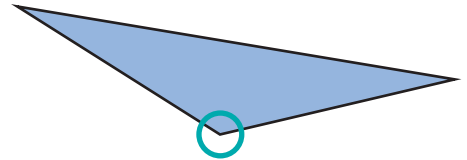Name _____   Date _____

Investigating Angles

NCTM Standards 3, 4, 7, 8

Tell whether each marked angle looks *acute, right,* or *obtuse.*
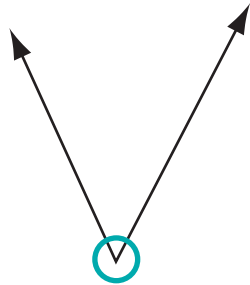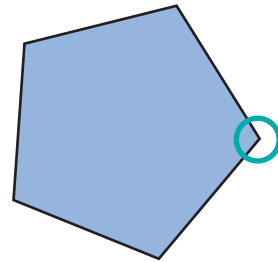
1

_____

2

_____

3

_____

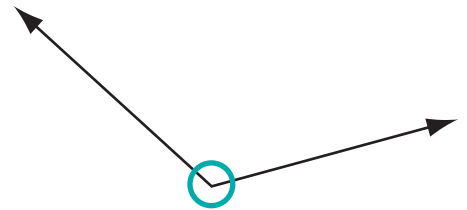**4**
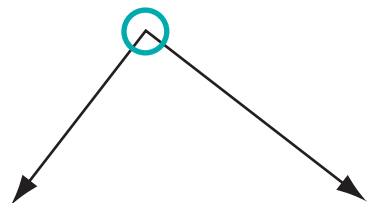
_____

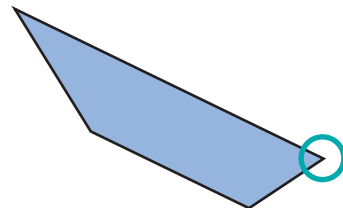**5**

_____
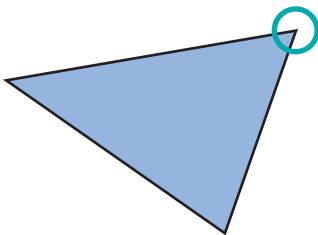
6

_____

7

_____

8

_____

For each pair of angles, identify which is bigger and explain your choice.

9 Which angle is bigger: *U* or *V*? ____

Explain: _____

_____

_____

U

V
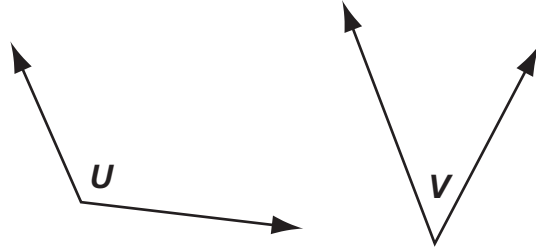
10 Which angle is bigger: *W* or *X*? ____

Explain: _____

_____

_____

_____

W

X
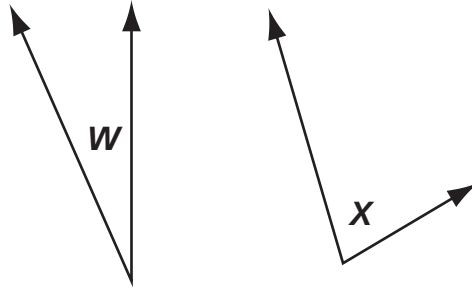
11 Which angle is bigger: *Y* or *Z*? ____

Explain: _____

_____

_____

_____

_____

Y

Z
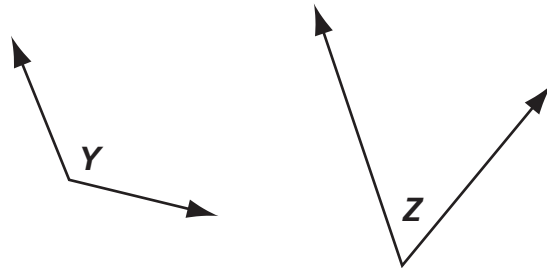
12 **Challenge** Can a triangle have two right angles?
Explain your thinking with words and pictures.

