Calculate the value of y.	**10.5** Bereken die waarde van y.

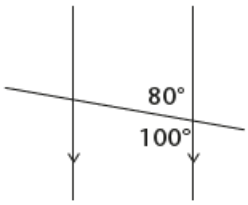

102° – 2y
78°

11.CLASSWORK: Approximately 45 mins x 2 Activity 4 & 5: Day 4 & 5	11.KLASWERK: Ongeveer 45 min x 2 Aktiwiteit 4 & 5: Dag 4 & 5
LINES INTERSECTED BY A TRANSVERSAL: **PAIRS OF ANGLES FORMED BY A TRANSVERSAL:**	**LYNE WAT GESNY WORD DEUR 'N SNYLYN:** **PARE HOEKE WAT DEUR 'N SNYLYN GEVORM WORD:**
A **transversal** is a line that crosses at least two other lines.	**'**n **Snylyn** is 'n lyn wat minstens twee ander lyne sny.
	
When a transversal intersects two lines, we can compare the sets of angles on the two lines by looking at their positions.	Wanneer 'n snylyn twee lyne sny,kan 'n mens die stelle hoeke wat op die twee lyne gevorm word vergelyk deur na hulle posisies te kyk.
The angles that lie on the same side of the transversal and are in matching positions are called **corresponding angles** (**corr. ∠s**). In the figure, these are corresponding angles: · a and e · b and f · d and h · c and g.	Die hoeke wat aan dieselfde kant van die snylyn in ooreenstemmende posisies is, word **ooreenkomstige hoeke (ooreenk.∠e)** genoem. In die figuur hieronder is die pare ooreenkomstige hoeke. · a en e · b en f · d en h · c en g.
	
Alternate angles (**alt. ∠s**) lie on opposite sides of the transversal, but are not adjacent or vertically opposite. When the alternate angles lie between the two lines, they are called **alternate interior angles**. In the figure, these are alternate interior angles:	**Verwisselende hoeke (verw. ∠e)** lê aan weerskante van die snylyn,maar is nie aangrensend of regoorstaande nie.Wanneer die verwisselende hoeke tussen die twee lyne lê,word hulle

· d and f · c and e. When the alternate angles lie outside of the two lines, they are called **alternate exterior angles**. In the figure, these are alternate exterior angles: · a and g · b and h.	**verwisselende binnehoeke** genoem. In die figuur is die pare verwisselende binnehoeke: · d en f · c en e. Wanneer die verwisselende hoeke buite die twee lyne lê, word hulle **verwisselende buitehoeke** genoem. In die figuur is die pare verwisselende buitehoeke: · a en g · b en h.
	
Co-interior angles (**co-int. ∠s**) lie on the same side of the transversal and between the two lines. In the figure, these are co-interior angles: · c and f · d and e.	**Ko-binnehoeke (ko-binne∠e)** lê aan die dieselfde kant van die snylyn en tussen die twee lyne. In die figuur is die pare ko-binnehoeke: · c and f · d and e.
	
12.CONSOLIDATION / CONCLUSION & HOMEWORK	**12. KONSOLIDASIE / SLOT & HUISWERK**
Emphasise that: When lines are parallel: • corresponding angles are equal • alternate interior angles are equal • alternate exterior angles are equal	**Beklemtoon:** Wanneer lyne ewewydig is,is: • oorenkomstige hoeke gelyk • verwisselende binnehoeke gelyk • verwisselende buitehoeke gelyk • die som van ko-binnehoeke 180°.

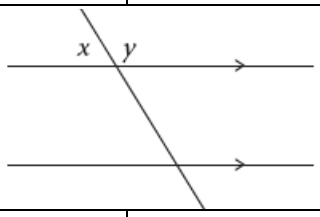
• co-interior angles add up to 180°.	
Recommended Homework: **Do the following** **12.1** Write down the following pairs of angles: a. two pairs of corresponding angles b. two pairs of alternate interior angles c. two pairs of alternate exterior angles d. two pairs of co-interior angles e. two pairs of vertically opposite angles	**Aanbevele Huiswerk:** **Doen die volgende:** **12.1** Skryf die volgende pare hoeke neer: a. twee pare ooreenkomstige hoeke b. twee pare verwisselende binnehoeke c. twee pare verwisselende buitehoeke d. twee pare ko-binnehoeke e. twee pare regoorstaande hoeke
	
12.2 Copy these drawings and fill in the corresponding angles to those given	**12.2** Skets die tekening oor en vul die waardes van die gegewe hoeke se ooreenkomstige hoeke in.
	
