Section 2.0 Review

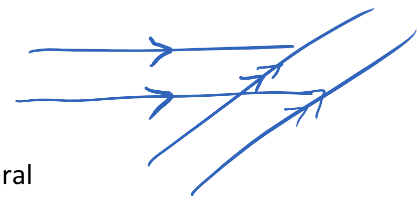
Monday, February 22, 2016 9:03 AM

Section 2.0 Review

Define:

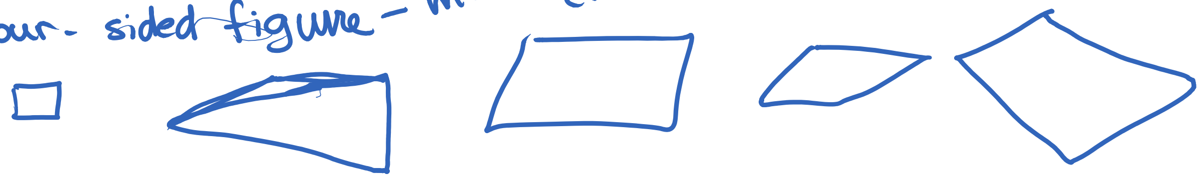
- Parallel Lines

- lines never meet

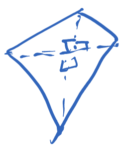


- Quadrilateral

any four-sided figure - must be closed



- Kite



- Rhombus

all sides are equal
angles are not 90°

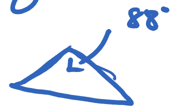
- Parallelogram

Hi you!

a rectangle someone kicked

- Acute Triangle

all angles are less than 90°

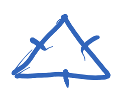


- Obtuse Triangle

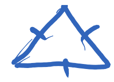
one angle is greater than 90°

- Equilateral Triangle

all sides are equal. All angles are 60°.

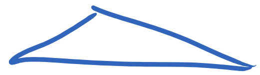


all sides are equal. All angles are 60°.



- Scalene Triangle

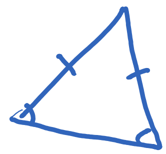
No sides are equal



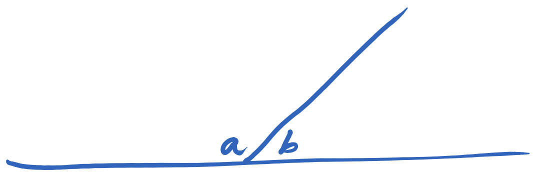
- Isosceles Triangle

Two sides are equal

Two angles are equal

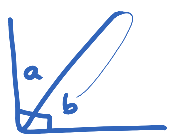


- Supplementary Angles (180)



$a + b = 180°$

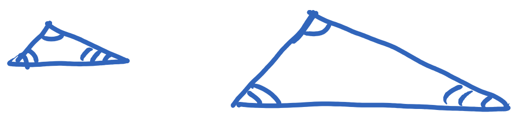
- Complementary Angles (90)



$a + b = 90°$

Similar Triangles

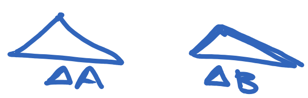
two triangles that have the same angle measures.



Congruent Triangles

"equal"

same length + angles



$A \equiv B$

"congruent"

Vertically Opposite Angles

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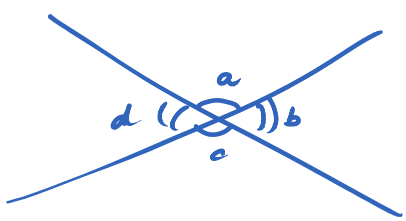
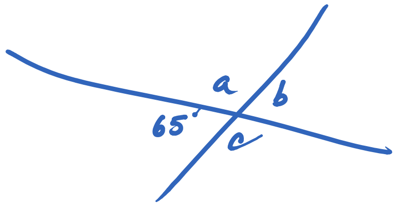


$\angle a = \angle c$

$\angle b = \angle d$



Calculate $\angle a$, $\angle b$, $\angle c$.

$\angle b = 65$ vertically opp.

$65 + \angle c = 180°$

$\angle c = 115°$ supp. angles

$\angle a = 115°$ vert. opp.

p. 38 # 1-6 all.

Section 2.1-2.2

Tuesday, February 23, 2016 11:16 AM

<u>Geometric Properties Review</u>

Angle Properties

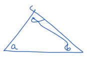
Acute $< 90^\circ$	Straight 180°	Angles at a point lines that intersect to form angles
obtuse $> 90^\circ$ $< 180^\circ$	complimentary $a+b=90^\circ$	Angles on a line
right	Supplementary $a+b=180^\circ$	Vertically opposite angles (X) $a=b$ $c=d$
Perpendicular	Bisect $a=b$	diagonal

Two lines that intersect at 90° ~~angles~~

Triangle Properties

*3 sides * 3 angles*

polygons



$a+b+c=180^\circ$

all angles are less than 180°

~~Only 1~~

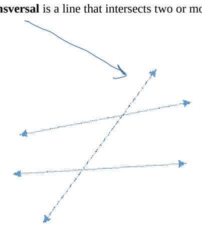
Only one angle can be more than 90°.

$a=b$

$a=b=c=60^\circ$

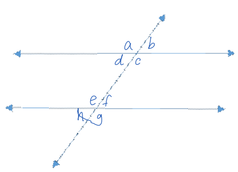
Parallel lines and Transversals

A **transversal** is a line that intersects two or more other lines at distinct points.

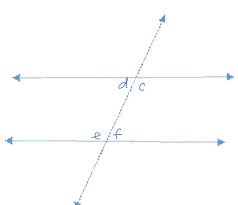


Parallel lines are lines with the same slope/direction but different planes. Parallel lines will never meet or touch each other.

If two parallel lines are cut by a transversal, eight angles are created.



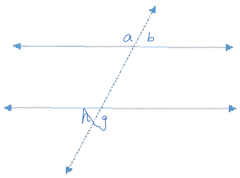
Interior Angles lie inside the parallel lines.



$c=e$

$d=f$

Exterior angles lie outside the parallel lines.

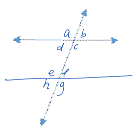


$a = g$

$b = h$

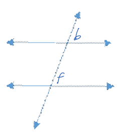
Corresponding angles are one interior angle and one exterior angle that are non-adjacent and on the same side of the transversal.

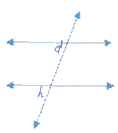
"F"

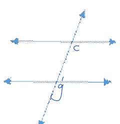


$b = f$ $d = h$

$a = e$ $c = g$



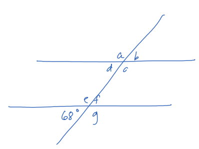




If two parallel lines are cut by a transversal, then corresponding angles are equal

Likewise, if two lines are cut by a transversal and the corresponding angles are equal, then the lines are parallel.

Example 1: Find the indicated angle:



$f = 68^\circ$ V. Opp.

$d = 68^\circ$ Corr. Angles

$b = 68^\circ$ V. opp. / Alt. Ext. Angles

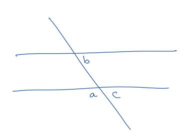
$180^\circ - 68^\circ = 112^\circ$ $g = 112^\circ$ supp angles.

$e = 112^\circ$ V. Opp.

$a = 112^\circ$ corr. angles

$c = 112^\circ$ V. opp. / alt. int. angles

Ex. 2



$a = 106^\circ$

$b = 66^\circ$

Are they parallel?

1) Assume they are parallel.

2) $180^\circ - 106^\circ = 74^\circ$

3) $\angle b = \angle c$ b/c corresponding angles

$66^\circ \neq 74^\circ$

False. They are not parallel.

From <https://rcsdtech-my.sharepoint.com/personal/s_thibeault_rcsd_ca/Documents/3%20%20Foundations%2020/Unit%202%20-%20Angles/Geometric%20Properties%20Review.docx>

Ch. 2 – Properties of Angles and Triangles

2.1 & 2.2 – Angles and Parallel Lines

Parallel Lines // ‖	**Transversal**
2 lines will never meet	3rd line that

3) $\angle b = \angle c$ b/c corresponding angles
$66° \neq 74°$

False. They are not parallel.