_____

_____

_____

_____

_____

_____

Classifying Angles and Triangles

NCTM Standards 3, 4, 7, 9

Name _____   Date _____

1 Complete the table below. Identify each angle as **acute, right,** or **obtuse.** Then measure it to the nearest 5 .
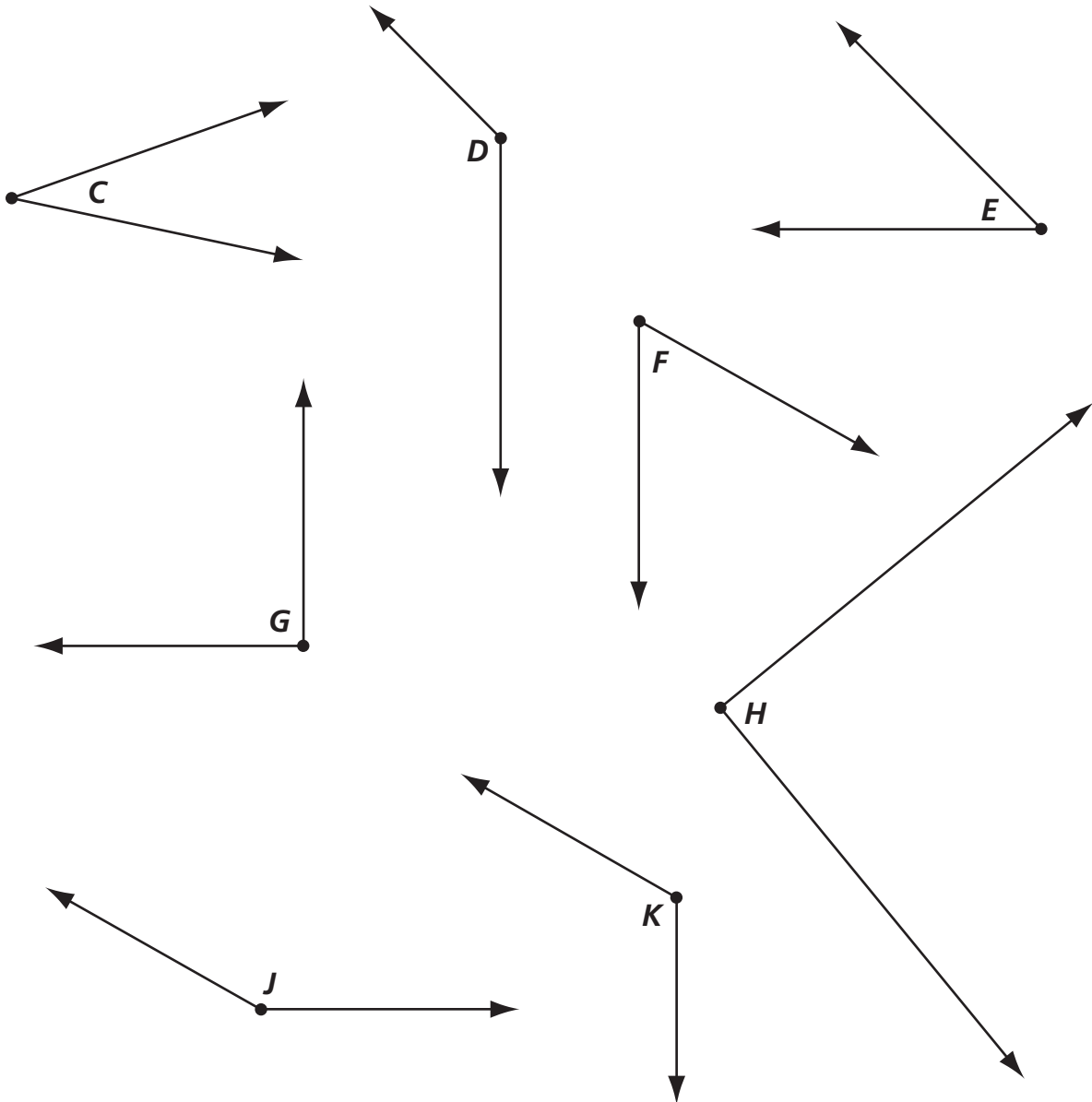
Angle	C	D	E	F	G	H	J	K
acute, right, or obtuse				acute				
Measure				60				

2 Use a ruler and a protractor to measure the sides and angles of *XYZ.*

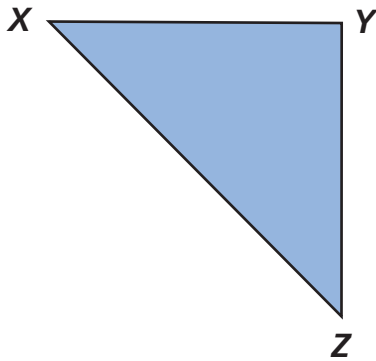| Angle	Measure	Side	Length
X	about _____	$\overline{XY}$	about _____ cm
Y	about _____	$\overline{YZ}$	about _____ cm
Z	about _____	$\overline{XZ}$	about _____ cm

3 Circle all of the following that apply to *XYZ.*

Scalene   Isosceles   Equilateral   Acute   Right   Obtuse

4 Use a ruler and a protractor to measure the sides and angles of *UVW.*
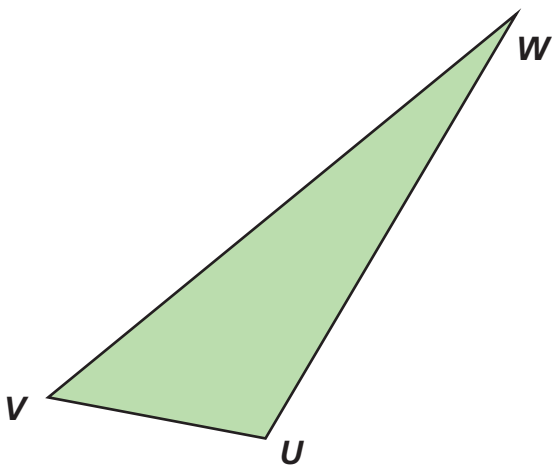
Angle	Measure	Side	Length
U	about _____	$\overline{UV}$	about _____ cm
V	about _____	$\overline{VW}$	about —— cm
W	about _____	$\overline{UW}$	about _____ cm

5 Circle all of the following that apply to *UVW.*

Scalene   Isosceles   Equilateral   Acute   Right   Obtuse

6 **Challenge** Can a triangle be both isosceles and right? _____

Can a triangle be both equilateral and right? _____

What other combination of the two classes of triangles is **not**

possible? _____

Name _____   Date _____

Constructing Triangles

NCTM Standards 3, 4, 8, 10

1 On a separate piece of paper, construct XYZ so that:

Length of $\overline{YZ}$	6 cm
Length of $\overline{XZ}$	3 cm
Measure of Z	60

2 Now measure the triangle you have drawn.

Length of $\overline{XY}$	about _____ cm
Measure of X	about _____
Measure of Y	about _____

3 Cut out XYZ and compare it with the others in your class. What do you notice?

_____

_____

4 Attach your copy of XYZ below.

Here is a triangle.
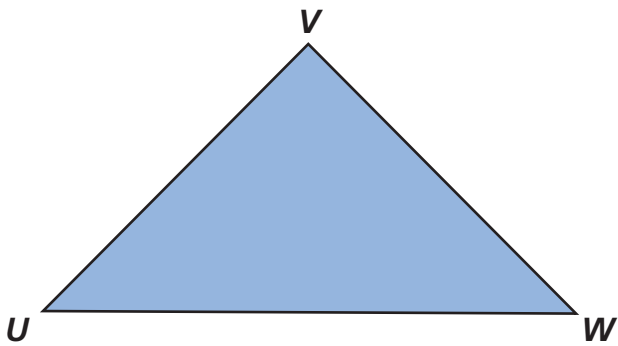
5 Choose two of its angles to measure. Also measure the side of the triangle shared by those two angles. In the table, write the names and measures of the angles and side you chose.

Name	Measure
___	___
___	___
___	___ cm

6 Use those measures to draw a triangle on your own paper. Draw the side first, and make sure it is between the angles that you measured.