12.3 Copy the following drawings and fill in the alternate exterior angles:	**12.3** Skets die tekening oor en vul die waardes van die gegewe hoeke se verwisselende buitehoeke in.
	
12.4 a) Copy the drawings and fill in the alternate interior angles. b) Circle the two pairs of co-interior angles in each figure.	**12.4** a) Skets die tekening oor en vul die waardes van die gegewe hoeke se verwisselende binnehoeke in. b) Omkring die twee pare ko-binnehoeke in elk van die figure.





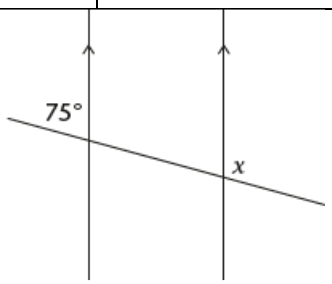
12.5 a) Copy the drawings below. Without measuring, fill in all the angles in the following figures that are equal to x and y.
b) Explain your reasons for each x and y that you filled in.

12.5 a) Skets die onderstaande tekeninge.Sonder om te meet,vul al die hoeke in wat gelyk is aan x *en* y.
b) Verduidelik jou redes vir elke x *en* y wat jy ingevul het.



12.6 Give the value of x *below*:

12.6 Gee die waardes van x hier onder.

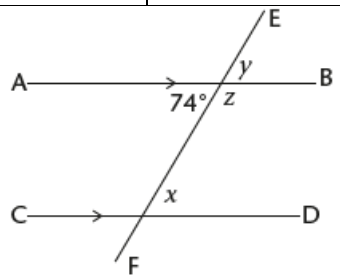


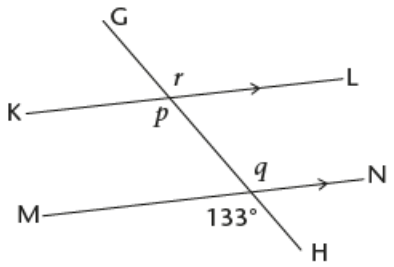
13.CLASSWORK: Approximately 45 mins

Activity 6: Day 6:

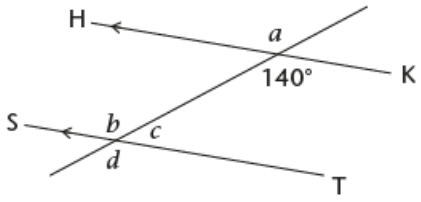
13.KLASWERK: Ongeveer 45mins

Aktiwiteit 6: Dag 6:

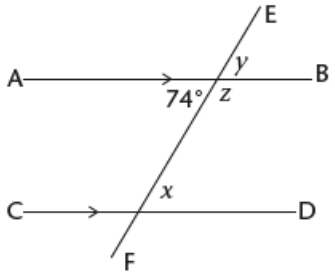
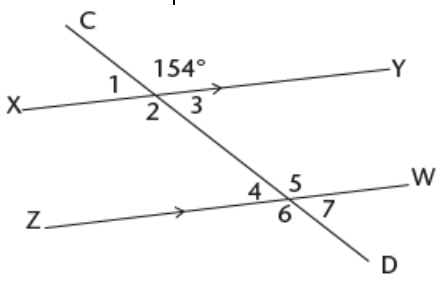
FINDING UNKNOWN ANGLES ON PARALLEL LINES Work out the sizes of the unknown angles. Give reasons for your answers	BEPAAL ONBEKENDE HOEKE OP EWEWYDIGE LYNE Bepaal die groottes van die onbekende hoeke. Gee redes vir jou antwoorde.
Example Find the sizes of x, y and z. x = 74° [alt. ∠ with given 74° ; AB // CD] y = 74° [corr. ∠ with x; AB // CD] or y = 74° [vert. opp. ∠ with given 74°] z = 106° [co-int. ∠ with x; AB // CD] or z = 106° [∠s on a straight line]	**Voorbeeld** Vind die groottes van $x, y\ en\ z$. x = 74° [verw. ∠met gegewe 74° ;AB // CD] y = 74° [ooreenk. ∠met x; AB // CD] of y = 74° [regoorst. ∠ met gegewe 74] z = 106 [ko-binne. ∠ met x; AB // CD] of z = 106° [∠e op reguit lyn]
	