2.1 #1-5
p.70

Parallel Lines //	Transversal
2 lines w/ // never meet. always equal distance apart	3rd line that intersects parallel lines
Alternate Interior Angles "Z" angles EQUAL. Two non-adjacent interior angles on opp sides of the transversal	**Alternate Exterior Angles** EQUAL. Two exterior angles formed btwn // lines and a transversal on opp sides of the transversal.
Corresponding Angles "F" angles EQUAL	**Interior Angles** Form a "C" and add to 180°. $a+b=180$
Right Triangle c is hyp. Pythag $a^2+b^2=c^2$	**Complimentary and Supplementary Angles** adds to 90° / adds to 180°
Vertically Opposite Angles EQUAL	**Angles at a Point** add to 360°

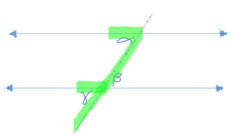
From <https://rcsdtech-my.sharepoint.com/personal/s_thibeault_rcsd_ca/Documents/3%20%20Foundations%2020/Unit%202%20-%20Angles/Ch%202-%202.1%20and%202.2%201.docx>

2.2- Angles formed by Parallel Lines

- The first column contains statements we believe are true.
- The second column contains the reason for the statement (how do we know it's true?)
- These statements and justifications involve known facts about:
  - corresponding angles (they are equal) F
  - vertically opposite angles (they are equal) X
  - supplementary angles (together they form a straight angle)
- We get to substitute one angle for another once we know they are equal
- The **transitive** property can be used: if a = b and b = c, then a = c

Prove the following conjectures:

1) "When parallel lines are intersected by a transversal, the alternate interior angles are equal."
Create a diagram: Z



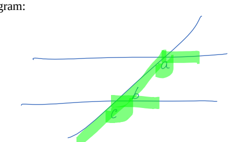
∴ means therefore

What are you trying to prove? $\alpha = \beta$

Statement	Reason
$\alpha = \gamma$	corresponding angles
$\gamma = \beta$	vertically opposite
$\therefore \alpha = \beta$	transitive property

□ QED.

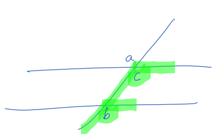
2) "When parallel lines are intersected by a transversal, the same-side interior angles are supplementary."
Create a diagram: = 180°



What are you trying to prove? $a+b=180°$

Statement	Reason
$b+c=180°$	supplementary
$a=c$	corresponding angles
$\therefore b+a=180°$	transitive property □

3) "When parallel lines are intersected by a transversal, the alternate exterior angles are equal."
Create a diagram:



What are you trying to prove? $a=b$

Statement	Reason
$b=c$	corresponding angles
$a=c$	vertically opposite
$\therefore a=b$	transitive property

Results

Now that we have proved these statements are true, we can use them in other proofs!

-
- $\therefore a = b$ transitive property
-
-
Results
Now that we have proved these statements are true, we can use them in other proofs!

1. Corresponding angles are equal
2. Alternate interior angles are equal
3. Alternate exterior angles are equal
4. Same side interior angles are supplementary
5. Vertically opposite angles are equal

Examples

From <https://rcsdtech-my.sharepoint.com/personal/s_thibeault_rcsd_ca/Documents/3%20%20Foundations%2020/Unit%202%20-%20Angles/notes2.2.docx>

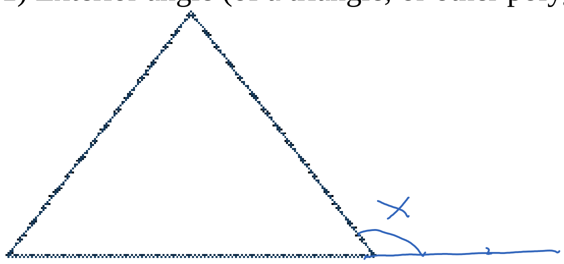
Section 2.3

Thursday, February 25, 2016 10:13 AM

2.3- Angle Properties in Triangles

Key Terms:

1) Exterior angle (of a triangle, or other polygon):

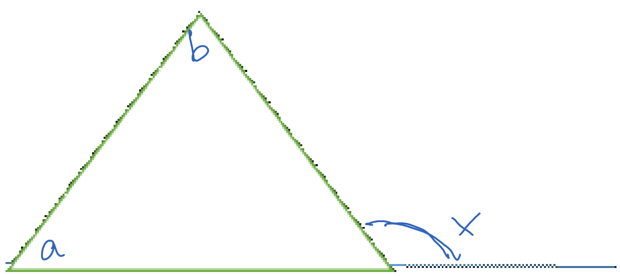
- 

The angle that is formed by a side of a triangle, or other polygon, and the extension of an adjacent side

2) Non-adjacent interior angles (in a triangle):

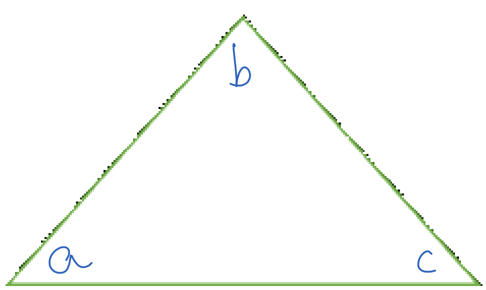
- The two angles of a triangle that do not have the same vertex as an exterior angle

meeting point



Triangle Property #1:

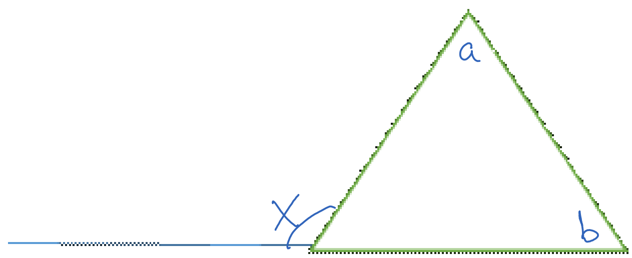
The sum of the measure of the interior angles of any triangles is 180°.



$a + b + c = 180°$

Triangle Property #2:

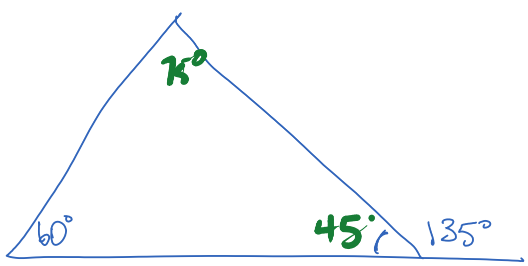
The measure of any exterior angle of a triangle is proven to be equal to the sum of the measure of the two non-adjacent interior angles.



$a + b = x$

Examples:

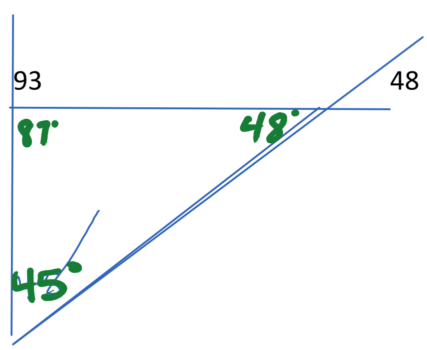
Determine the angle measures in the following triangle:



$135 - 60 = 75°$

$180 - 135 = 45°$

~~Prove AB // CD:~~ Find the angles.



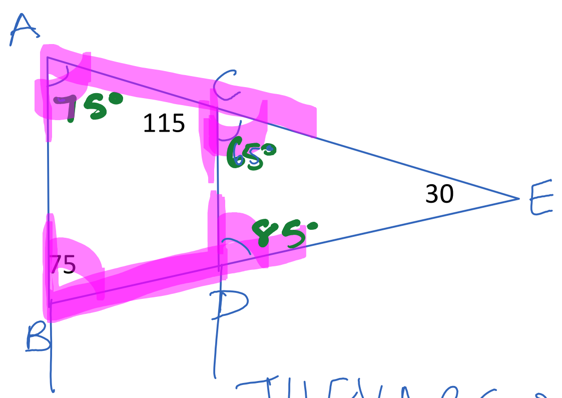
$180 - 93 = 87°$

$180 - 87 - 48 =$

$93 = 48 + \underline{\underline{x}}$

Prove AB || CD.

Prove AB || CD.