7 Cut out your triangle and compare it with the one above, and with others in your class. What do you notice?
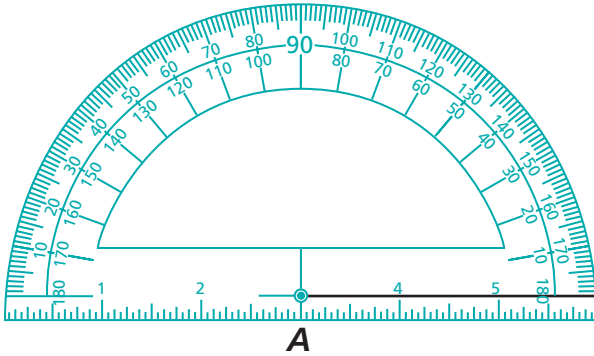
_____

_____

8 Tape your triangle below.

Name _____ Date _____

Constructing Similar Triangles

NCTM Standards 3, 4

Use a straightedge to draw a line to make the angles.

1

A

measure of ∠ **A**: 60

2

B
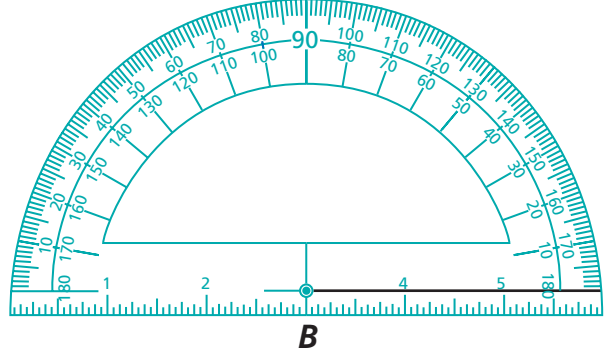
measure of ∠ **B**: 45

Use a protractor and straightedge to draw the angles.

3 ∠ **X** measures 30 .

4 ∠ **Y** measures 120 .

X•————————————

Y•————————————
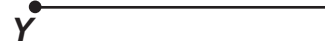
5 Draw lines to match similar figures.

prime   **CLXXIX**   one hundred seventy-nine **179**
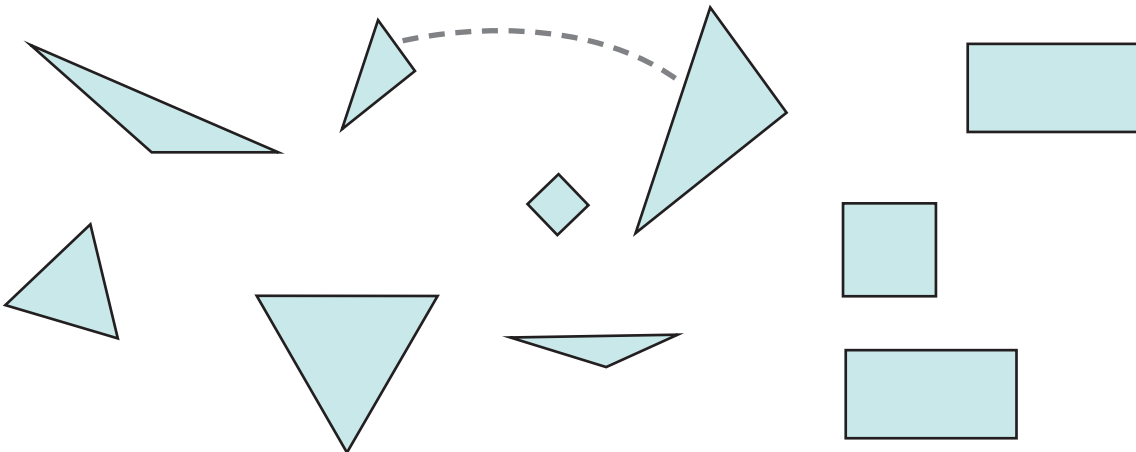
Use a ruler with this triangle to do the following.

6 Find the midpoint of $\overline{UV}$. Label it **X.**

7 Find the midpoint of $\overline{VW}$. Label it **Y.**

8 Connect the midpoints to form $\overline{XY}$.

9 Label the angles in ∆ **XVY** as angles **3, 4** and **5.**

V

1

U

2

W
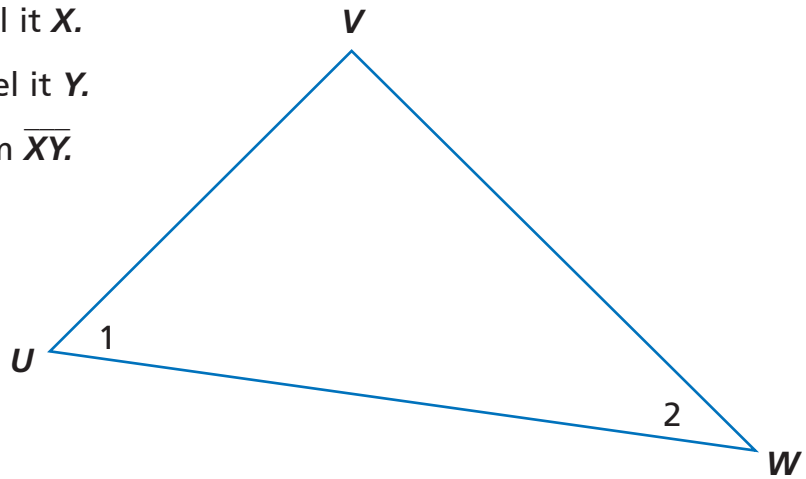
Use the triangles above to answer the following.

