

# COMPACTED MATHEMATICS

## CHAPTER 9B

### GEOMETRIC PROPERTIES

#### TOPICS COVERED:

- Four Triangle Project  
(angles, right angles, obtuse angles, acute angles, perimeter, area, sum of angles, polygons)
- Classifying triangles
- Measuring angles
- Complementary and supplementary angles
- Coordinate graphs

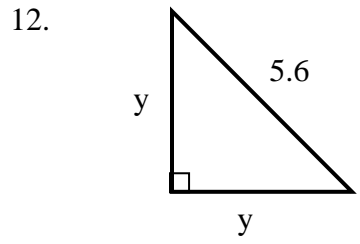
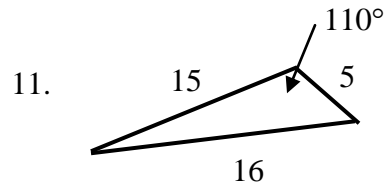
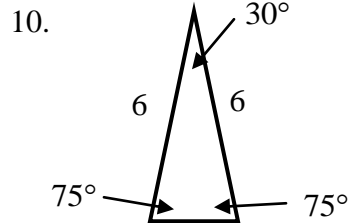
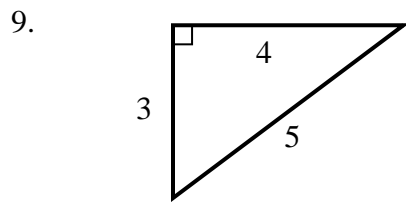
Classify the triangles as right, acute, or obtuse, given the three angles.

1.	40°, 30°, 110°		2.	60°, 30°, 90°	
3.	50°, 60°, 70°		4.	90°, 46°, 44°	

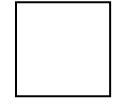
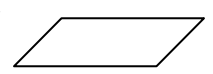
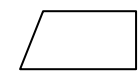
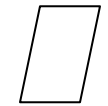
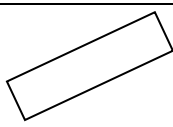
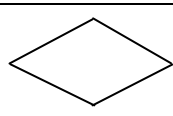
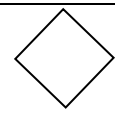
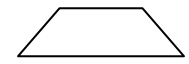
Classify each triangle as equilateral, isosceles, or scalene, given the lengths of the three sides.

5.	3 cm, 5 cm, 3 cm		6.	50 m, 50 m, 50 m	
7.	2 ft, 5 ft, 6 ft		8.	4 m, 4m, 6m	

Give all possible names for the triangle (for example, right isosceles).

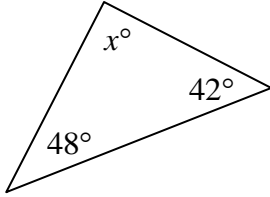


Write the name of each quadrilateral. Choose from the following names: trapezoid, parallelogram, rhombus, rectangle, and square. Some objects may have more than one name.

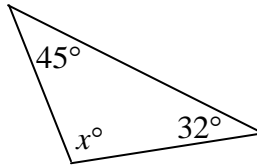
13. 	14. 	15. 	16. 
17. 	18. 	19. 	20. 

Find the value of  $x$ . Then classify each triangle as acute, right, or obtuse.

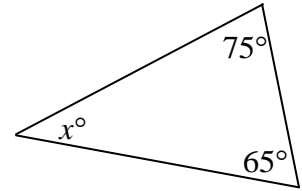
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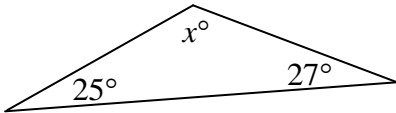
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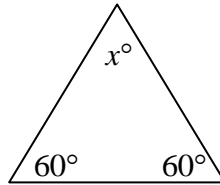
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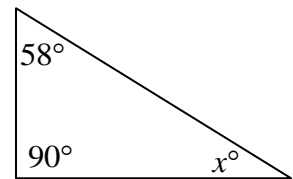
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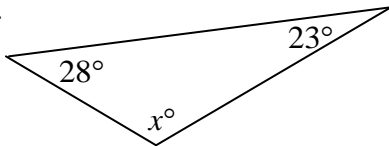
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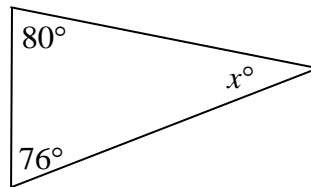
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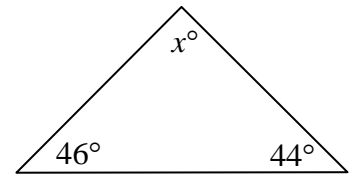
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8.