$180 - 30 - 75 = 75°$

$180 - 115 = 65°$

$180 - 65 - 30 = 85°$

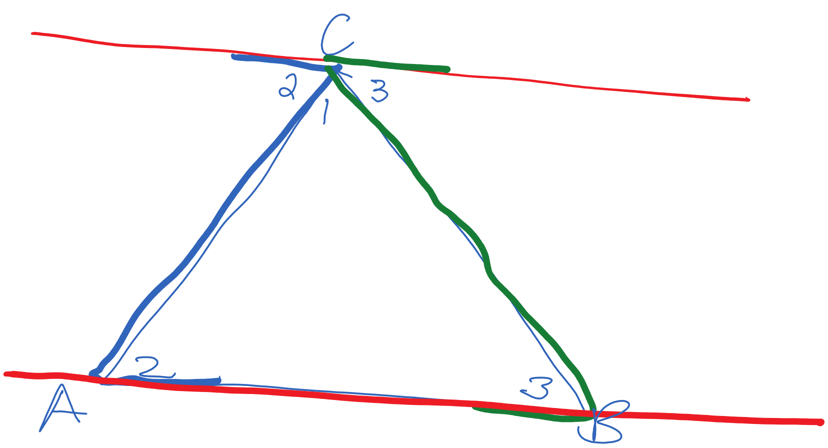
THEY ARE NOT PARALLEL. □

From <https://rcsdtech-my.sharepoint.com/personal/s_thibeault_rcsd_ca/Documents/3%20Foundations%2020/Unit%202%20-%20Angles/notes2.3.docx>

- **The sum of the angles in a triangle is 180°.**

We can use our knowledge of parallel lines to prove this theorem.

Example 1. Given ΔABC, prove <1 + <2 + <3 = 180°.



① Draw // lines @ base + top

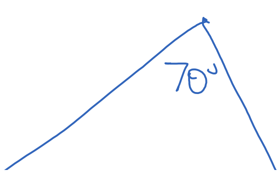
② Look for alt. int. angles.

③ Add supp. angles.

$\angle 2 + \angle 1 + \angle 3 = 180°$

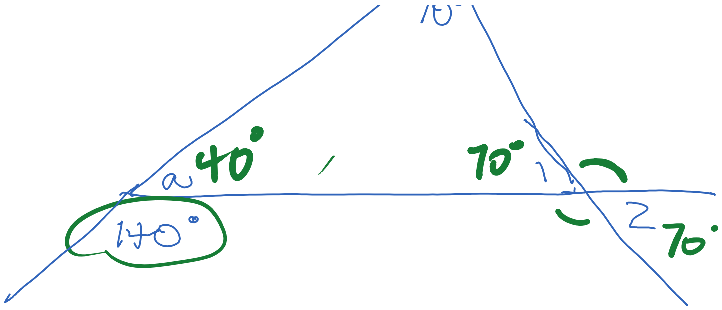
$\therefore \angle 1 + \angle 2 + \angle 3 = 180°$ b/c commutitive property.

Example 2. Determine the measures of <1 and <2.



$180 - 140° = a$

$40° = a$



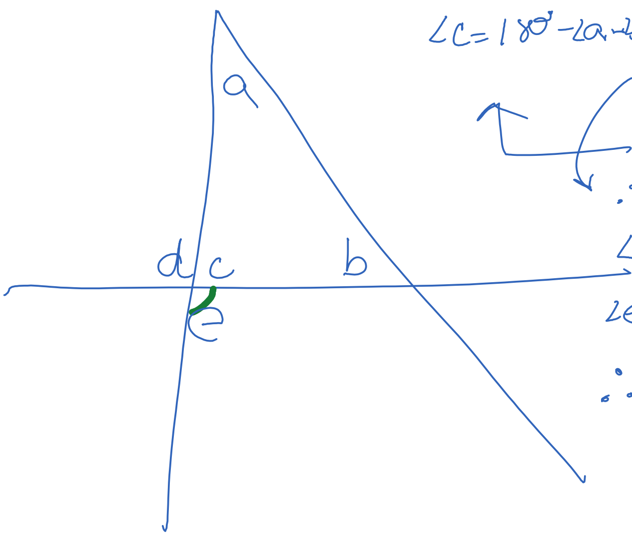
$40° = a$

$180 - 70 - 40 = \angle 1$

$70° = \angle 1$

The measure of an exterior angle of a triangle is equal to the sum of the measures of the two non-adjacent interior angles.

Example 3. Prove <e = <a + <b.



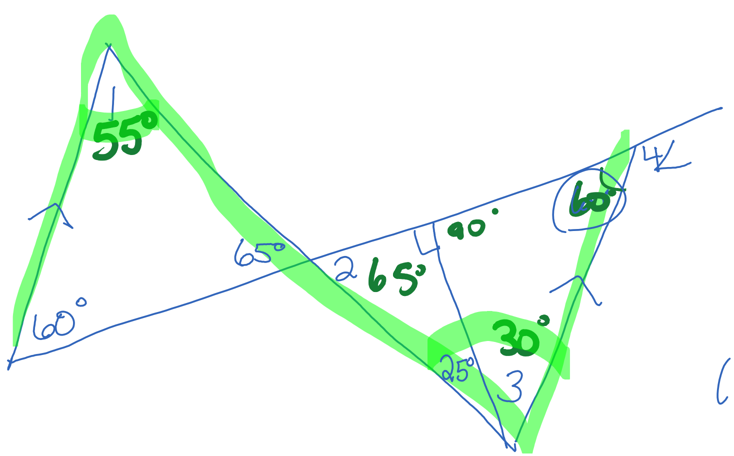
$\angle c = 180° - \angle a - \angle b$

Statement	Reason
$\angle e + \angle c = 180°$	supp angles
$\angle a + \angle b + \angle c = 180°$	angles in $\triangle$
$\therefore \angle e = 180° - \angle c$	algebra
$\angle e = 180° - (180 - a - b)$	transitive property
$\angle e = \cancel{180°} - \cancel{180} + a + b$	
$\therefore \angle e = \angle a + \angle b$	algebra

$\square$

QED

Example 4. Determine <1, <2, <3, and <4.



$180 - 60 - 65 = \angle 1$

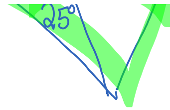
$= 55°$

$\angle 2 = 65°$ v. opp

$25° + \angle 3 = 55°$ alt. int.

$\angle 3 = 30°$

$180 - 90 - 30 = 60°$



$180 - 90 - 30 = 60°$

$180 - 60° = \underline{120°}$

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Section 2.4

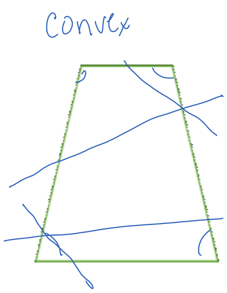
Friday, February 26, 2016 10:56 AM

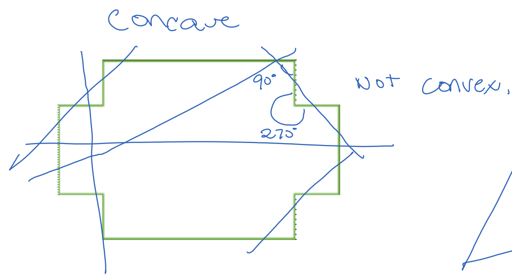
2.4- Angle Properties in Polygons

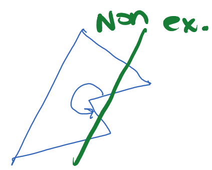
Key Terms:

1) Convex polygon: a polygon in which each interior angle measure less than 180°.

Example: Non- example:



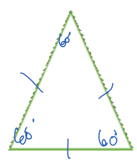




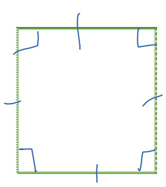
* If a line can pass through the polygon more than twice, it is NOT convex.

2) Regular polygon: a regular polygon for which all sides are equal length, and all interior angles have the same measure

Some regular polygons are so special, they have their own name:

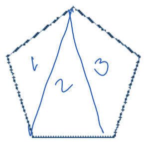


a regular triangle is called an equilateral triangle

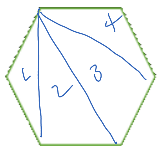


a regular quadrilateral is called a square
4

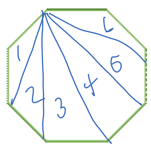
Other regular polygons are simply referred to by the name dictated by the number of sides, with the word "regular" in front:



a regular pentagon (penta = 5 sided)

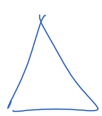


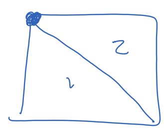
a regular hexagon (hexa = 6 sided)



a regular octagon (octa = 8 sided)

Polygon Names	Number of sides (n)	# of △'s	Σ of ∠'s
Triangle	3 sides	1	180°
Quadrilateral	4 sides	2	360°
Pentagon	5 sides	3 × 180° =	540°
Hexagon	6 sides	4 × 180° =	720°
Heptagon	7 sides	5	900°
Octagon	8 sides	6	1080
Nonagon	9 sides	7	1260°
Decagon	10 sides	8	1440°
Dodecagon	12 sides	10	1800°
n-gon	n sides	(n − 2) × 180°	180(n − 2)
Ex. 15-gon	15 sides	15 − 2 = 13	2340





Goal: Use the fact that we know the interior angles of a triangle add up to 180° to help us come up with a formula that will calculate the **interior angle sum** for ANY convex polygon with ANY number of sides (n).

$$\boxed{S = 180(n-2)}$$

n = # sides
S = sum of ∠s

Polygon Formula #1:

The interior angle sum for any convex polygon:

$$A = \frac{180(n-2)}{n}$$

A = angle measure
* must be a regular polygon

IAS = (n – 2) 180°
(n = number of sides)

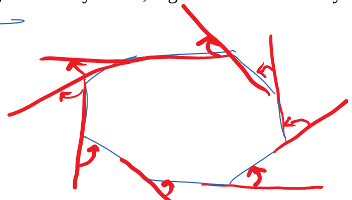
Polygon formula #2:

The exterior angle sum (EAS) for any convex polygon is always 360°, regardless of how many sides it has!