14.CONSOLIDATION / CONCLUSION & KLASWERK/HOMEWORK	**14.KONSOLIDASIE / SLOT & KLASWERK/HUISWERK**
Emphasise that: When lines are parallel: • corresponding angles are equal • alternate interior angles are equal • alternate exterior angles are equal • co-interior angles add up to 180°.	**Beklemtoon:** Wanneer lyne ewewydig is,is: • oorenkomstige hoeke gelyk • verwisselende binnehoeke gelyk • verwisselende buitehoeke gelyk • die som van ko-binnehoeke 180°.
Recommended Homework: **Do the following**	**Aanbevele Huiswerk:** **Doen die volgende**
14.1 Work out the sizes of p, q and r.	**14.1** Bereken die groottes van $p, q\ en\ r$.



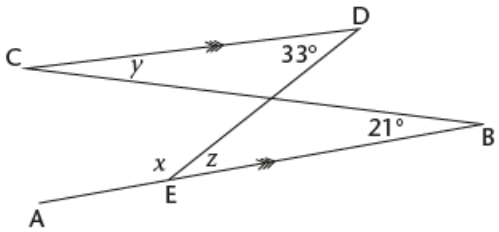
14.2 Find the sizes of *a*, *b*, *c* and *d*.	**14.2** Bereken die groottes van $a, b, c\ en\ d$.



15.CLASSWORK: Approximately 45 mins **Activity 7: Day 7:**	**15. KLASWERK: Ongeveer 45mins** **Aktiwiteit 7: Dag 7:**
SOLVING GEOMETRIC PROBLEMS: ANGLE RELATIONSHIPS ON PARALLEL LINES	**LOS MEER MEETKUNDIGE PROBLEME OP: HOEKVERWANTSKAPPE OP EWEWYDIGE LYNE**

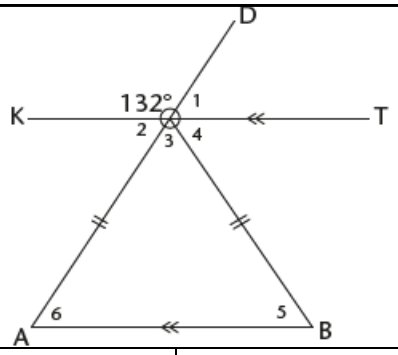
Draw the sketch on the board and explain sytematically. Work out the sizes of the unknown angles. Give reasons for your answers.	Teken die skets op die bord en verduidelik stelselmatig. Werk uit die hoekgroottes van die onbekende hoeke. Verskaf redes vir jou antwoorde.
example Find the sizes of x, y and z. $x = 74°$ [alt. ∠ with given 74° ; AB // CD] $y = 74°$ [corr. ∠ with x; AB // CD] or $y = 74°$ [vert. opp. ∠ with given 74°] $z = 106°$ [co-int. ∠ with x; AB // CD] or $z = 106°$ [∠s on a straight line]	**Voorbeeld** Vind die groottes van x, y *en* z. $x = 74°$ [verw. ∠met gegewe 74° ;AB // CD] $y = 74°$ [ooreenk. ∠met x; AB // CD] of $y = 74°$ [regoorst. ∠ met gegewe 74] $z = 106$ [ko-binne. ∠ met x; AB // CD] of $z = 106°$ [∠e op reguit lyn]
	
16.CONSOLIDATION / CONCLUSION & HOMEWORK **Recommended Homework:** **Do the following:**	**16.KONSOLIDASIE / SLOT & KLASWERK / HUISWERK** **Aanbevele Huiswerk:** **Doen die volgende**
16.1 Calculate the sizes of ∠1 to ∠7.	**16.2** Bepaal die groottes van ∠1 tot ∠7.
	

16.2 Calculate the sizes of x, y and z.	**16.2** Bepaal die groottes van x, y en z.

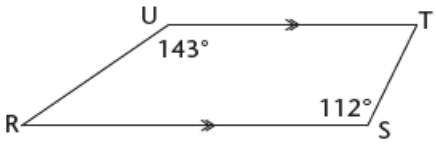


17.CLASSWORK: Approximately 45 mins x 2 **Activity 8 & 9: Day 8 & 9:**	**17. KLASWERK: Ongeveer 45 mins x 2** **Aktiwiteit 8 & 9: Dag 8 & 9:**
SOLVING GEOMETRIC PROBLEMS INCLUDING PROPERTIES OF TRIANGLES AND QUADRILATERALS	**LOS MEER MEETKUNDIGE PROBLEME OP HOEKVERWANTSKAPPE EN DIE EIENSKAPPE VAN DRIE- EN VIERHOEKE**
REVISE: (Prior Knowledge) Properties of triangles as well as definitions of quadrilaterals using an appropriate worksheet.	**HERSIEN : (Prior Knowledge)** Eienskappe van driehoeke en definisies vierhoeke deurmiddel van n gepaste werkblad**.**
worksheet Geometry of 2D shapes grade 8	