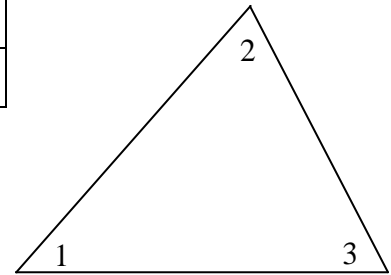


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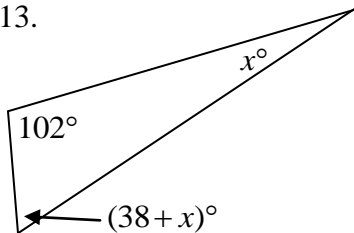
Use the figure at the right to solve each of the following.

10.	Find $m\angle 1$ if $m\angle 2 = 30^\circ$ and $m\angle 3 = 55^\circ$ .	
11.	Find $m\angle 1$ if $m\angle 2 = 45^\circ$ and $m\angle 3 = 90^\circ$ .	
12.	Find $m\angle 1$ if $m\angle 2 = 110^\circ$ and $m\angle 3 = 25^\circ$ .	

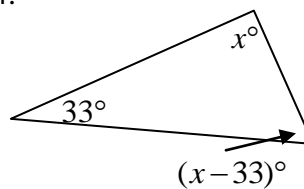


Find the measure of the angles in each triangle.

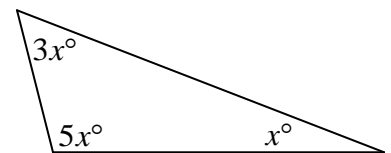
13.



14.



15.



Activity	<b>Triangles</b>	NAME:
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**Draw each of the following types of triangles.**

1. Acute and scalene

2. Acute and isosceles

3. Acute and equilateral

4. Right and scalene

5. Right and isosceles

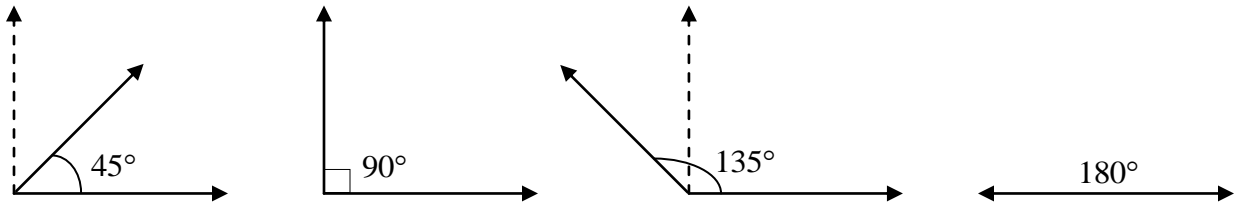
6. Obtuse and scalene

7. Obtuse and isosceles

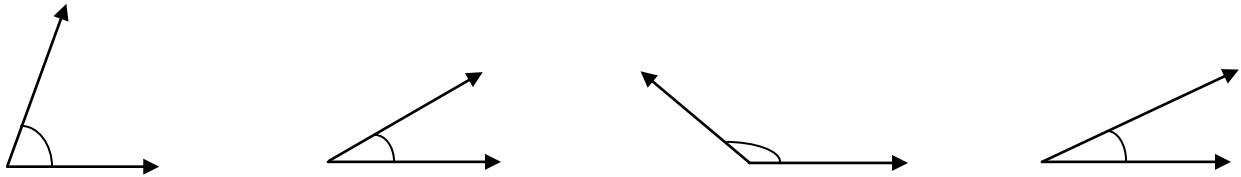
**Find the measure of the missing angle in each triangle and the sum of the angles.**

	<b>Angle 1</b>	<b>Angle 2</b>	<b>Angle 3</b>	<b>Sum of angles</b>
8.	100°	50°		
9.		60°	60°	
10.	10°		90°	
11.	171°	4°		
12.		57°	44°	
13.	106°		38°	
14.	37°	37°		
15.		45°	45°	

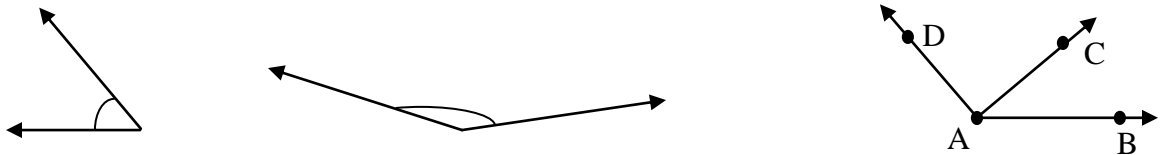
**Reference Angles:**



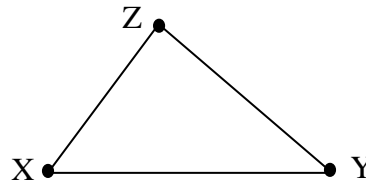
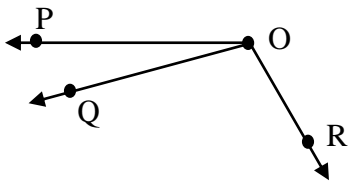
Determine the best estimate for each angle. Circle your answer.