Polygon formula #2:

The exterior angle sum (EAS) for any convex polygon is always 360°, regardless of how many sides it has!

EAS = 360°



Polygon formula #3:
(regular polygons only)

Recall: each interior angle of a regular polygon has the same measure.

Each interior angle (EIA) for regular polygons can be found by dividing the interior angle sum by the number of angles in the polygon. *(The number of angles is the same as the number of sides)*

$$\textbf{EIA} = \frac{\mathbf{180° (n - 2)}}{\mathbf{n}}$$

(n = number of sides)

Polygon formula #4
(regular polygons only)

Each exterior angle (EEA) for regular polygons can be found by dividing the exterior angle sum (always 360°) by the number of angles in the polygon) *(The number of angles is the same as the number of sides)*

$$\textbf{EEA} = \frac{\mathbf{360}}{\mathbf{n}}$$

(n = number of sides)

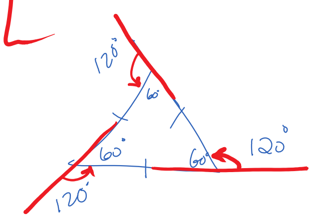
p. 51 #1, 2, 3, ~~4~~, 9

Heptagon = 7 sides

$S = 180(n-2)$
$S = 180(7-2)$
$S = 180(5)$
$S = 900°$

Examples:

Show that the exterior angle sum for a triangle is 360°.

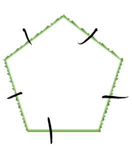


$120 + 120 + 120 = 360°$

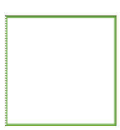
From <https://rcsdtech-my.sharepoint.com/personal/s_thibeault_rcsd_ca/Documents/3%20%20Foundations%2020/Unit%202%20-%20Angles/notes2.4.docx>

2.4 Con't
Let's look at how big each interior angle is in a regular polygon:

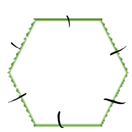
Side:



$a = \frac{180(5-2)}{5}$
$= \frac{180(3)}{5} = 108°$

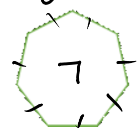


$a = \frac{180(4-2)}{4}$
$a = 90°$



$a = \frac{180(6-2)}{6}$
$a = \frac{180(4)}{6} = 120°$

$$a = \frac{180(4)}{6} = 120^\circ$$



$$a = \frac{180(7-2)}{7}$$

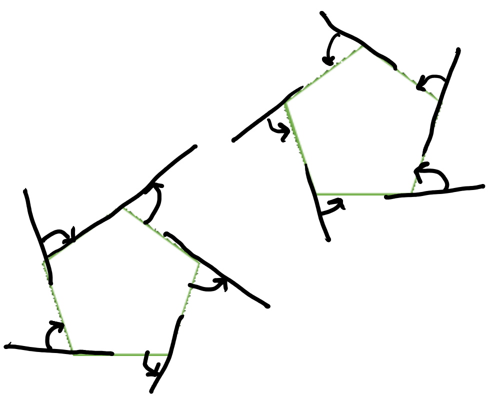
$$a = \frac{180(5)}{7} = 128.6^\circ$$

# of angles:
Measure of each:

Formula for interior angle of a regular polygon: $a = \frac{180(n-2)}{n}$ } single angle measure

Exterior Angles: always look at them from one direction, clockwise or counter-clockwise.

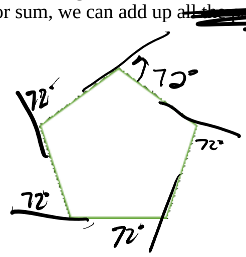
Clockwise Counter-Clockwise



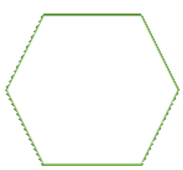
$$E = \frac{360}{n} = \frac{360}{5} = 72^\circ$$

$$E = 180 - IA = 180^\circ - 108 = 72^\circ$$

Each interior angle has an exterior angle that forms a straight line making 180°. To find the exterior sum, we can add up [redacted]

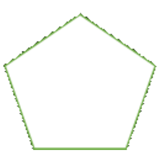


$72 \times 5 = 360^\circ$



* For shapes to tesselate, the exterior angles MUST add up to 360°.

Example.

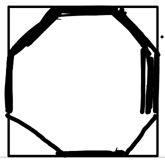


A convex polygon has an exterior angle sum of: 360°

Theorem: The sum of the exterior angles of any convex polygon is 360°.

Show that each exterior angle of a regular polygon is

1. Draw an Octagon (8 sided), hexagon (6 sided), and a pentagon (5 sided). Then add on the exterior angles in each polygon.

Octagon	Hexagon	Pentagon
		

2. Find the sums of the interior angles for each

Octagon	Hexagon	Pentagon
$S=180(n-2)$ $=180(8-2)$ $=180(6)$ $=1080^\circ$		

3. Find the measure of the interior angles for each

Octagon	Hexagon	Pentagon
$a=\frac{180(n-2)}{n}$ $=\frac{1080}{8}$ $=135^\circ$		

4. Find the measure of the exterior angles for each

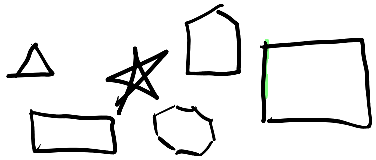
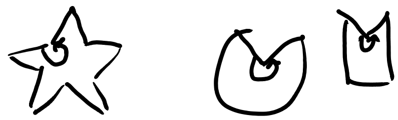
Octagon	Hexagon	Pentagon
① $E=\frac{360}{8}$ $=45^\circ$ ② $E=180-135=45^\circ$		

5. Find the answer to 360° divided by the number of sides for each polygon

Octagon	Hexagon	Pentagon
45°		

6. Compare the results in step 5 to the results in step 4	7. List your observations of the results from step 6
They are the same!	

A convex polygon has all interior angles less than 180°.	A concave polygon has at least one interior angle greater than 180°.
	

A convex polygon has all interior angles less than 180°. 	A concave polygon has at least one interior angle greater than 180°. 

Example 1. Determine the measure of each interior angle of a regular 17-sided polygon.

$$a = \frac{180(n-2)}{n} = \frac{180(17-2)}{17} = \frac{180(15)}{17} = 158.8^\circ$$

Exterior and Interior Angles:

① $E = \frac{360}{17} = 21.2^\circ$

② $E = 180 - 158.8 = 21.2^\circ$

* Quiz Wed! Test Friday!