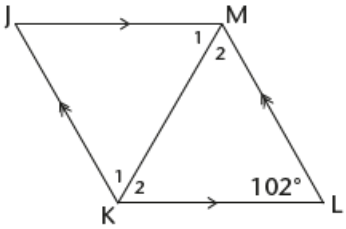
18.CONSOLIDATION / CONCLUSION & HOMEWORK **Recommended Homework:** **Do the following**	**18.KONSOLIDASIE / SLOT & KLASWERK /HUISWERK** **Aanbevele Klaswerk/Huiswerk** **Doen die volgende**
18.1 Calculate the sizes of ∠1 to ∠6.	**18.1** Bereken die groottes van ∠1 tot ∠6.



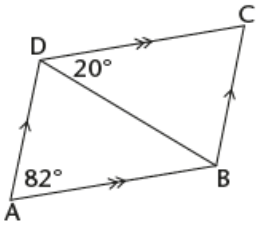
18.2 RSTU is a trapezium. Calculate the sizes of ∠T and ∠R.	**18.2** RSTU is 'n trapezium. Bereken die groottes van ∠T en ∠R.



18.3 JKLM is a rhombus. Calculate the sizes of ∠JML, ∠M_2 and ∠K	**18.3** JKLM is 'n ruit. Bereken die groottes van ∠JML, ∠M_2 and ∠K



18.4 ABCD is a parallelogram. Calculate the sizes of ∠ADB, ∠ABD, ∠C and ∠DBC.	**18.4** ABCD is 'n parallelogram. Bereken die groottes van ∠ADB, ∠ABD, ∠C and ∠DBC.



19.CLASSWORK: **Day 9: Informal test & consolidation** **Intervention**	**19. KLASWERK:** **Dag 9: Informele toets & Konsolidasie** **- Intervensie**
TEACHERS GUIDE	**ONDERWYSER GIDS**

DAY 1: ACTIVITY 1

1.1 a) Obtuse angle
b) reflex angle
c) straight angle
d) acute angle

1.2 a) reflex angle
b) acute angle
c) right angle
d) reflex angle

5.2 a) $\angle 1 + \angle 2 = 80^0 + 100^0 = 180^0$

b) $\angle 3 + \angle 4 + \angle 5 = 80^0 + 60^0 + 40^0 = 180^0$

6.1.1 $a + 63^0 = 180^0$ $(\angle s\ on\ a\ straight\ line)$

$$a = 180^0 - 63^0$$
$$a = 117^0$$

6.1.2 $x + 29^0 + 90^0 = 180^0$ $(\angle s\ on\ a\ straight\ line)$

$$x = 180^0 - 29^0 - 90^0$$

$$x = 61^0$$

6.1.3 $2y + 48^0 + 52^0 = 180^0$ $(\angle s\ on\ a\ straight\ line)$

$$2y = 180^0 - 52^0 - 48^0$$

$$2y = 80^0$$

$$y = 40^0$$

6.2 (a) $x + 3x + 2x = 180^0$ $(\angle s\ on\ a\ straight\ line)$

$$6x = 180^0$$

$$x = 30^0$$

(b) $\angle ECB = 2x = 2(30^0) = 60^0$

6.3 (a) $70^0 + 80^0 + m + 10^0 = 180^0$ $(\angle s\ on\ a\ straight\ line)$

$$m = 20^0$$

(b) $\angle SQR = m + 10^0 = 20^0 + 10^0 = 30^0$

6.4

$a)\ (x + 30^0) + (x + 40^0) + (2x + 10^0) = 180^0\ (\angle s\ on\ straight\ line)$