1.	$35^\circ$	2.	$65^\circ$	3.	$95^\circ$	4.	$55^\circ$
	$70^\circ$		$30^\circ$		$170^\circ$		$25^\circ$
	$120^\circ$		$150^\circ$		$140^\circ$		$85^\circ$



5.	$50^\circ$	6.	$25^\circ$	7.	$m\angle BAC$ is about...	$40^\circ$
	$80^\circ$		$110^\circ$		$m\angle CAD$ is about...	$15^\circ$
	$110^\circ$		$155^\circ$			$65^\circ$
8.					$m\angle BAD$ is about...	$90^\circ$
						$100^\circ$
9.						$130^\circ$



10.	$m\angle POR$ is about...	$160^\circ$	13.	$m\angle X$ is about...	$60^\circ$
					$35^\circ$
11.	$m\angle POQ$ is about...	$40^\circ$	14.	$m\angle Y$ is about...	$45^\circ$
		$15^\circ$			$25^\circ$
12.	$m\angle QOR$ is about...	$105^\circ$	15.	$m\angle Z$ is about...	$75^\circ$
		$140^\circ$			$40^\circ$

**Complementary angles** add up to  $90^\circ$ . **Supplementary angles** add up to  $180^\circ$ .

Find the measure of the angle that is complementary to the angle having the given measure.

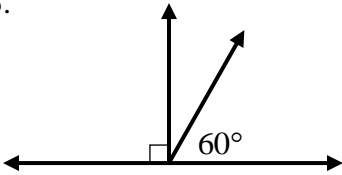
1.	$20^\circ$		2.	$67^\circ$		3.	$14^\circ$	
4.	$81^\circ$		5.	$45^\circ$		6.	$74^\circ$	

Find the measure of the angle that is supplementary to the angle having the given measure.

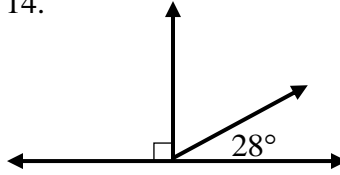
7.	$120^\circ$		8.	$56^\circ$		9.	$29^\circ$	
10.	$162^\circ$		11.	$83^\circ$		12.	$1^\circ$	

Find the angle measure that is not given.

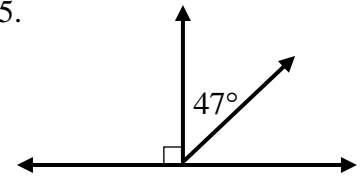
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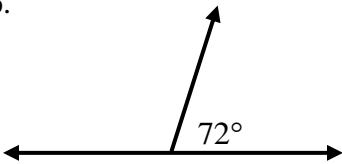
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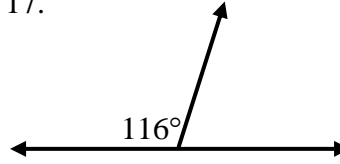
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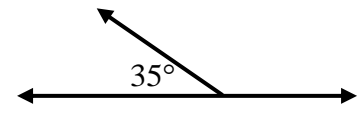
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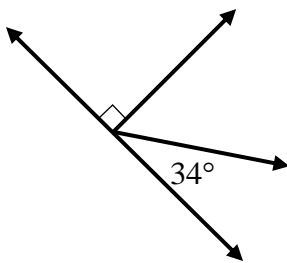
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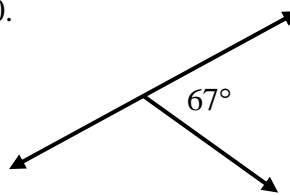
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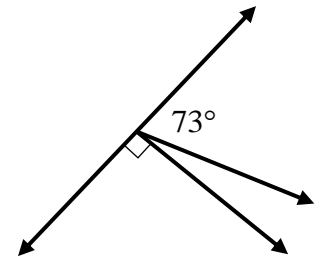
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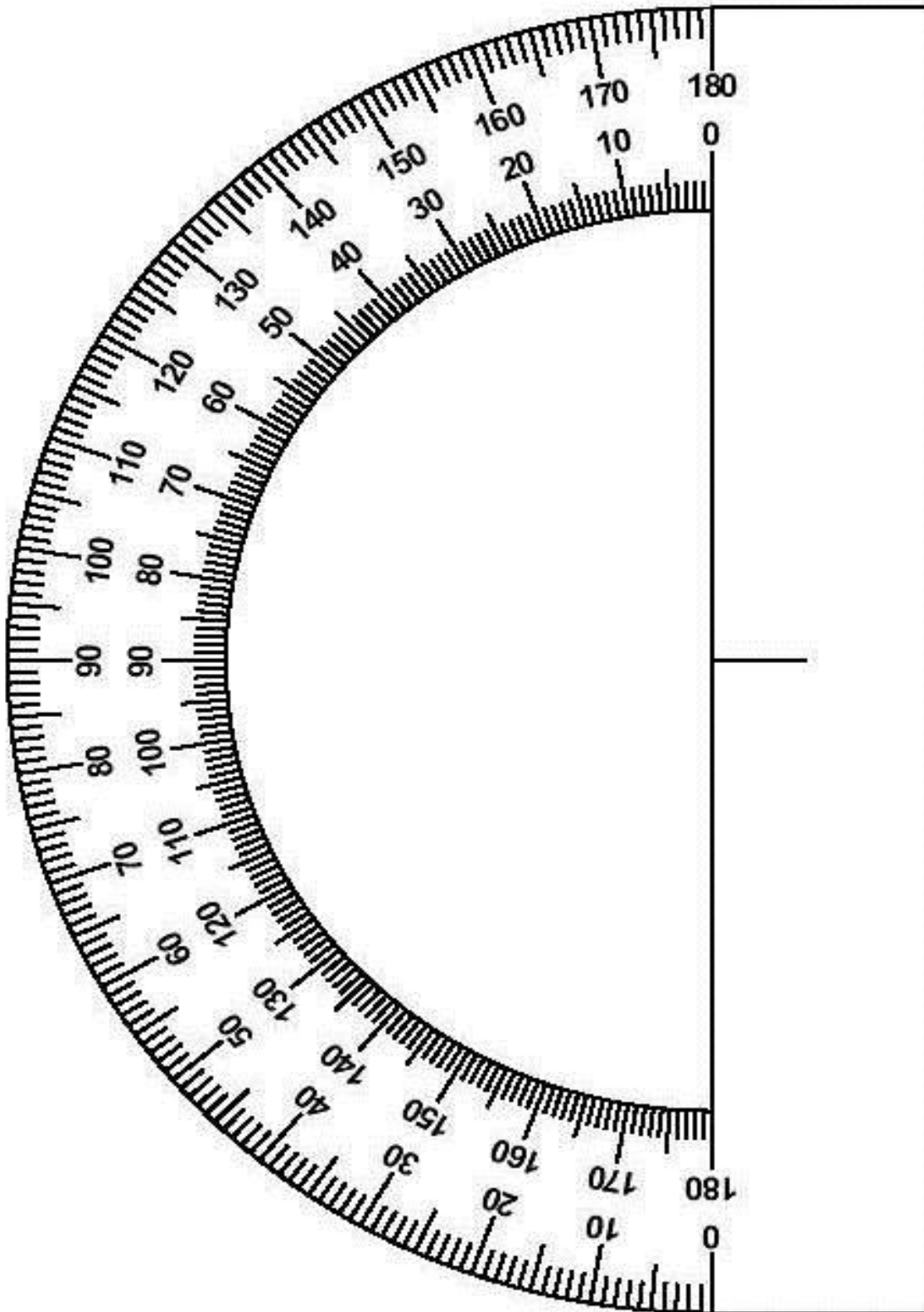