From <https://rcsdtech-my.sharepoint.com/personal/s_thibeault_rcsd_ca/Documents/3%20%20Foundations%2020/Unit%202%20-%20Angles/2.4%20handout.docx>

p.50 #1-8, 11

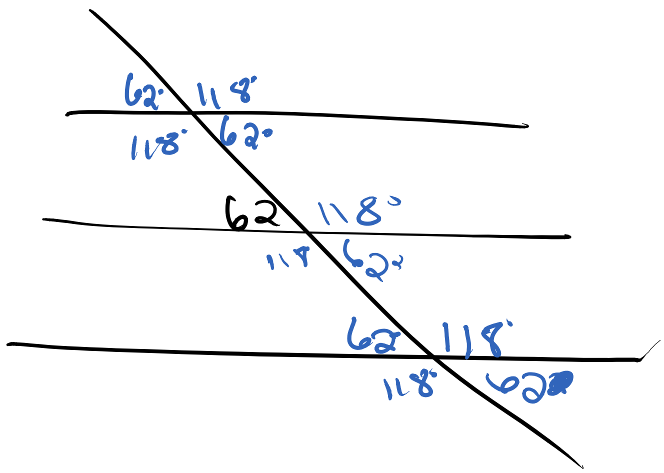
Quizzes

Thursday, March 3, 2016 9:38 AM

2.1 – 2.2 Quiz

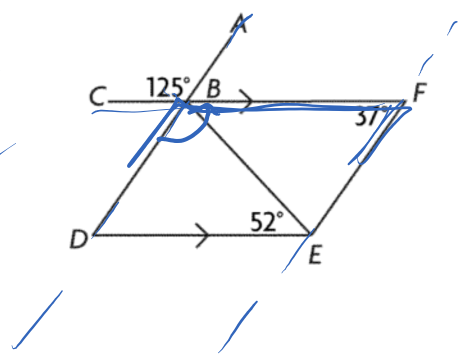
NAME: ______________________________ Date: _________________________

1. Determine the measure of all unknown angles. Be sure to label them and show your work.



$180 - 62 = 118°$

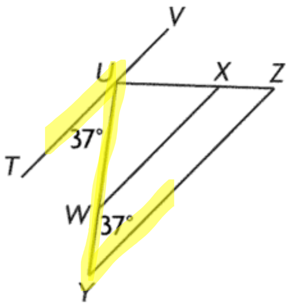
2. Are *BD* and *FE* parallel? Explain how you know.



$125° + 37° = 162°$

∴ Not //.

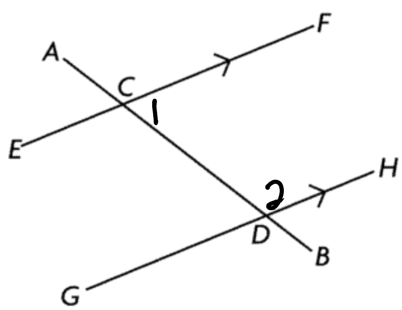
3. Prove: $TV \parallel YZ$



Because $\angle TUY$ is equal to $\angle UYZ$ (alt. int), $TV \parallel YZ$.

/2

4. Prove $<C = <D$.



$\angle C = \angle 2$

$\angle 2 = \angle D$

$\therefore \angle C = D$

$\square$

/3

From <Quiz 2.1-2.2.docx>

Math 20 Ch 2 Quiz.docx

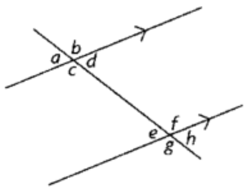
Thursday, March 3, 2016 9:40 AM

Math 20 Ch 2 Quiz

Multiple Choice

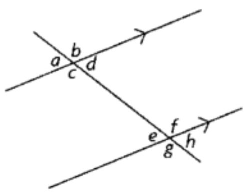
Identify the choice that best completes the statement or answers the question.

B 1. Which pairs of angles are equal in this diagram?



~~a.~~ $a = b$, $c = d$, and $e = f$
b. $a = e$, $c = g$, and $b = f$
~~c.~~ $a = c$, $e = g$, and $f = h$
~~d.~~ $a = e$, $b = d$, and $c = g$

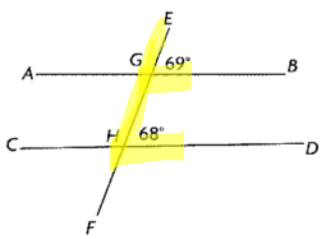
D 2. Which pairs of angles are equal in this diagram?



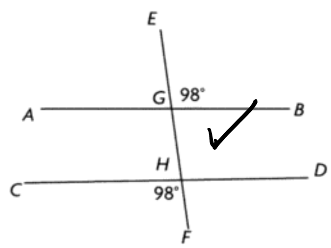
~~a.~~ $b = e$, $c = h$, and $d = g$
~~b.~~ $b = a$, $c = e$, and $d = f$
~~c.~~ $b = c$, $e = g$, and $f = h$
d. $b = f$, $c = g$, and $d = h$

B 3. In which diagram(s) is AB parallel to CD?

1.



2.



a. Choice 1 only
b. Choice 2 only
c. Choice 1 and Choice 2
d. Neither Choice 1 nor Choice 2

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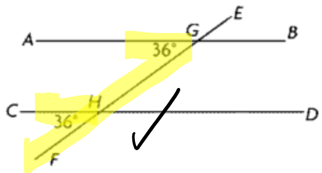
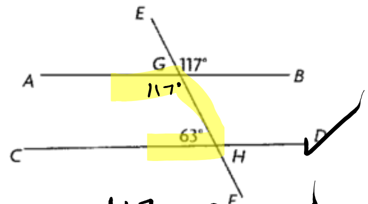
C 4. In which diagram(s) is AB parallel to CD?

1.



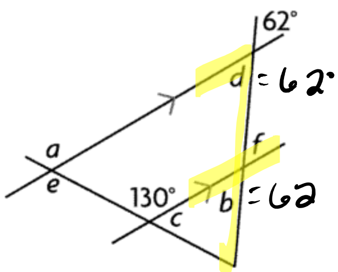
2.



117 + 63 = 180

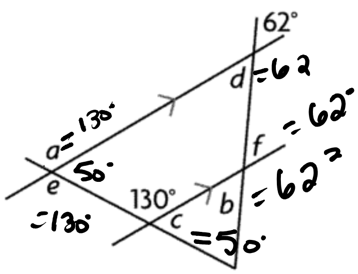
a. Choice 1 only
b. Choice 2 only
c. Choice 1 and Choice 2
d. Neither Choice 1 nor Choice 2

A 5. Which statement about the angles in this diagram is false?



a. $\angle b = 50°$
b. $\angle c = 50°$
c. $\angle e = 130°$
d. $\angle f = 62°$

B 6. Which statement about the angles in this diagram is false?



a. $\angle a + \angle c = 180°$
b. $\angle e + \angle d = 180°$
c. $\angle d + \angle b = 124°$
d. $180° - \angle f = 118°$

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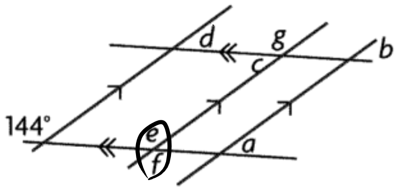
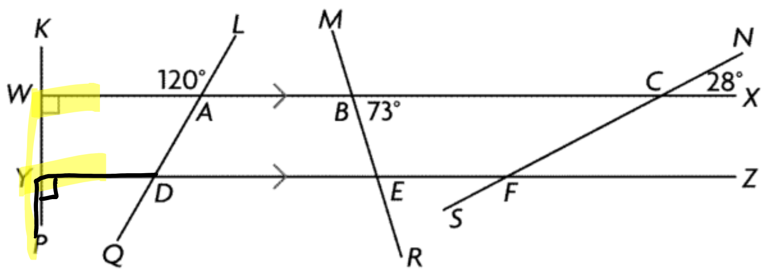
D 7. Which statement about the angles in this diagram is false?



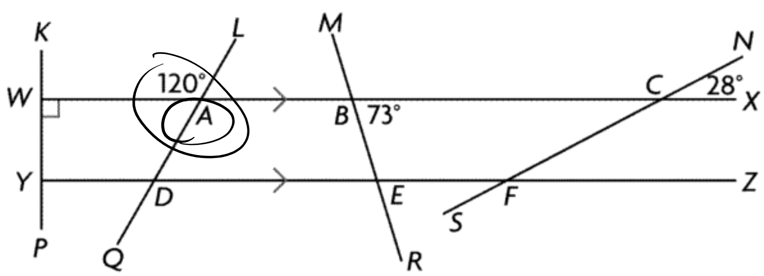
a. $\angle e = \angle f$
b. $\angle a = \angle b$
c. $\angle d = \angle c$
d. $\angle f = \angle a$

A 8. Which angle property proves $\angle PYD = 90°$?



a. corresponding angles F
b. alternate interior angles Z
c. alternate exterior angles
d. supplementary angles

A 9. Which angle property proves $\angle DAB = 120°$?



a. vertically opposite angles X
b. alternate exterior angles
c. alternate interior angles
d. corresponding angles

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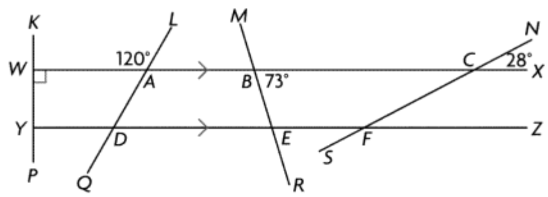
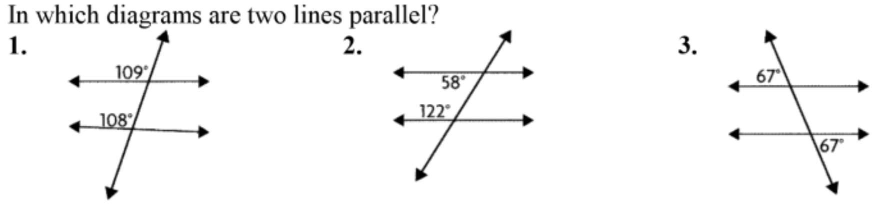
____ 10. Which angle property proves $\angle BED = 73°$?