10 What angle is congruent to ∠ **1?** _____

11 What angle is congruent to ∠ **2?** _____

12 Identify a triangle similar to ∆ **UVW.** _____

13 Add two more line segments so that there are four triangles all congruent to ∆ **XVY** inside ∆ **UVW.**

14 **Challenge** Draw ∆ **BDA** with the following measures:

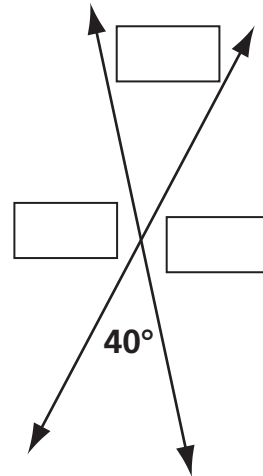| Name	Measure
$\overline{BA}$	about **10 cm**
$\overline{BD}$	about **7 cm**
∠B	about **45°**

Angles Formed by Intersecting Lines

NCTM Standards 3, 4, 7, 9

Use your knowledge of straight angles and opposite angles to figure out the missing angle measures. (No protractors, please!)
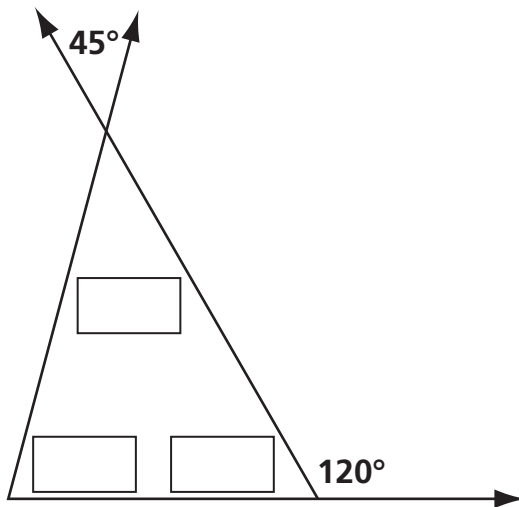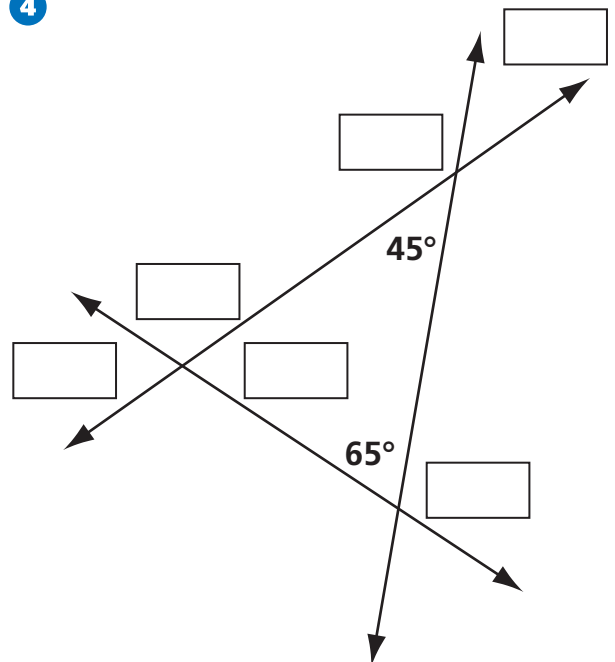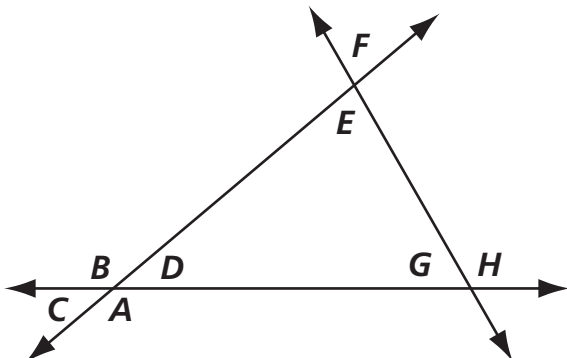
1

50°

2

40°

3

45°

120°

4

45°

65°
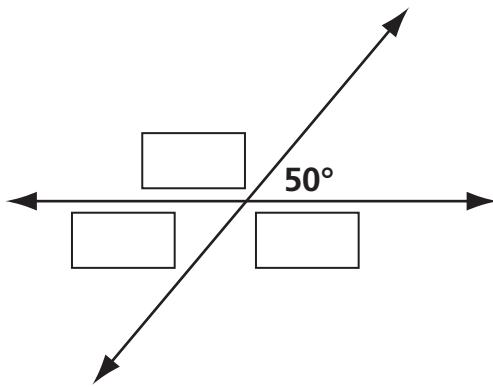
5 Fill in letters to make the number sentences true. No protractors, please!

$m\ \underline{}\ m\ \underline{}\ $ **180°**

$m\ \underline{}\ m\ \underline{}\ m\ \underline{}\ $ **180°**

6 Complete the table.

Angle	Measure
C	40
F	80
G	
H	
A	

7 Find eight angles that measure 80 . You may use a protractor if you wish.
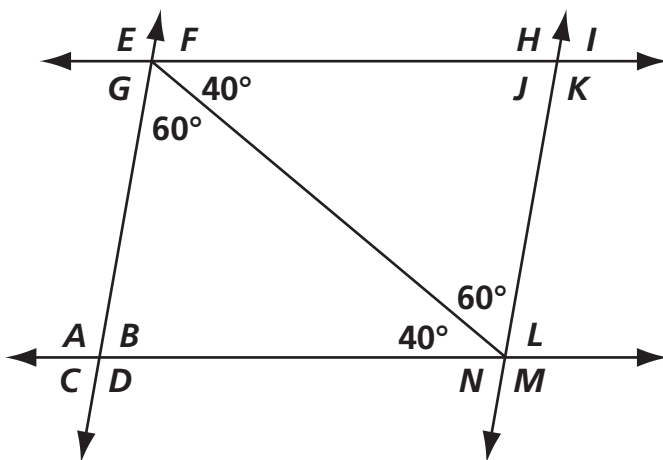
Angle	Measure
B	80
	80
	80
	80
	80
	80
	80
	80
	80

8 **Challenge** **Without** a protractor, figure out the angle measures and complete the table.
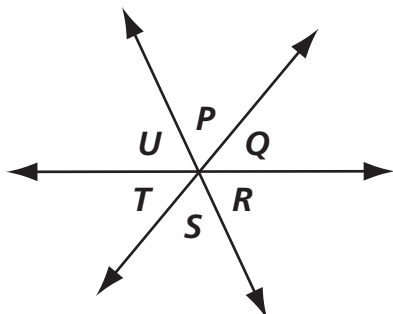
Angle	Measure
P	65
Q	
R	65
S	
T	
U	

Name _____ Date _____

Angles Formed by a Line Intersecting Parallel Lines

NCTM Standards 1, 3, 4, 7, 8, 9

Trace over a Z in each group of intersecting lines.