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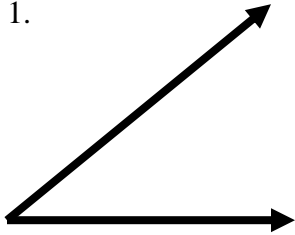
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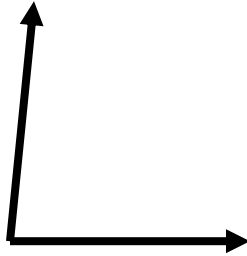


**Measure Angles:** Write what type of angle each is and then measure it.

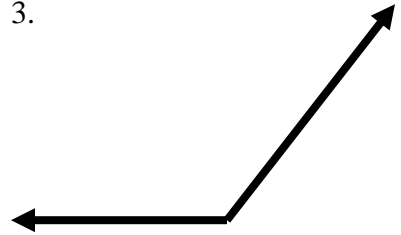
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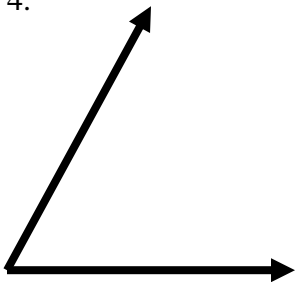
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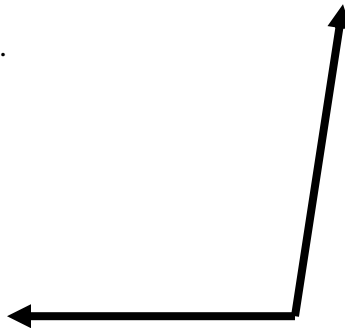
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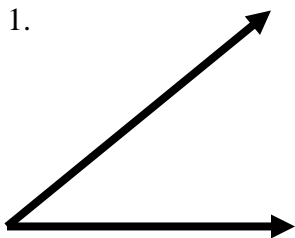


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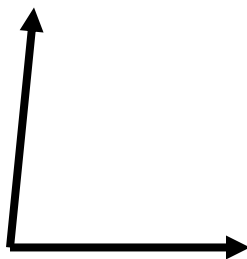


