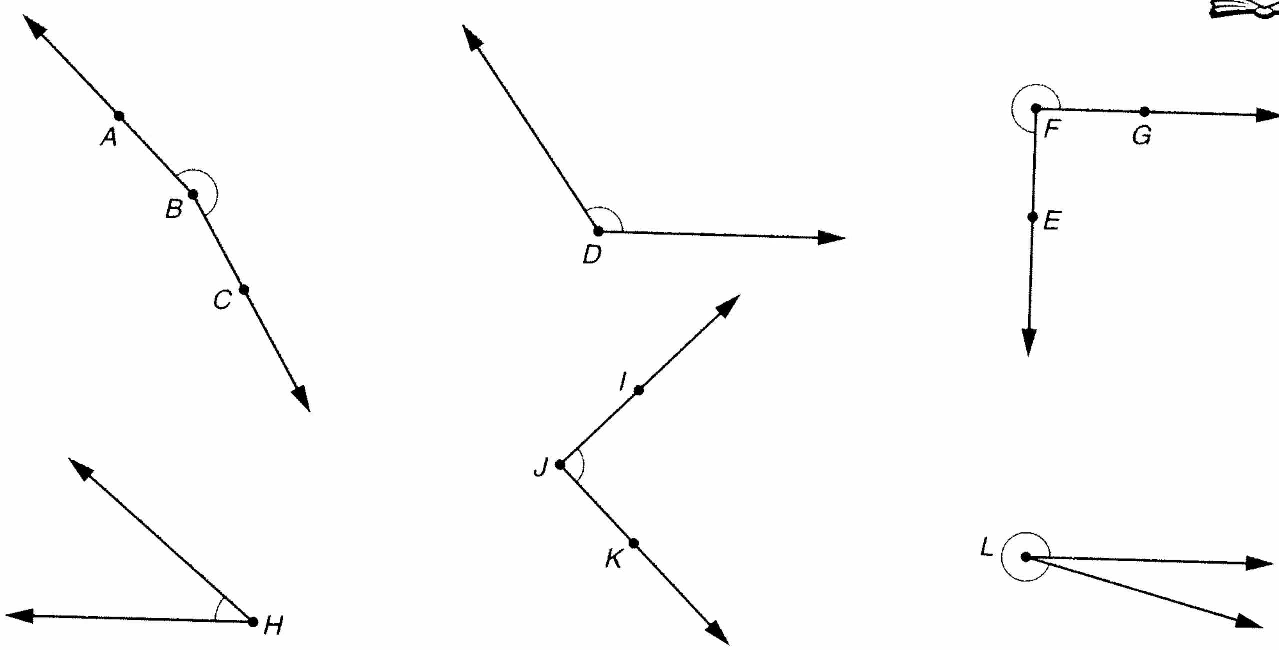
Name ______________________ Date ______________ Time ______________

STUDY LINK 5•1 Angles

SRB 160 230–232

1. Measure each angle to the nearest degree. Write the measure next to the angle.



2. a. Which angle above is an acute angle? __________

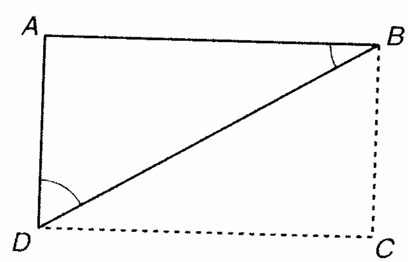
   b. A right angle? __________ c. An obtuse angle? __________

   d. Which angles above are reflex angles? ______________________________

3. a. Measure each angle in triangle *ADB* at the right.

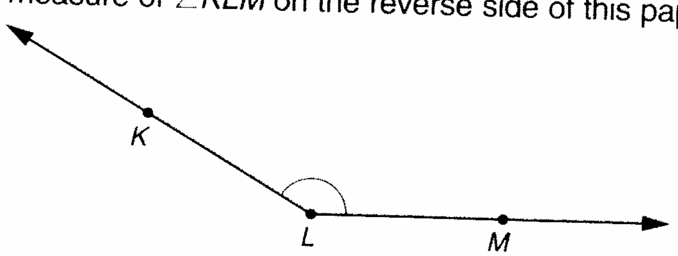
   b. Find the sum of the 3 angle measures. __________°

   c. Use Problem 3b to calculate the sum of the interior angle measures in quadrangle *ABCD*. __________°