1 *a* ‖ *b*
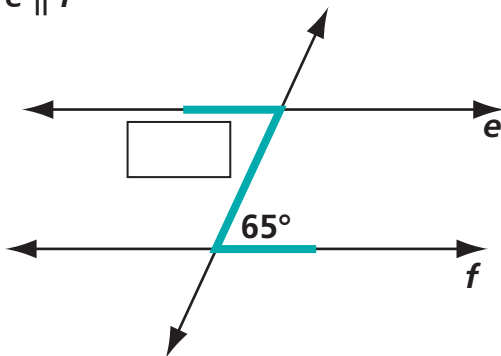
a

b

2 *c* ‖ *d*
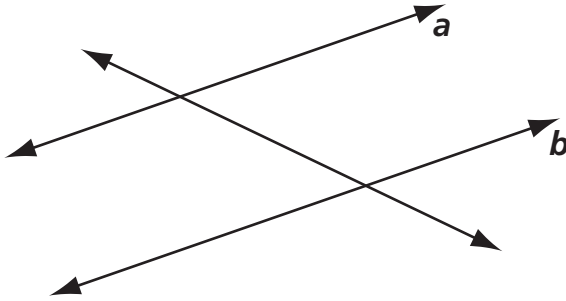
c   *d*
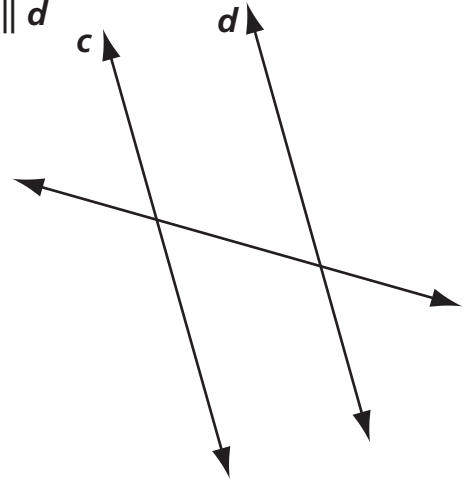
Use the Zs to figure out the missing angle measures.

3 *e* ‖ *f*

e

65°

f

4 *g* ‖ *h*

g

90°

h

5 *i* ‖ *j*

i   *j*

60°

6 *l* ‖ *m*

l

m

120°
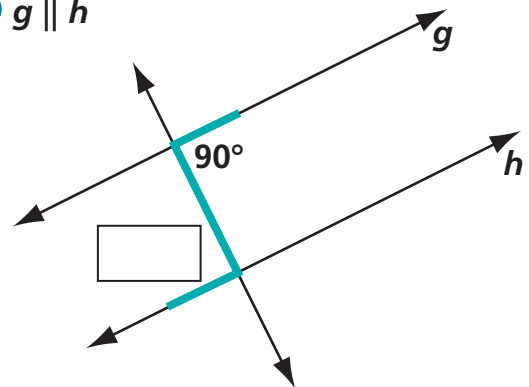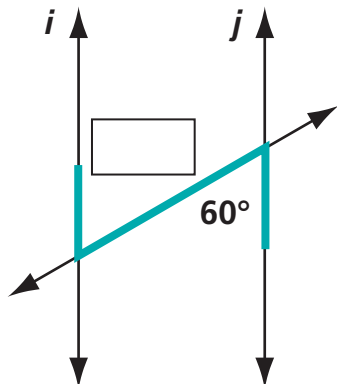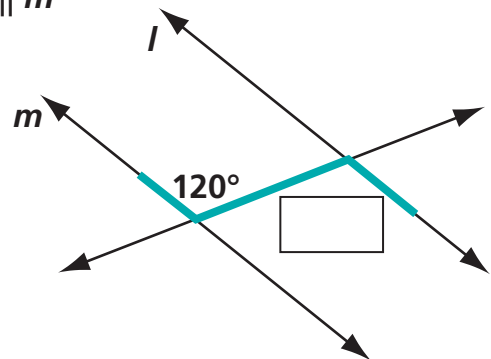
Without a protractor, use your knowledge about Zs, straight angles, and opposite angles to figure out the missing angle measures.

7 $r \parallel t$

s

r   135° [ ]

[ ]

t   [ ]

8 $g \parallel h$

f

[ ]

g   45°

[ ]
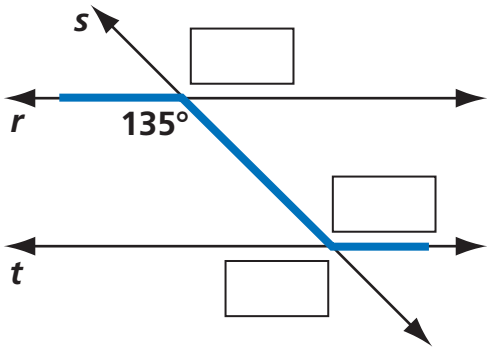
h   [ ]   [ ]
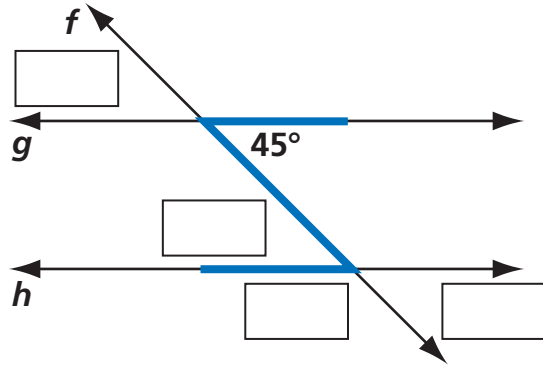
Use a protractor to measure at least one angle. See how few you need to measure!