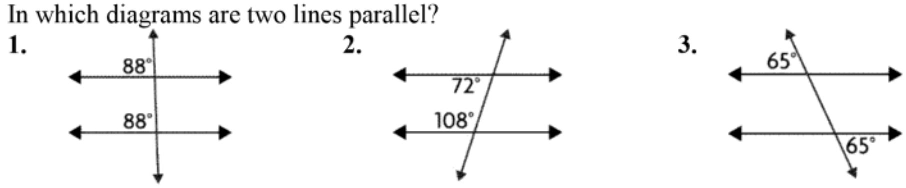
a. alternate interior angles
b. vertically opposite angles
c. corresponding angles
d. alternate exterior angles

____ 11. In which diagrams are two lines parallel?



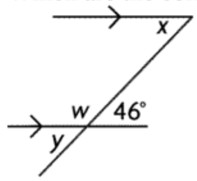
a. Choices 1, 2, and 3
b. Choice 1 and Choice 3
c. Choice 2 and Choice 3
d. Choice 1 only

____ 12. In which diagrams are two lines parallel?



a. Choice 2 and Choice 3
b. Choice 1 only
c. Choice 1 and Choice 3
d. Choices 1, 2, and 3

____ 13. Which are the correct measures of the indicated angles?



a. $\angle w = 146°$, $\angle x = 44°$, $\angle y = 146°$
b. $\angle w = 134°$, $\angle x = 46°$, $\angle y = 46°$
c. $\angle w = 136$, $\angle x = 44°$, $\angle y = 136°$
d. $\angle w = 116°$, $\angle x = 64°$, $\angle y = 64°$

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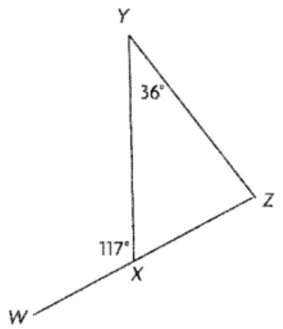
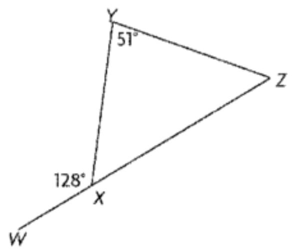
____ 14. Which are the correct measures for $\angle YXZ$ and $\angle XZY$?



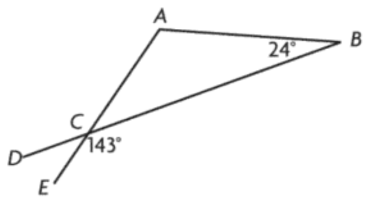
a. $\angle YXZ = 63°$, $\angle XZY = 91°$
b. $\angle YXZ = 53°$, $\angle XZY = 91°$
c. $\angle YXZ = 63°$, $\angle XZY = 81°$
d. $\angle YXZ = 53°$, $\angle XZY = 81°$

____ 15. Which are the correct measures for $\angle YXZ$ and $\angle XZY$?



a. $\angle YXZ = 52°$, $\angle XZY = 77°$
b. $\angle YXZ = 52°$, $\angle XZY = 87°$
c. $\angle YXZ = 62°$, $\angle XZY = 77°$
d. $\angle YXZ = 62°$, $\angle XZY = 87°$

____ 16. Which are the correct measures for $\angle DCE$ and $\angle CAB$?



a. $\angle DCE = 47°$, $\angle CAB = 109°$
b. $\angle DCE = 37°$, $\angle CAB = 119°$
c. $\angle DCE = 13°$, $\angle CAB = 143°$
d. $\angle DCE = 31°$, $\angle CAB = 134°$

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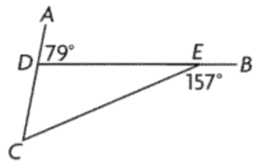
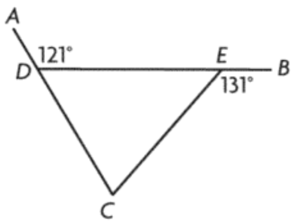
____ 17. Which are the correct measures of the interior angles of ΔCDE?



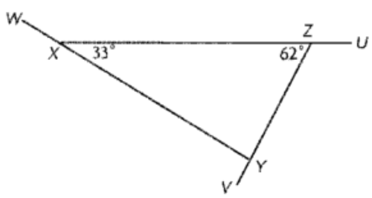
a. $\angle DCE = 46°$, $\angle CDE = 101°$, and $\angle CED = 33°$
b. $\angle DCE = 32°$, $\angle CDE = 83°$, and $\angle CED = 65°$
c. $\angle DCE = 76°$, $\angle CDE = 91°$, and $\angle CED = 13°$
d. $\angle DCE = 56°$, $\angle CDE = 101°$, and $\angle CED = 23°$

____ 18. Which are the correct measures of the interior angles of ΔCDE?



a. $\angle DCE = 92°$, $\angle CDE = 49°$, and $\angle CED = 39°$
b. $\angle DCE = 52°$, $\angle CDE = 69°$, and $\angle CED = 59°$
c. $\angle DCE = 62°$, $\angle CDE = 49°$, and $\angle CED = 69°$
d. $\angle DCE = 72°$, $\angle CDE = 59°$, and $\angle CED = 49°$

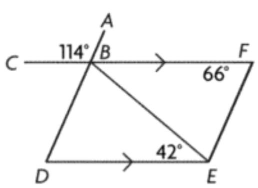
____ 19. Which are the correct measures for $\angle WXZ$, $\angle UZY$, and $\angle VYX$?



a. $\angle WXZ = 147°$, $\angle UZY = 118°$, and $\angle VYX = 95°$
b. $\angle WXZ = 147°$, $\angle UZY = 108°$, and $\angle VYX = 85°$
c. $\angle WXZ = 157°$, $\angle UZY = 118°$, and $\angle VYX = 95°$
d. $\angle WXZ = 157°$, $\angle UZY = 108°$, and $\angle VYX = 85°$

Short Answer

20. Determine the measure of $\angle ABF$.



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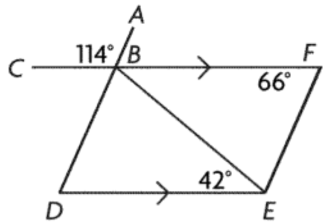
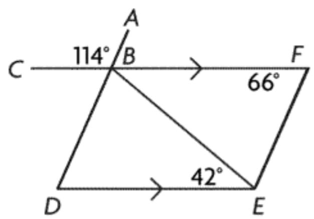
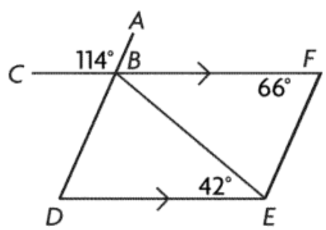
21. Determine the measure of $\angle BEF$.



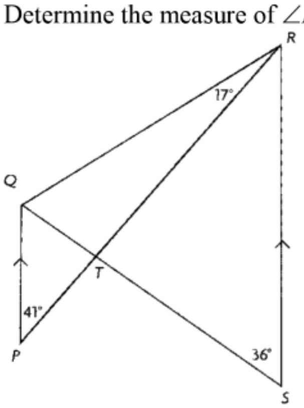
22. Determine the measure of $\angle DBF$.