Try This

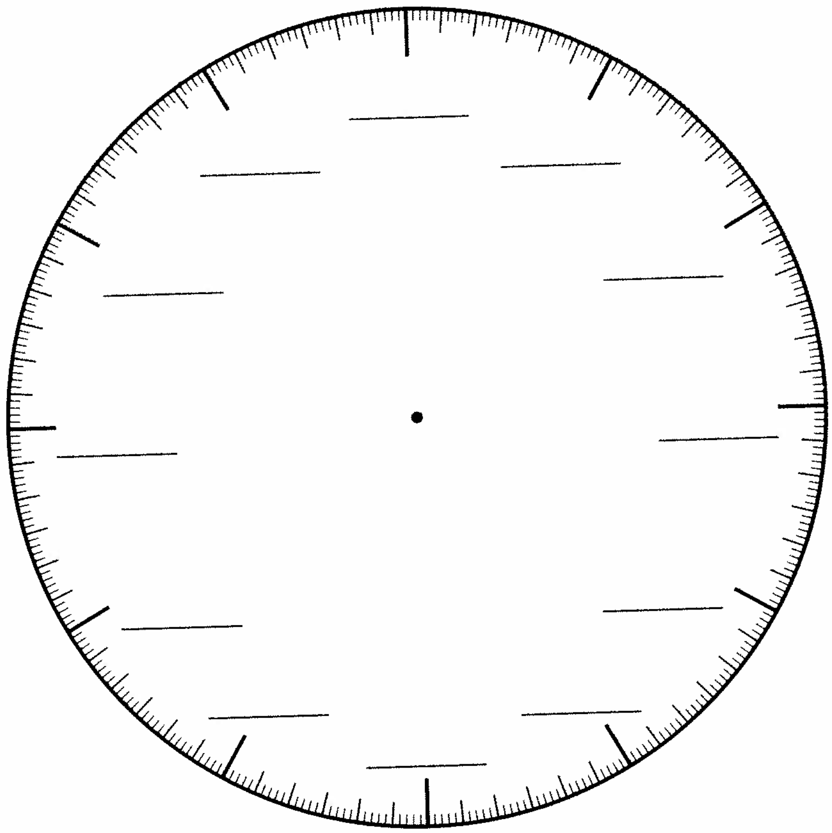
4. Find the measure of ∠*KLM*. Then draw an angle that is 60% of the measure of ∠*KLM* on the reverse side of this paper. Label it as ∠*NOP*.

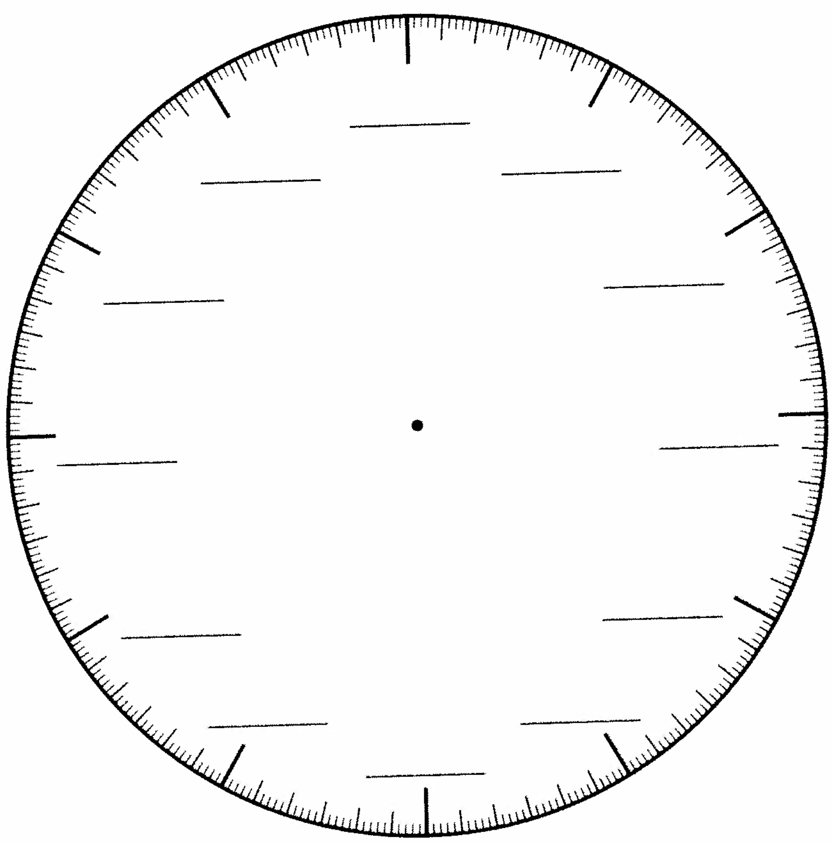


Name Date Time

LESSON 5·1

Making an Angle Measurer





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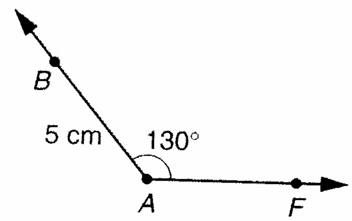
Name Date Time