9 $m \parallel n$

l   [ ]

m   [ ]   [ ]   [ ]

n

10 $d \parallel e$

[ ]
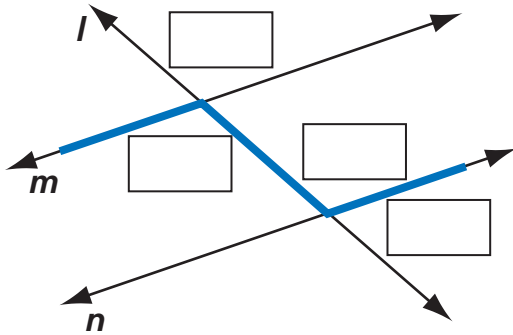
c   d   e

[ ]   [ ]

[ ]   [ ]

---
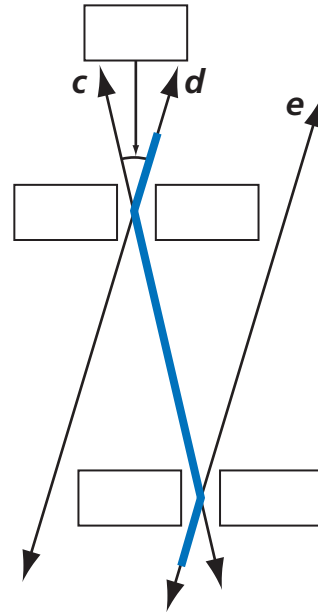
11 Challenge Explain how you would use this picture to show why angles in Zs have the same measure.

m   n

A   B

C

$m \parallel n$

_____

_____

_____

_____

Name _____   Date _____
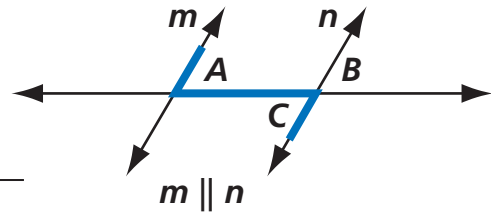
Comparing and Classifying Quadrilaterals

NCTM Standards 3, 7, 9

Circle the names of all the quadrilaterals for which the sentence is correct.

1 This shape has **4 sides.**

    trapezoid   rhombus   square   parallelogram   rectangle   kite

2 This shape has **4 congruent angles.**

    trapezoid   rhombus   square   parallelogram   rectangle   kite

3 This shape has **4 congruent sides.**

    trapezoid   rhombus   square   parallelogram   rectangle   kite

4 This shape has **two pairs of parallel sides.**

    trapezoid   rhombus   square   parallelogram   rectangle   kite

5 This shape has **two pairs of congruent sides.**

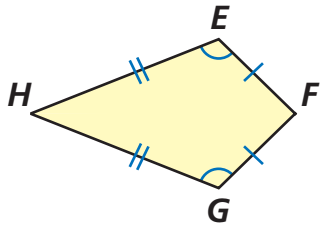   trapezoid   rhombus   square   parallelogram   rectangle   kite

6 This shape always **includes a right angle.**

    trapezoid   rhombus   square   parallelogram   rectangle   kite

Answer the questions about the attributes of these quadrilaterals. To find all the lines of symmetry, trace the figures and fold the copies.
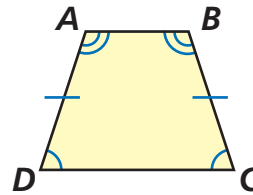
7 Quadrilateral *EFGH*

Draw all lines of symmetry on the figure.

Number of **pairs** of congruent sides: ____

Number of **pairs** of congruent angles: ____
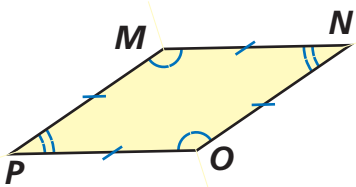
8 Quadrilateral *ABCD*

Draw all lines of symmetry on the figure.

Number of **pairs** of parallel sides: ____

Number of **pairs** of congruent angles: ____

9 Quadrilateral *MNOP*

Draw all lines of symmetry on the figure.

Number of congruent sides: ____

Number of **pairs** of congruent angles: ____

10 Quadrilateral *QRST*
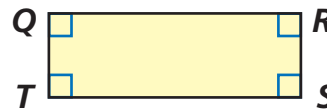
Draw all lines of symmetry on the figure.

Number of **pairs** of congruent sides: ____
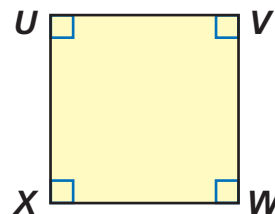
Number of **pairs** of perpendicular sides: ____

11 Challenge Quadrilateral *UVWX*

Draw all lines of symmetry on the figure.
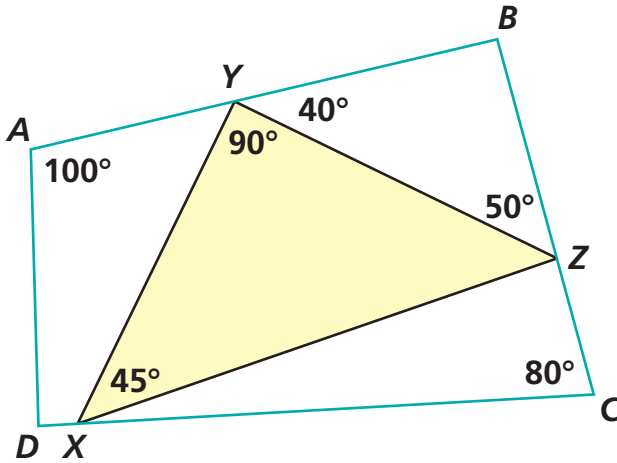
Number of congruent sides: ____

Number of **pairs** of perpendicular sides: ____

Name _____ Date _____

# Investigating Quadrilaterals

NCTM Standards 3, 4, 6, 7, 9

1 Without using a protractor, find the missing angle measures. (Hint: Use what you know about triangles first, then use what you know about quadrilaterals.)