$$x = 25^0$$

b) $\angle HEF = 2x + 10^0 = 2(25^0) + 10^0 = 60^0$

DAG 1: AKTIWITEIT 1

1.1 a) Stomp hoek
b) refleks hoek
c) reguit lyn
d) skerp hoek

1.2 a) refleks hoek
b) skerp hoek
c) regte hoek
d) refleks hoek

5.2 a) $\angle 1 + \angle 2 = 80^0 + 100^0 = 180^0$

b) $\angle 3 + \angle 4 + \angle 5 = 80^0 + 60^0 + 40^0 = 180^0$

6.1.1 $a + 63^0 = 180^0$ $(\angle e\ op\ reguit\ lyn)$

$$a = 180^0 - 63^0$$
$$a = 117^0$$

6.1.2 $x + 29^0 + 90^0 = 180^0$ $(\angle e\ op\ reguit\ lyn)$

$$x = 180^0 - 29^0 - 90^0$$

$$x = 61^0$$

6.1.3 $2y + 48^0 + 52^0 = 180^0$ $(\angle e\ op\ reguit\ lyn)$

$$2y = 180^0 - 52^0 - 48^0$$

$$2y = 80^0$$

$$y = 40^0$$

6.2 (a) $x + 3x + 2x = 180^0$ $(\angle e\ op\ reguit\ lyn)$

$$6x = 180^0$$

$$x = 30^0$$

(b) $\angle ECB = 2x = 2(30^0) = 60^0$

6.3 (a) $70^0 + 80^0 + m + 10^0 = 180^0$ $(\angle e\ op\ reguit\ lyn)$

$$m = 20^0$$

(b) $\angle SQR = m + 10^0 = 20^0 + 10^0 = 30^0$

6.4

$(x + 30^0) + (x + 40^0) + (2x + 10^0) = 180^0$ $(\angle e\ op\ reguit\ lyn)$

$$x = 25^0$$

b) $\angle HEF = 2x + 10^0 = 2(25^0) + 10^0 = 60^0$

6.5

a) $2k + (k + 65^0) + 2k = 180^0$ $(\angle s\ on\ a\ straight\ line)$

$k = 23^0$

b) $\angle TYP = k + 65^0 = 23^0 + 65^0 = 88^0$

6.5

a) $2k + (k + 65^0) + 2k = 180^0$ $(\angle e\ op\ reguit\ lyn)$

$k = 23^0$

b) $\angle TYP = k + 65^0 = 23^0 + 65^0 = 88^0$

DAY 2: ACTIVITY 2

7.1 $\angle a = 100^0$ $\angle b = 80^0$ $\angle c = 100^0$ $\angle d = 80^0$

7.2 Vertically opposite angles (vert. opp. ∠s) are the angles opposite each other when two lines intersect.

Vertically opposite angles are always equal.

8.1.1 $x = 105^0$ $(vert.opp\ \angle s)$

$y + 105^0 = 180^0$ $(\angle s\ on\ a\ straight\ line)$

$y = 75^0$

$y = z$ $(vert.opp\ \angle s)$

$z = 75^0$

8.1.2 $j = 64^0$ $(vert.opp\ \angle s)$

$64^0 + k = 180^0$ $(\angle s\ on\ a\ straight\ line)$

$k = 116^0$

$k = l$ $(vert.opp\ \angle s)$

$l = 116^0$

8.1.3 $b = 62^0$ $(vert.opp\ \angle s)$

$a = 88^0$ $(vert.opp\ \angle s)$

$88^0 + c + 62^0 = 180^0$ $(\angle s\ on\ straight\ line)$

$c = 30^0$

$c = d$ $(vert.opp\ \angle s)$

$d = 30^0$

DAG 2: AKTIWITEIT 2

7.1 $\angle a = 100^0$ $\angle b = 80^0$ $\angle c = 100^0$ $\angle d = 80^0$

7.2 Regoorstande hoeke (regoorst. ∠e) is die hoeke wat regoor mekaar is wanneer twee lyne sny.

Regoorstaande hoeke is altyd gelyk.