23. Determine the measure of $\angle BDE$.



24. Determine the measure of $\angle PQT$.



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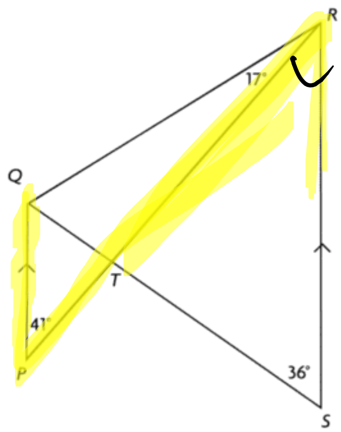
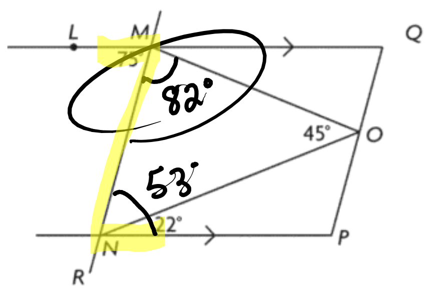
25. Determine the measure of $\angle TRS$.



41° alt. int.

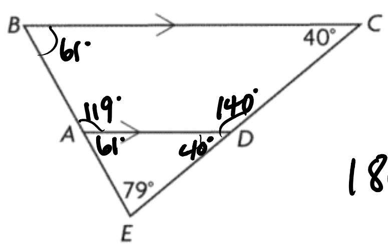
26. Determine the measure of $\angle NMO$.



$75 - 22 = 53^\circ$

$180 - 45 - 53 = 82^\circ$

27. Determine the unknown angles.



$180 - 40 - 79 = 61^\circ$

$180 - 61 - 79 = 40^\circ$

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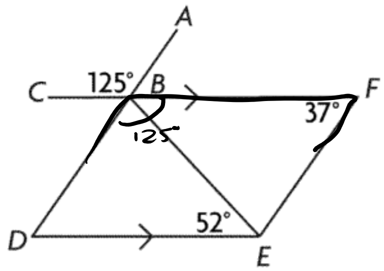
Problem

28. Are BD and FE parallel? Explain how you know.

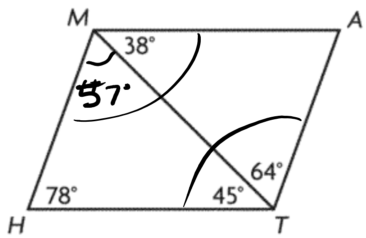


No.

$125 + 37 = 162 \neq 180°$

NOT $\parallel$

29. Is quadrilateral $MATH$ a parallelogram? Explain.



No.

$78 + 45 = 123°$

$180 - 123 = 57°$

$45 + 64 = 109°$

$57 + 38 = 95°$

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Math 20 Ch 2 Quiz
Answer Section

MULTIPLE CHOICE

1. ANS: B PTS: 1 DIF: Grade 11 REF: Lesson 2.1
OBJ: 1.1 Generalize, using inductive reasoning, the relationships between pairs of angles formed by transversals and parallel lines, with or without technology. | 1.5 Verify, with examples, that if lines are not parallel the angle properties do not apply. TOP: Parallel lines
KEY: parallel lines| transversals
2. ANS: D PTS: 1 DIF: Grade 11 REF: Lesson 2.1
OBJ: 1.1 Generalize, using inductive reasoning, the relationships between pairs of angles formed by transversals and parallel lines, with or without technology. | 1.5 Verify, with examples, that if lines are not parallel the angle properties do not apply. TOP: Parallel lines
KEY: parallel lines| transversals
3. ANS: B PTS: 1 DIF: Grade 11 REF: Lesson 2.1
OBJ: 1.1 Generalize, using inductive reasoning, the relationships between pairs of angles formed by transversals and parallel lines, with or without technology. | 1.5 Verify, with examples, that if lines are not parallel the angle properties do not apply. TOP: Parallel lines
KEY: parallel lines| transversals
4. ANS: C PTS: 1 DIF: Grade 11 REF: Lesson 2.1
OBJ: 1.1 Generalize, using inductive reasoning, the relationships between pairs of angles formed by transversals and parallel lines, with or without technology. | 1.5 Verify, with examples, that if lines are not parallel the angle properties do not apply. TOP: Parallel lines
KEY: parallel lines| transversals
5. ANS: A PTS: 1 DIF: Grade 11 REF: Lesson 2.2
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle. | 1.4 Identify and correct errors in a given proof of a property involving angles. | 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. | 2.2 Identify and correct errors in a given solution to a problem that involves the measures of angles. | 2.3 Solve a contextual problem that involves angles or triangles. | 2.4 Construct parallel lines, using only a compass or a protractor, and explain the strategy used. | 2.5 Determine if lines are parallel, given the measure of an angle at each intersection formed by the lines and a transversal.
TOP: Angles formed by parallel lines KEY: parallel lines| transversals| angles
6. ANS: B PTS: 1 DIF: Grade 11 REF: Lesson 2.2
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle. | 1.4 Identify and correct errors in a given proof of a property involving angles. | 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. | 2.2 Identify and correct errors in a given solution to a problem that involves the measures of angles. | 2.3 Solve a contextual problem that involves angles or triangles. | 2.4 Construct parallel lines, using only a compass or a protractor, and explain the strategy used. | 2.5 Determine if lines are parallel, given the measure of an angle at each intersection formed by the lines and a transversal.
TOP: Angles formed by parallel lines KEY: parallel lines| transversals| angles
7. ANS: D PTS: 1 DIF: Grade 11 REF: Lesson 2.2
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle. | 1.4 Identify and correct errors in a given proof of a property involving angles. | 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. | 2.2 Identify and correct errors in a given solution to a problem that involves the measures of angles. | 2.3 Solve a contextual problem that involves angles or triangles. | 2.4

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Construct parallel lines, using only a compass or a protractor, and explain the strategy used. | 2.5 Determine if lines are parallel, given the measure of an angle at each intersection formed by the lines and a transversal.
TOP: Angles formed by parallel lines KEY: parallel lines| transversals| angles

8. ANS: A PTS: 1 DIF: Grade 11 REF: Lesson 2.2
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle. | 1.4 Identify and correct errors in a given proof of a property involving angles. | 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. | 2.2 Identify and correct errors in a given solution to a problem that involves the measures of angles. | 2.3 Solve a contextual problem that involves angles or triangles. | 2.4 Construct parallel lines, using only a compass or a protractor, and explain the strategy used. | 2.5 Determine if lines are parallel, given the measure of an angle at each intersection formed by the lines and a transversal.
TOP: Angles formed by parallel lines KEY: parallel lines| transversals| angles

9. ANS: A PTS: 1 DIF: Grade 11 REF: Lesson 2.2
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle. | 1.4 Identify and correct errors in a given proof of a property involving angles. | 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. | 2.2 Identify and correct errors in a given solution to a problem that involves the measures of angles. | 2.3 Solve a contextual problem that involves angles or triangles. | 2.4 Construct parallel lines, using only a compass or a protractor, and explain the strategy used. | 2.5 Determine if lines are parallel, given the measure of an angle at each intersection formed by the lines and a transversal.
TOP: Angles formed by parallel lines KEY: parallel lines| transversals| angles

10. ANS: A PTS: 1 DIF: Grade 11 REF: Lesson 2.2
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle. | 1.4 Identify and correct errors in a given proof of a property involving angles. | 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. | 2.2 Identify and correct errors in a given solution to a problem that involves the measures of angles. | 2.3 Solve a contextual problem that involves angles or triangles. | 2.4 Construct parallel lines, using only a compass or a protractor, and explain the strategy used. | 2.5 Determine if lines are parallel, given the measure of an angle at each intersection formed by the lines and a transversal.
TOP: Angles formed by parallel lines KEY: parallel lines| transversals| angles

11. ANS: C PTS: 1 DIF: Grade 11 REF: Lesson 2.2
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle. | 1.4 Identify and correct errors in a given proof of a property involving angles. | 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. | 2.2 Identify and correct errors in a given solution to a problem that involves the measures of angles. | 2.3 Solve a contextual problem that involves angles or triangles. | 2.4 Construct parallel lines, using only a compass or a protractor, and explain the strategy used. | 2.5 Determine if lines are parallel, given the measure of an angle at each intersection formed by the lines and a transversal.
TOP: Angles formed by parallel lines KEY: parallel lines| transversals| angles

12. ANS: D PTS: 1 DIF: Grade 11 REF: Lesson 2.2
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle. | 1.4 Identify and correct errors in a given proof of a property involving angles. | 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. | 2.2 Identify and correct errors in a given solution to a problem that involves the measures of angles. | 2.3 Solve a contextual problem that involves angles or triangles. | 2.4 Construct parallel lines, using only a compass or a protractor, and explain the strategy used. | 2.5 Determine if lines are parallel, given the measure of an angle at each intersection formed by the lines and a transversal.
TOP: Angles formed by parallel lines KEY: parallel lines| transversals| angles