Angle	Measure
AYX	
B	
YZX	
XZC	
CXZ	
DXY	
D	

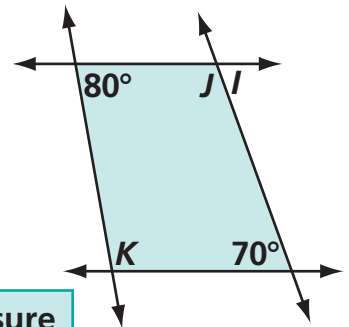**Without using a protractor, find the missing angle measures in these special quadrilaterals. Use what you know about the quadrilaterals and about angle measures in Z's. For each, you need to find one angle measure outside the quadrilateral.**

2 Parallelogram
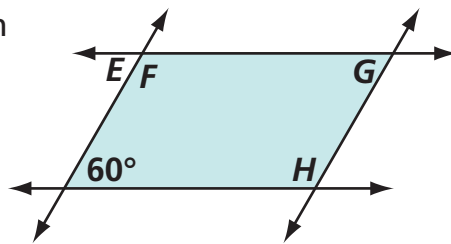
Angle	Measure
E	
F	
G	
H	

3 Trapezoid

Angle	Measure
I	
J	
K	

4 Without a protractor, use your knowledge about Zs, straight angles, opposite angles, and angles in quadrilaterals to figure out the missing angle measures. (There may be other angles you want to find, as well!)

$\overline{PR} \parallel \overline{SV}$

$\overline{PV} \parallel \overline{RS}$

$\overline{WT} \parallel \overline{RS}$

R   S

90°
W   T

P   30°

40°
V   139°
U
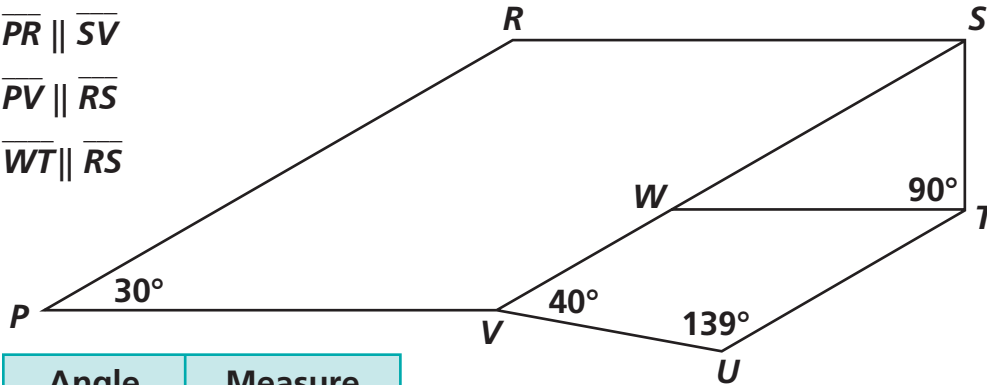
Angle	Measure
VWT	
SWT	
PRS	
RSW	
TSW	
WTU	
PVW	

5 Challenge When Jonah said, "Quadrilateral *STUV* in the figure above is a trapezoid," Nina disagreed.
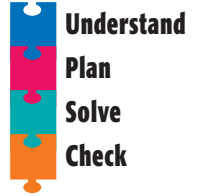
"It does look like a trapezoid," she said, "but it can't be. Look at all the angle measures."

Nina is correct! Why isn't Quadrilateral *STUV* a trapezoid?

_____

_____

_____

_____

Name _____   Date _____
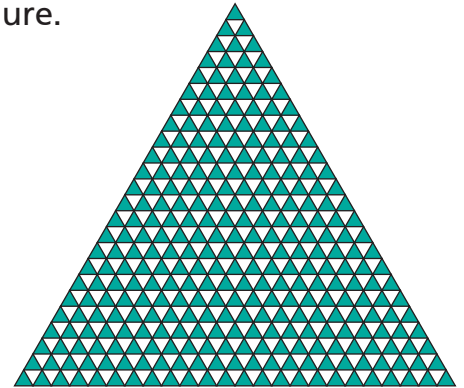
Problem Solving Strategy
Look for a Pattern
NCTM Standards 2, 3, 4, 6, 8, 10

1 Kurt used green and white triangles to make this figure.
There are 24 rows in the figure.

A How many small triangles
(green and white) did he need?   _____

B How many small triangles
(green and white) would be
in a figure with *n* rows?   _____

2 The heptagon (seven-sided polygon) on the left can be cut
into eight congruent triangles, as shown on the right. The
triangles are right triangles, and one angle measures 20 .
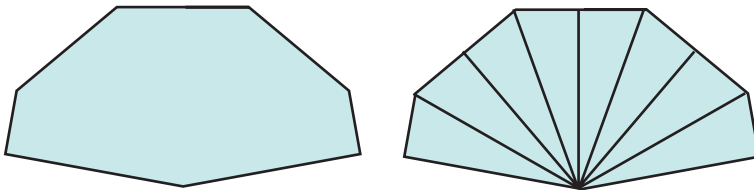
A What is the sum of the angle
measures at the vertices of
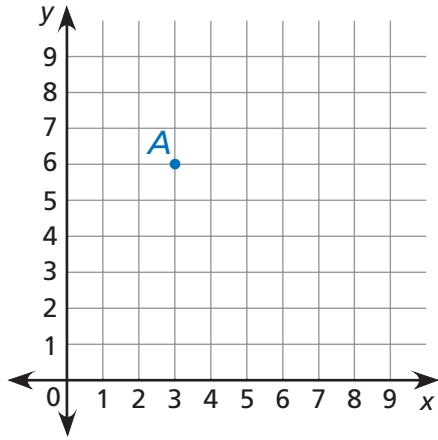the heptagon?   _____

B Explain how you found your answer.

_____

_____

_____

_____

_____

_____

_____

Problem Solving Test Prep

Choose the correct answer.

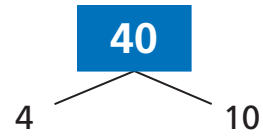**1** Alex moves point *A* right 3 spaces and down 2 spaces. What is the location of point *A* after the translation?