**Measure Angles:** Write what type of angle each is and then measure it.

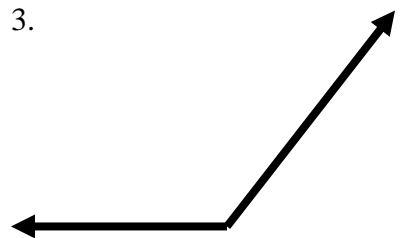
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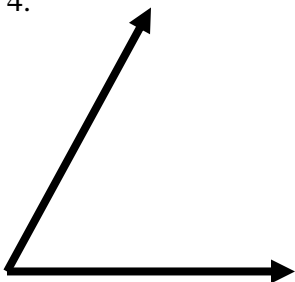
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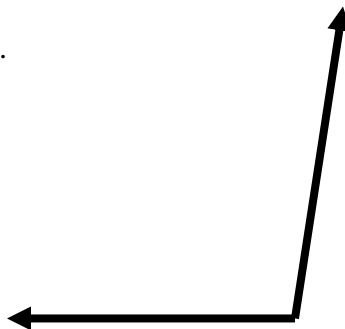
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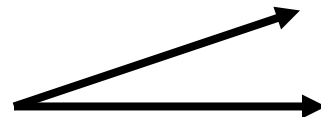
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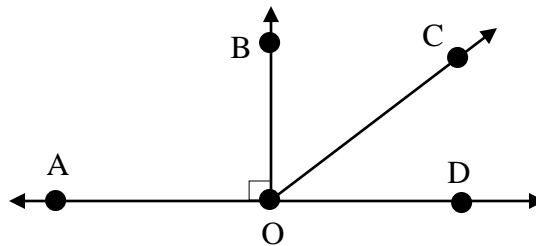


6.



Activity	<b>Angles</b>	NAME:
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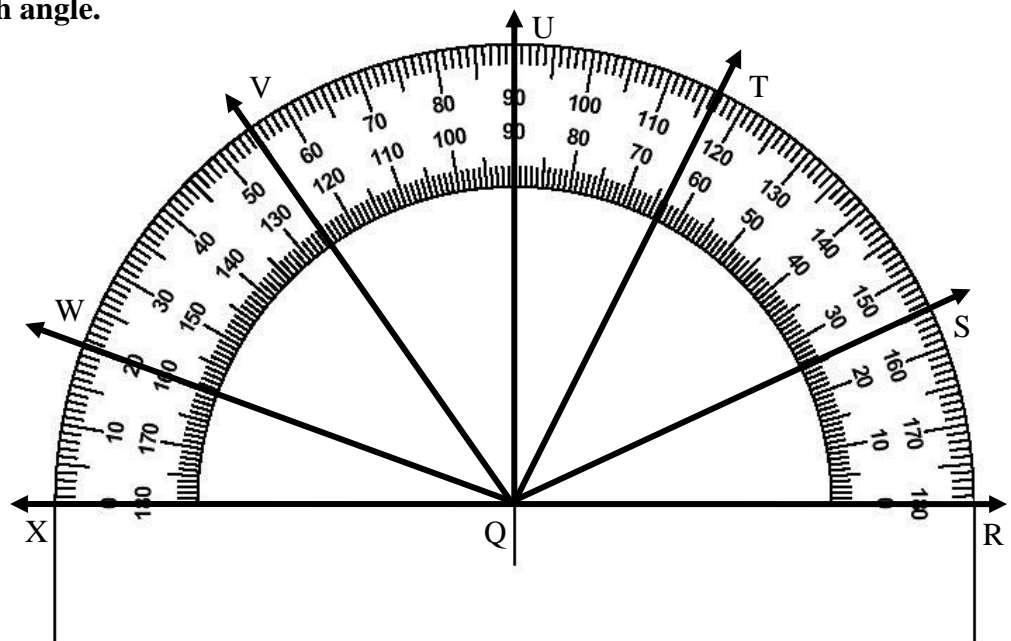
Complete each statement.



1.	The figure formed by two rays from the same endpoint is an...	
2.	The intersection of the two sides of an angle is called its...	
3.	The vertex of $\angle COD$ in the drawing above is point...	
4.	The instrument used to measure angles is called a...	
5.	The basic unit in which angles are measured is the...	
6.	$\angle AOB$ has a measure of $90^\circ$ and is called a _____ angle.	
7.	An angle whose measure is between $0^\circ$ and $90^\circ$ is an _____ angle.	
8.	Two acute angles in the figure are $\angle BOC$ and _____.	
9.	An angle whose measure is between $90^\circ$ and $180^\circ$ is an _____ angle.	
10.	An obtuse angle in the figure is _____.	

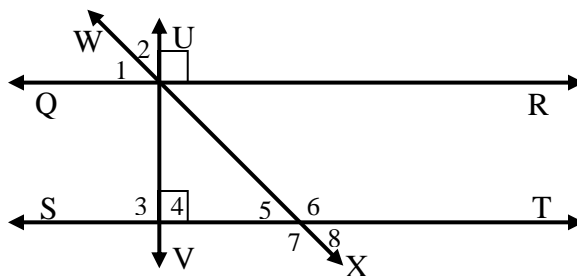
Give the measure of each angle.