8.1.1 $x = 105^0$ $(regoorst\ \angle e)$

$y + 105^0 = 180^0$ $(\angle e\ op\ reguit\ lyn)$

$y = 75^0$

$y = z$ $(regoorst\ \angle e)$

$z = 75^0$

8.1.2 $j = 64^0$ $(regoorst\ \angle e)$

$64^0 + k = 180^0$ $(\angle e\ op\ reguit\ lyn)$

$k = 116^0$

$k = l$ $(regoorst\ \angle e)$

$l = 116^0$

8.1.3 $b = 62^0$ $(regoorst\ \angle e)$

$a = 88^0$ $(regoorst\ \angle e)$

$88^0 + c + 62^0 = 180^0$ $(\angle e\ op\ reguit\ lyn)$

$c = 30^0$

$c = d$ $(regoorst\ \angle e)$

$d = 30^0$

DAY 3: ACTIVITY 3

9.2 Revise (Prior Knowledge)

a) $b = 9$
b) $f = 5$
c) $m = 8$
d) $p = 5$
e) $k = 3$

10.1 $m + 20^0 = 100^0$ $(vert.opp\ \angle s)$

$m = 80^0$

10.2 $3t + 12^0 = 66^0$ $(vert.opp\ \angle s)$

$t = 18^0$

DAG 3: AKTIWITEIT 3

9.2 Revise (Prior Knowledge)

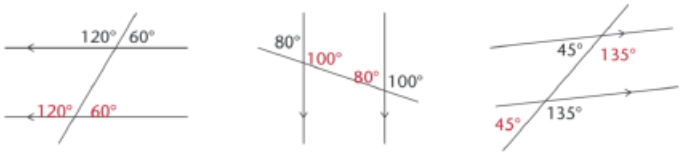
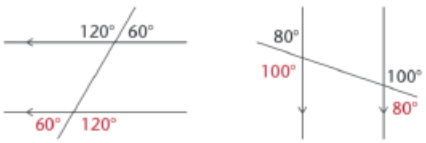
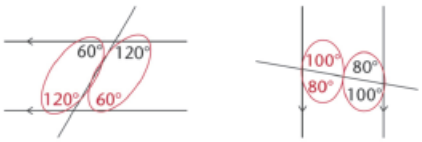
a) $b = 9$
b) $f = 5$
c) $m = 8$
d) $p = 5$
e) $k = 3$

10.1 $m + 20^0 = 100^0$ $(regoorst\ \angle e)$

$m = 80^0$

10.2 $3t + 12^0 = 66^0$ $(regoorst\ \angle e)$

$t = 18^0$

10.3 $108^0 = 2p + 30^0$ $(vert.opp \angle s)$ $p = 39^0$ **10.4** $58^0 = 2z - 10^0$ $(vert.opp \angle s)$ $z = 34^0$ **10.5** $102^0 - 2y = 78^0$ $(vert.opp \angle s)$ $y = 12^0$	**10.3** $108^0 = 2p + 30^0$ $(regoorst \angle e)$ $p = 39^0$ **10.4** $58^0 = 2z - 10^0$ $(regoorst \angle e)$ $z = 34^0$ **10.5** $102^0 - 2y = 78^0$ $(regoorst \angle e)$ $y = 12^0$
DAY 4 & 5: ACTIVITY 4 & 5	
12.1 *a*) a and e, c and g, b and f, d and h **b)** b and h, c and e **c)** a and g, d and f **d)** b and e, c and h **e)** a and c, h and f, d and b, e and g	**12.1** *a*) a en e, c en g, b en f, d en h **b)** b en h, c en e **c)** a en g, d en f **d)** b en e, c en h **e)** a en c, h en f, d en b, e en g
12.2  **12.3**  **12.4**  	
12.5	

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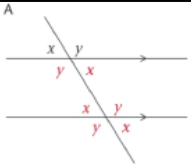
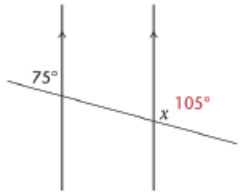


b) Top point of the intersection ,the vertically opposite angles are y on the left of the transversal and x on the right of the transversal.
The angles at the bottom point of intersection are the same sizes as those at the top and are in the same order; corresponding pairs of angles.
The same with alternate pairs.

b) By die boonste snypunt is die regoorstaande hoeke y aan die linkerkant en x aan die regterkant van die snylyn. Die hoeke by die onderste snylyn het dieselfde groottes as die by die boonste snypunt en is ook in dieselfde volgorde; pare ooreenkomstige hoeke en verwisselende hoeke.