A. (5,8)   **C.** (1,8)

B. (6,4)   **D.** (6,2)

2 Which fraction is greater than $\frac{5}{16}$?

A. $\frac{3}{8}$ **C.** $\frac{1}{4}$

B. $\frac{2}{9}$ **D.** $\frac{6}{20}$

3 Which numbers complete the factor tree for the prime factors of 40?

A. 2, 4, 5

B. 2, 2, 5, 5

C. 2, 2, 2, 2, 5

D. 2, 2, 2, 5

4 Which is a true statement for this set of data?

3, 3, 3, 5, 6, 7, 9, 10, 11, 11, 12

A. mode   median

B. median   mean

C. mean   median

**D.** mode   mean

---

✏️Show What You Know

Solve each problem. Explain your answer.

5 If you use beans to represent the numbers in the pattern below, how many beans will you use for the first 7 numbers? Explain.
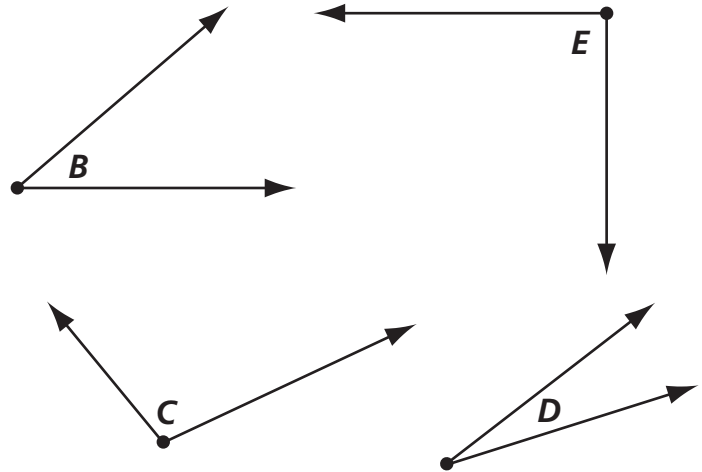
1, 3, 7, 15, 31, . . .

_____

_____

_____

_____

6 Pablo folds a paper in half, then in half again, and so on. The first two folds are shown below. After how many folds will he have 32 congruent sections? Explain.
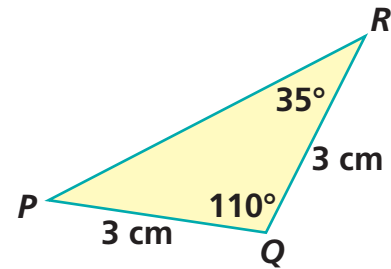

_____

_____

Review/Assessment

Name _____ Date _____
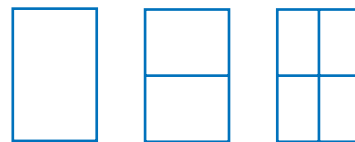
Complete the table. Identify each angle as *acute*, *right*, or *obtuse*. Then measure to the nearest 5 . **Lessons 1 and 2**

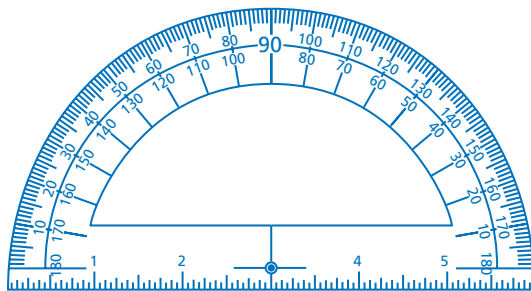|	Angle	acute, right, or obtuse?	Measure
1	B		
2	C		
3	D		
4	E		

For 5–6, use the information in the drawing (not protractors or rulers). **Lesson 2**

5 The measure of *P* is _____.
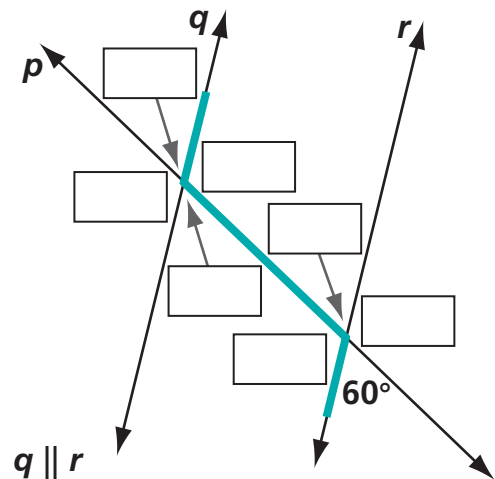
6 Circle all that apply. *PQR* is . . .

acute   obtuse   right   scalene   isosceles   equilateral

(triangle PQR: R = 35°, Q = 110°, sides 3 cm and 3 cm)

7 Use a straightedge to draw an angle that is 35 . **Lesson 3**

measure of *A*: 35

8 Without using a protractor, find the missing angle measures. **Lessons 5 and 6**

q ∥ r

(angles p, q, r with 60°)

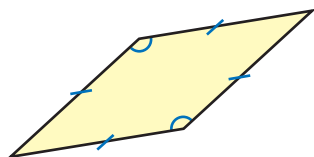**9** Use a ruler and a protractor. Draw a triangle with these measures. **Lesson 3**

Length of $\overline{AB}$: 8 cm

Measure of ∠A: 45

Measure of ∠B: 30

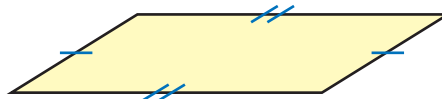**Notice the congruent sides and angles. Circle all the names that match each quadrilateral.** **Lessons 7 and 8**

10

11

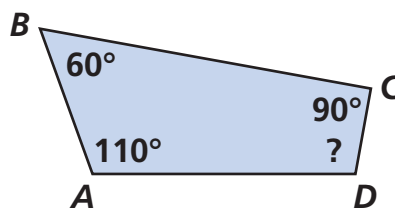| square	rhombus		rectangle	parallelogram
rectangle	parallelogram		trapezoid	rhombus

12 For 10–11, sketch in any lines of symmetry in the quadrilaterals. **Lesson 7**

---

13 Without using a protractor, find the measure of ∠D. **Lesson 8**

The measure of ∠D is _____.

B
60°
90° C
110°
?
A
D

Solve the problem. **Lesson 9**

14 Anthony used pattern block rhombuses to make the first three similar figures in this pattern. How many pattern block rhombuses will he need to make the fifth figure in the pattern?

_____