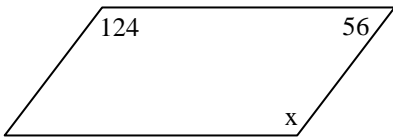
11	$\angle RQS$	
12	$\angle RQT$	
13	$\angle RQU$	
14	$\angle RQV$	
15	$\angle RQW$	
16	$\angle XQW$	
17	$\angle XQT$	
18	$\angle UQV$	
19	$\angle VQT$	
20	$\angle WQS$	



Activity	<b>Angles</b>	NAME:
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Use the figure below to answer questions 1 through 7.

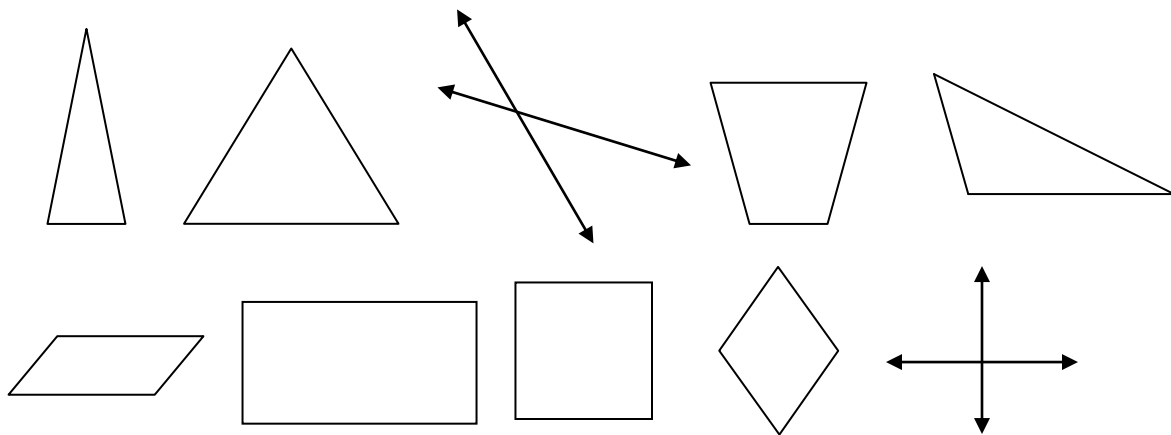


1.	Describe how QR and ST are related. A. They are perpendicular lines. B. They are intersecting lines. C. They are parallel lines. D. They are complementary.	
2.	Describe how WX and UV are related. A. They are perpendicular lines. B. They are intersecting lines. C. They are parallel lines. D. They are supplementary.	
3.	Describe how UV and ST are related. A. They are perpendicular lines. B. They are complementary. C. They are parallel lines. D. They are right angles.	
4.	Which are complementary angles? A. $\angle 1$ and $\angle 2$ B. $\angle 3$ and $\angle 4$ C. $\angle 5$ and $\angle 6$ D. $\angle 7$ and $\angle 8$	
5.	Which are supplementary angles? A. $\angle 1$ and $\angle 2$ B. $\angle 4$ and $\angle 5$ C. $\angle 5$ and $\angle 8$ D. $\angle 7$ and $\angle 8$	
6.	If the measure of $\angle 5$ is $45^\circ$ , what is the measure of $\angle 6$ ?	
7.	What is the measure of $\angle 3$ ?	
8.	What is the measure of $x$ in the parallelogram? 	

*I. Match letter of vocabulary word with appropriate definition.*

- |   |                         |
|---|-------------------------|
| 1. ___ A triangle with no congruent sides                 | a. Trapezoid            |
| 2. ___ Parallelogram, 4 right angles                      | b. Parallelogram        |
| 3. ___ A triangle with 3 congruent sides                  | c. Rectangle            |
| 4. ___ Lines that cross at a point                        | d. Rhombus              |
| 5. ___ A triangle with 2 congruent sides                  | e. Square               |
| 6. ___ Exactly one pair of opposite sides parallel        | f. Scalene triangle     |
| 7. ___ Parallelogram, 4 right angles, 4 congruent sides   | g. Isosceles triangle   |
| 8. ___ Lines that cross at $90^\circ$                     | h. Equilateral triangle |
| 9. ___ Parallelogram, 4 congruent sides                   | i. Intersecting lines   |
| 10. ___ Opposite sides parallel, opposite sides congruent | j. Perpendicular line   |

*II. Place correct letter, from part I, inside or near shape. Each shape will only contain one letter. Choose the most appropriate (i.e. specific) letter.*