13. ANS: B PTS: 1 DIF: Grade 11 REF: Lesson 2.2
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines,

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including the sum of the angles in a triangle. | 1.4 Identify and correct errors in a given proof of a property involving angles. | 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. | 2.2 Identify and correct errors in a given solution to a problem that involves the measures of angles. | 2.3 Solve a contextual problem that involves angles or triangles. | 2.4 Construct parallel lines, using only a compass or a protractor, and explain the strategy used. | 2.5 Determine if lines are parallel, given the measure of an angle at each intersection formed by the lines and a transversal.
TOP: Angles formed by parallel lines KEY: parallel lines| transversals| angles

14. ANS: C PTS: 1 DIF: Grade 11 REF: Lesson 2.3
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle.| 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. TOP: Angles in triangles
KEY: angles| triangles
15. ANS: A PTS: 1 DIF: Grade 11 REF: Lesson 2.3
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle.| 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. TOP: Angles in triangles
KEY: angles| triangles
16. ANS: B PTS: 1 DIF: Grade 11 REF: Lesson 2.3
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle.| 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. TOP: Angles in triangles
KEY: angles| triangles
17. ANS: D PTS: 1 DIF: Grade 11 REF: Lesson 2.3
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle.| 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. TOP: Angles in triangles
KEY: angles| triangles
18. ANS: D PTS: 1 DIF: Grade 11 REF: Lesson 2.3
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle.| 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. TOP: Angles in triangles
KEY: angles| triangles
19. ANS: A PTS: 1 DIF: Grade 11 REF: Lesson 2.3
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle.| 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. TOP: Angles in triangles
KEY: angles| triangles

SHORT ANSWER

20. ANS:
$\angle ABF = 66°$

PTS: 1 DIF: Grade 11 REF: Lesson 2.2
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle. | 1.4 Identify and correct errors in a given proof of a property involving angles. | 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. | 2.2 Identify and correct errors in a given solution to a problem that involves the measures of angles. | 2.3 Solve a contextual problem that involves angles or triangles. | 2.4

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Construct parallel lines, using only a compass or a protractor, and explain the strategy used. | 2.5 Determine if lines are parallel, given the measure of an angle at each intersection formed by the lines and a transversal.
TOP: Angles formed by parallel lines KEY: parallel lines| transversals| angles

21. ANS:
$\angle BEF = 72°$

PTS: 1 DIF: Grade 11 REF: Lesson 2.2
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle. | 1.4 Identify and correct errors in a given proof of a property involving angles. | 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. | 2.2 Identify and correct errors in a given solution to a problem that involves the measures of angles. | 2.3 Solve a contextual problem that involves angles or triangles. | 2.4 Construct parallel lines, using only a compass or a protractor, and explain the strategy used. | 2.5 Determine if lines are parallel, given the measure of an angle at each intersection formed by the lines and a transversal.
TOP: Angles formed by parallel lines KEY: parallel lines| transversals| angles

22. ANS:
$\angle DBF = 114°$

PTS: 1 DIF: Grade 11 REF: Lesson 2.2
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle. | 1.4 Identify and correct errors in a given proof of a property involving angles. | 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. | 2.2 Identify and correct errors in a given solution to a problem that involves the measures of angles. | 2.3 Solve a contextual problem that involves angles or triangles. | 2.4 Construct parallel lines, using only a compass or a protractor, and explain the strategy used. | 2.5 Determine if lines are parallel, given the measure of an angle at each intersection formed by the lines and a transversal.
TOP: Angles formed by parallel lines KEY: parallel lines| transversals| angles

23. ANS:
$\angle BDE = 66°$

PTS: 1 DIF: Grade 11 REF: Lesson 2.2
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle. | 1.4 Identify and correct errors in a given proof of a property involving angles. | 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. | 2.2 Identify and correct errors in a given solution to a problem that involves the measures of angles. | 2.3 Solve a contextual problem that involves angles or triangles. | 2.4 Construct parallel lines, using only a compass or a protractor, and explain the strategy used. | 2.5 Determine if lines are parallel, given the measure of an angle at each intersection formed by the lines and a transversal.
TOP: Angles formed by parallel lines KEY: parallel lines| transversals| angles

24. ANS:
$\angle a = 18°$, $\angle b = 54°$, $\angle c = 27°$

PTS: 1 DIF: Grade 11 REF: Lesson 2.2
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle. | 1.4 Identify and correct errors in a given proof of a property involving angles. | 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. | 2.2 Identify and correct errors in a given solution to a problem that involves the measures of angles. | 2.3 Solve a contextual problem that involves angles or triangles. | 2.4 Construct parallel lines, using only a compass or a protractor, and explain the strategy used. | 2.5 Determine if lines are parallel, given the measure of an angle at each intersection formed by the lines and a transversal.

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TOP: Angles formed by parallel lines KEY: parallel lines| transversals| angles

25. ANS:
$\angle a = 15°$, $\angle b = 30°$, $\angle c = 10°$

PTS: 1 DIF: Grade 11 REF: Lesson 2.2
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle. | 1.4 Identify and correct errors in a given proof of a property involving angles. | 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. | 2.2 Identify and correct errors in a given solution to a problem that involves the measures of angles. | 2.3 Solve a contextual problem that involves angles or triangles. | 2.4 Construct parallel lines, using only a compass or a protractor, and explain the strategy used. | 2.5 Determine if lines are parallel, given the measure of an angle at each intersection formed by the lines and a transversal.
TOP: Angles formed by parallel lines KEY: parallel lines| transversals| angles

26. ANS:
$\angle PQT = 36°$

PTS: 1 DIF: Grade 11 REF: Lesson 2.2
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle. | 1.4 Identify and correct errors in a given proof of a property involving angles. | 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. | 2.2 Identify and correct errors in a given solution to a problem that involves the measures of angles. | 2.3 Solve a contextual problem that involves angles or triangles. | 2.4 Construct parallel lines, using only a compass or a protractor, and explain the strategy used. | 2.5 Determine if lines are parallel, given the measure of an angle at each intersection formed by the lines and a transversal.
TOP: Angles formed by parallel lines KEY: parallel lines| transversals| angles

27. ANS:
$\angle TRS = 41°$

PTS: 1 DIF: Grade 11 REF: Lesson 2.2
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle. | 1.4 Identify and correct errors in a given proof of a property involving angles. | 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. | 2.2 Identify and correct errors in a given solution to a problem that involves the measures of angles. | 2.3 Solve a contextual problem that involves angles or triangles. | 2.4 Construct parallel lines, using only a compass or a protractor, and explain the strategy used. | 2.5 Determine if lines are parallel, given the measure of an angle at each intersection formed by the lines and a transversal.
TOP: Angles formed by parallel lines KEY: parallel lines| transversals| angles

28. ANS:
$\angle NMO = 82°$

PTS: 1 DIF: Grade 11 REF: Lesson 2.3
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle.| 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. TOP: Angles in triangles
KEY: angles| triangles

29. ANS:
$\angle ADE = 40°$, $\angle EAD = 61°$, $\angle ABC = 61°$, $\angle BAD = 119°$, $\angle CDA = 140°$

PTS: 1 DIF: Grade 11 REF: Lesson 2.3
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines,

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including the sum of the angles in a triangle.| 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. TOP: Angles in triangles
KEY: angles| triangles

PROBLEM

30. ANS:
$\angle ABC = \angle FBD = 125°$ Vertically opposite angles
$\angle EFB + \angle FBD = 162°$
So, *BD* is not parallel to *FE* because the interior angles on the same side of the transversal are not supplementary.

PTS: 1 DIF: Grade 11 REF: Lesson 2.2
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle. | 1.4 Identify and correct errors in a given proof of a property involving angles. | 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. | 2.2 Identify and correct errors in a given solution to a problem that involves the measures of angles. | 2.3 Solve a contextual problem that involves angles or triangles. | 2.4 Construct parallel lines, using only a compass or a protractor, and explain the strategy used. | 2.5 Determine if lines are parallel, given the measure of an angle at each intersection formed by the lines and a transversal.
TOP: Angles formed by parallel lines KEY: parallel lines| transversals| angles

31. ANS:
It is not a parallelogram. $\angle AMT$ does not equal $\angle MTH$, so alternate interior angles are not equal.

PTS: 1 DIF: Grade 11 REF: Lesson 2.3
OBJ: 1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle.| 2.1 Determine the measures of angles in a diagram that involves parallel lines, angles and triangles, and justify the reasoning. TOP: Angles in triangles
KEY: angles| triangles