12.6



DAY 6: ACTIVITY 6

14.1

$q = 133^0$ $(vert.opp\ \angle s)$

$q = r$ $(corr.\angle s; KL \parallel MN)$
$r = 133^0$

$r = p$ $(vert.opp\ \angle s)$
$p = 133^0$

14.2

$a = 140^0$ $(vert.opp\ \angle s)$

$d = 140^0$ $(corr.\angle s;\ HK \parallel ST)$

$d = b$ $(vert.opp\ \angle s)$
$b = 140^0$

$c + 140^0 = 180^0$ $(\angle s\ on\ straight\ line)$
$c = 40^0$

14.1

$q = 133^0$ $(regoorst\ \angle e)$

$q = r$ $(ooreenk.\angle e; KL \parallel MN)$
$r = 133^0$

$r = p$ $(regoorst\ \angle e)$
$p = 133^0$

14.2

$a = 140^0$ $(regoorst\ \angle e)$

$d = 140^0$ $(ooreenk.\angle e;\ HK \parallel ST)$

$d = b$ $(regoorst\ \angle e)$
$b = 140^0$

$c + 140^0 = 180^0$ $(\angle e\ op\ reguit\ lyn)$
$c = 40^0$

DAY 7: ACTIVITY 7

16.1

$\angle 1 + 154^0 = 180^0$ $(\angle s\ on\ straight\ line)$
$\angle 1 = 26^0$

$\angle 2 = 154^0$ $(vert.opp\ \angle s)$

$\angle 1 = \angle 3$ $(vert.opp\ \angle s)$
$\angle 3 = 26^0$

$\angle 1 = \angle 4$ $(corresp.\angle s; XY \| ZW)$
$\angle 4 = 26^0$

$\angle 5 = 154^0$ $(corresp.\angle s; XY \| ZW)$

$\angle 5 = \angle 6$ $(corresp.\angle s; XY \| ZW)$
$\angle 6 = 154^0$

$\angle 3 = \angle 7$ $(corresp.\angle s; XY \| ZW)$
$\angle 7 = 26^0$

16.2

$y = 21^0$ $(alt.int\ \angle s; CD \| AB)$

$z = 33^0$ $(alt.int\ \angle s; CD \| AB)$

$x + z = 180^0$ $(\angle s\ on\ straight\ line)$
$x + 33^0 = 180^0$
$x = 147^0$

(OTHER SOUND MATHEMATICAL ALTERNATIVE METHODS/ REASONING ARE ACCEPTED)

16.1

$\angle 1 + 154^0 = 180^0$ $(\angle e\ op\ reguit\ lyn)$
$\angle 1 = 26^0$

$\angle 2 = 154^0$ $(regoorst\ \angle e)$

$\angle 1 = \angle 3$ $(regoorst\ \angle e)$
$\angle 3 = 26^0$

$\angle 1 = \angle 4$ $(ooreenk.\angle e; XY \| ZW)$
$\angle 4 = 26^0$

$\angle 5 = 154^0$ $(cooreenk.\angle e; XY \| ZW)$

$\angle 5 = \angle 6$ $(ooreenk.\angle e; XY \| ZW)$
$\angle 6 = 154^0$

$\angle 3 = \angle 7$ $(ooreenk.\angle e; XY \| ZW)$
$\angle 7 = 26^0$

16.2

$y = 21^0$ $(verw.\ binne\angle e; CD \| AB)$

$z = 33^0$ $(verw.\ binne\angle e; CD \| AB)$

$x + z = 180^0$ $(\angle e\ op\ reguit\ lyn)$
$x + 33^0 = 180^0$
$x = 147^0$

(ANDER WISKUNDIGE KORREK ALTERNATIEWE METODES / REDES IS AANVAARBAAR)

DAY 8 & 9: ACTIVITY 8 & 9

17. Revise – Prior Knowledge

SHARP

Worksheet 11 Memorandum: Geometry of 2D Shapes

Grade 8 Mathematics

1.	1.	Equilateral triangle	→ h → v	2.	Isosceles triangle	→ g → viii
	3.	Scalene triangle	→ d → iii	4.	Right-angled triangle	→ f → ix
	5.	Parallelogram	→ i → ii	6.	Rectangle	→ a → x
	7.	Square	→ b → iv	8.	Rhombus	→ j → vi
	9.	Trapezium	→ e → i	10.	Kite	→ c → vii