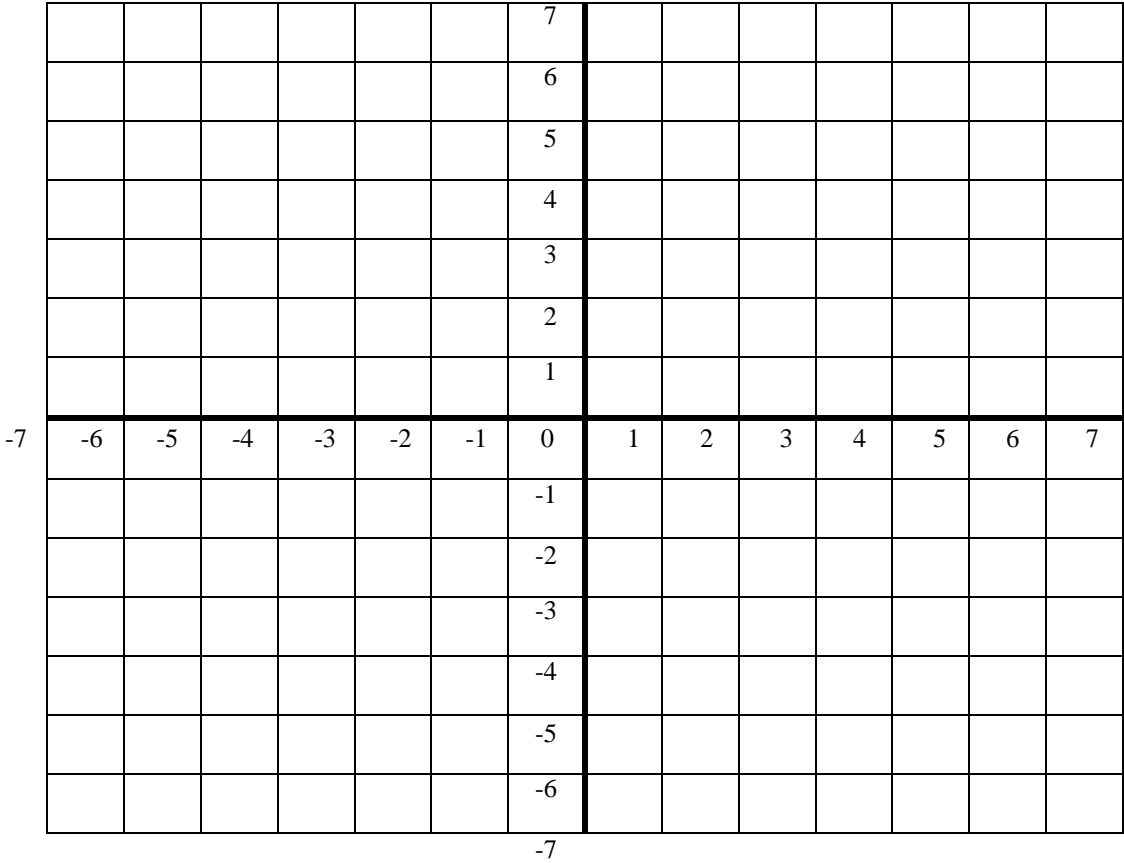


Activity 9-21	<b>You sunk my battleship!</b>	NAME:
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Have you ever played the classic game Battleship? This coordinate plane activity works in a very similar fashion. You have the following ships: Carrier (5 points long), Battleship (4 points long), Cruiser (3), Submarine (3), and a Destroyer (2). Using the coordinate plane below, place your ships wherever you wish by putting X's on specific ordered pairs (where the lines cross). They must be placed horizontally or vertically (not diagonally). Then, find a partner and play the game. Each person takes turns guessing an ordered pair on their opponent's plane. The opponent must respond "hit" or "miss". The winner is the first to sink their opponent's entire fleet. (Use the plane on the back to keep track of your guesses).

<b>Carrier (5)</b>	<b>Battleship (4)</b>	<b>Cruiser (3)</b>
<b>Submarine (3)</b>	<b>Destroyer (2)</b>	

**PLACE YOUR SHIPS HERE**



Activity 9-21	<b>You sunk my battleship!</b>	NAME: _____
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<b>Carrier (5)</b>	<b>Battleship (4)</b>	<b>Cruiser (3)</b>
<b>Submarine (3)</b>		<b>Destroyer (2)</b>

**KEEP TRACK OF YOUR GUESSES HERE**

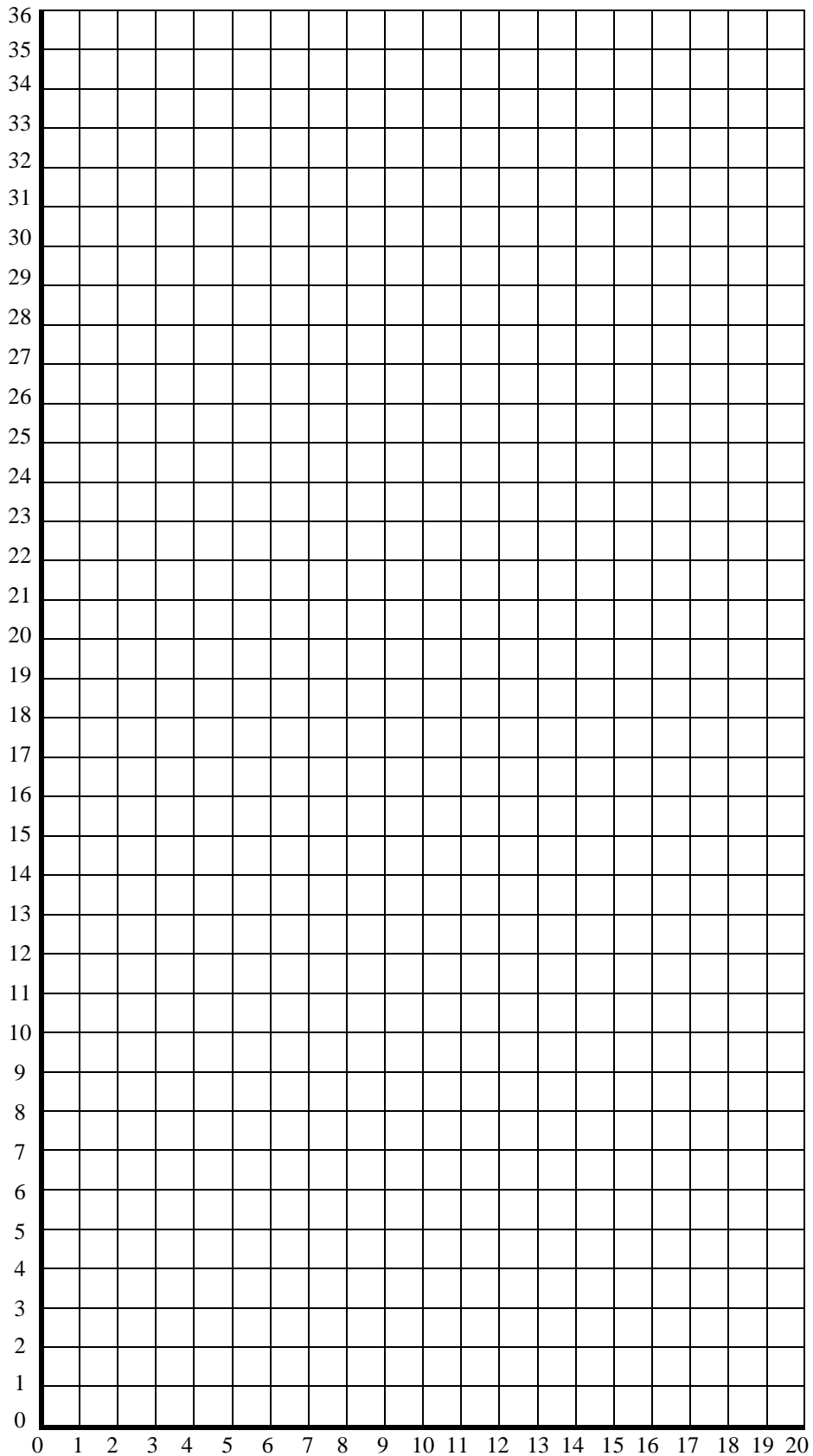
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						6								
						5								
						4								
						3								
						2								
						1								
-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7
						-1								
						-2								
						-3								
						-4								
						-5								
						-6								
						-7								

Connect each group of points in order on the supplied coordinate plane.

x	y
8	12
8	9
6	8
4	1
3	1
3	0
6	0
8	7
9	7
9	5
12	1
11	1
11	0
14	0
14	1
13	2
13	3
11	7
12	7
13	8
13	13
16	8
20	8
17	14
13	16
14	17
16	17
18	19
18	20
16	22
15	22
14	21
13	21
13	20
12	19

x	y
13	18
12	17
10	17
7	16
6	17
LINE ENDS	
x	y
11	13
8	12
7	12
5	15
5	16
4	17
5	18
6	18
6	16
8	14
10	15
LINE ENDS	
x	y
4	17
0	15
2	18
3	18
4	17
LINE ENDS	
x	y
11	17
9	16
8	14
LINE ENDS	

x	y
3	20
5	23
12	21
6	18
LINE ENDS	
x	y
2	18
3	20
4	20
4	19
5	18
5	22
4	22
5	23
6	22
5	22
LINE ENDS	
x	y
0	33
3	36
5	36
6	35
6	34
5	33
6	32
6	31
5	30
3	30
0	33
LINE ENDS	





		Sides	Specific shape	Perimeter	Sum of Angles
1	Square		Square		
2	Triangle				

	Made With	Sides	Specific shape	Perimeter	Sum of Angles
3	2 Triangles				
4	2 Triangles				
5	2 Triangles				
6	3 Triangles				
7	3 Triangles				
8	3 Triangles				
9	3 Triangles				
10	4 Triangles				
11	4 Triangles				
12	4 Triangles				
13	4 Triangles				
14	4 Triangles				
15	4 Triangles				
16	4 Triangles				
17	4 Triangles				
18	4 Triangles				
19	4 Triangles				
20	4 Triangles				
21	4 Triangles				
22	4 Triangles				
23	4 Triangles				

What pattern or rule do you notice between the number of sides on a shape and the sum of the angles?