18.1

$\angle 1 + 132^0 = 180^0$ $(\angle s\ on\ straight\ line)$
$\angle 1 = 48^0$

$\angle 1 = \angle 2$ $(vert.opp\ \angle s)$

18.1

$\angle 1 + 132^0 = 180^0$ $(\angle e\ op\ reguit\ lyn)$
$\angle 1 = 48^0$

$\angle 1 = \angle 2$ $(regoorst\ \angle e)$

$\angle 2 = 48^0$

$\angle 2 = \angle 6$ ($alt.int\ \angle s; KT \parallel AB$)
$\angle 6 = 48^0$

$\angle 6 = \angle 5$ ($\angle s\ opp\ equal\ sides$)
$\angle 5 = 48^0$

$\angle 5 = \angle 4$ ($alt.int\ \angle s; KT \parallel AB$)
$\angle 4 = 48^0$

$\angle 3 + \angle 4 + \angle 1 = 180^0$ ($\angle s\ on\ straight\ line$)
$\angle 3 + 48^0 + 48^0 = 180^0$
$\angle 3 = 48^0$

18.2

$\angle R + \angle U = 180^0$ ($co - int\ \angle s; RS \parallel UT$)
$\angle R + 143^0 = 180$
$\angle R = 37^0$

$\angle T + \angle S = 180^0$ ($co - int\ \angle s; RS \parallel UT$)
$\angle T + 112^0 = 180^0$
$\angle T = 68^0$

18.3

$\angle M_2 = \angle K_2$ ($\angle s\ opp\ equal\ sides\ as$
$LM = LK\ as\ JKLM\ is\ a\ rhombus$)

$\angle M_2 + \angle M_2 + 102^0 = 180^0$ ($\angle s\ on\ straight\ line$)
$\angle M_2 = 39^0$

$\angle M_2 = \angle K_1$ ($alt.int\ \angle s; JK \parallel LM$)
$\angle K_1 = 39^0$

$\angle M_1 = \angle K_2$
$\angle K_2 = 39^0$ ($alt.int\ \angle s; JK \parallel LM$)

$\angle JML = 39^0 + 39^0 = 78^0$

18.4

$\angle CDB = \angle ABD$ ($alt.int\ \angle s; AB \parallel DC$)
$\angle ABD = 20^0$

$\angle ADB = 180^0 - 82^0 - 20^0$ ($\angle s\ in\ \Delta ADB$)
$\angle ADB = 78^0$

$\angle ADB = \angle DBC$ ($alt.int\ \angle s; AB \parallel DC$)
$\angle DBC = 78^0$

$\angle C = 82^0$ ($opp\ \angle s\ of\ \parallel m$)

$\angle 2 = 48^0$

$\angle 2 = \angle 6$ ($verw.\ binne \angle e; KT \parallel AB$)
$\angle 6 = 48^0$

$\angle 6 = \angle 5$ ($\angle e\ teenoor\ gelyke\ sye$)
$\angle 5 = 48^0$

$\angle 5 = \angle 4$ ($verw.\ binne \angle e; KT \parallel AB$)
$\angle 4 = 48^0$

$\angle 3 + \angle 4 + \angle 1 = 180^0$ ($\angle e\ op\ reguit\ lyn$)
$\angle 3 + 48^0 + 48^0 = 180^0$
$\angle 3 = 48^0$

18.2

$\angle R + \angle U = 180^0$ ($ko - binn\ \angle e; RS \parallel UT$)
$\angle R + 143^0 = 180$
$\angle R = 37^0$

$\angle T + \angle S = 180^0$ ($ko - binne\ \angle e; RS \parallel UT$)
$\angle T + 112^0 = 180^0$
$\angle T = 68^0$

18.3

$\angle M_2 = \angle K_2$ (($\angle e\ teenoor\ gelyke\ sye\ want$
$LM = LK\ is\ 'n\ JKLM\ is\ a\ ruit$)

$\angle M_2 + \angle M_2 + 102^0 = 180^0$ ($\angle e\ op\ reguit\ lyn$)
$\angle M_2 = 39^0$

$\angle M_2 = \angle K_1$
$\angle K_1 = 39^0$ ($verw.\ binne \angle e; JK \parallel LM$)

$\angle M_1 = \angle K_2$
$\angle K_2 = 39^0$ ($verw.\ binne \angle e; JK \parallel LM$)

$\angle JML = 39^0 + 39^0 = 78^0$

18.4

$\angle CDB = \angle ABD$ ($verw.\ binne \angle e; AB \parallel DC$)
$\angle ABD = 20^0$

$\angle ADB = 180^0 - 82^0 - 20^0$ ($\angle s\ in\ \Delta ADB$)
$\angle ADB = 78^0$

$\angle ADB = \angle DBC$ ($verw.\ binne \angle e; AB \parallel DC$)
$\angle DBC = 78^0$

$\angle C = 82^0$ ($teenoorst. \angle e\ van\ \parallel m$)