LESSON 5·1

Constructing a Hexagon

Follow the directions below to draw hexagon *ABCDEF*. Line segment *AF* at the bottom of the page is one of the sides of the hexagon. The completed drawing should be a convex hexagon. Use your Geometry Template and a pencil with a sharp point.

1. Draw a 130° angle with its vertex at point *A*. One side of the angle is $\overline{AF}$. Draw a point on the other side that is 5 centimeters from point *A*. Label this point *B*.



2. Draw a 115° angle with its vertex at point *B*. One side of the angle is $\overline{AB}$. Draw a point on the other side that is $1\frac{1}{2}$ inches from point *B*. Label it point *C*.

3. Draw a 145° angle with its vertex at point *C*. One side of the angle is $\overline{BC}$. Draw a point on the other side that is 6.5 centimeters from point *C*. Label it point *D*.

4. Draw a 90° angle with its vertex at point *D*. One side of the angle is $\overline{CD}$. Draw a point on the other side that is $2\frac{3}{4}$ inches from point *D*. Label it point *E*. Then draw $\overline{EF}$ to complete the hexagon.

5. What is the measure of $\angle E$? ________

of $\angle F$? ________

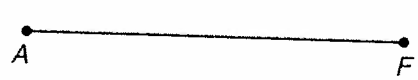
6. What is the length of $\overline{EF}$ to the nearest $\frac{1}{8}$ inch?

____

7. What is the sum of the measures of the angles of your hexagon?

____

The closer this sum is to 720°, the more accurate your drawing is.



Name ________________ Date ________________ Time ________________

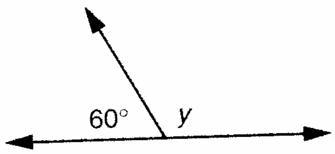
STUDY LINK 5•2

Angle Relationships

SRB 163 233

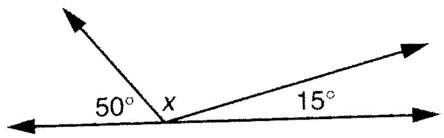
Find the following angle measures. Do not use a protractor.

1.



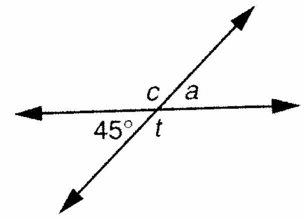
m∠y = ________

2.



m∠x = ________

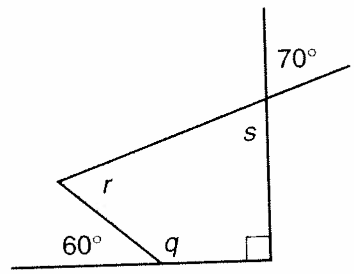
3.



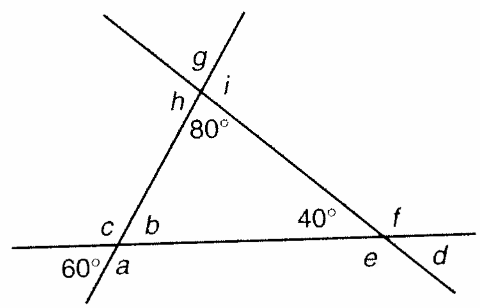
m∠c = ________

m∠a = ________

m∠t = ________



4. m∠q = ________ m∠r = ________ m∠s = ________



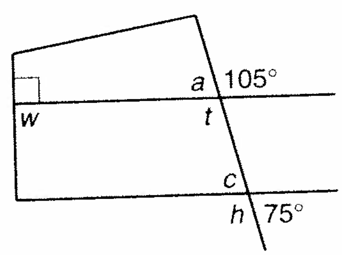
5. m∠a = ________ m∠b = ________

m∠c = ________ m∠d = ________

m∠e = ________ m∠f = ________

m∠g = ________ m∠h = ________

m∠i = ________



6. m∠w = ________ m∠a = ________

m∠t = ________ m∠c = ________

m∠h = ________

Practice

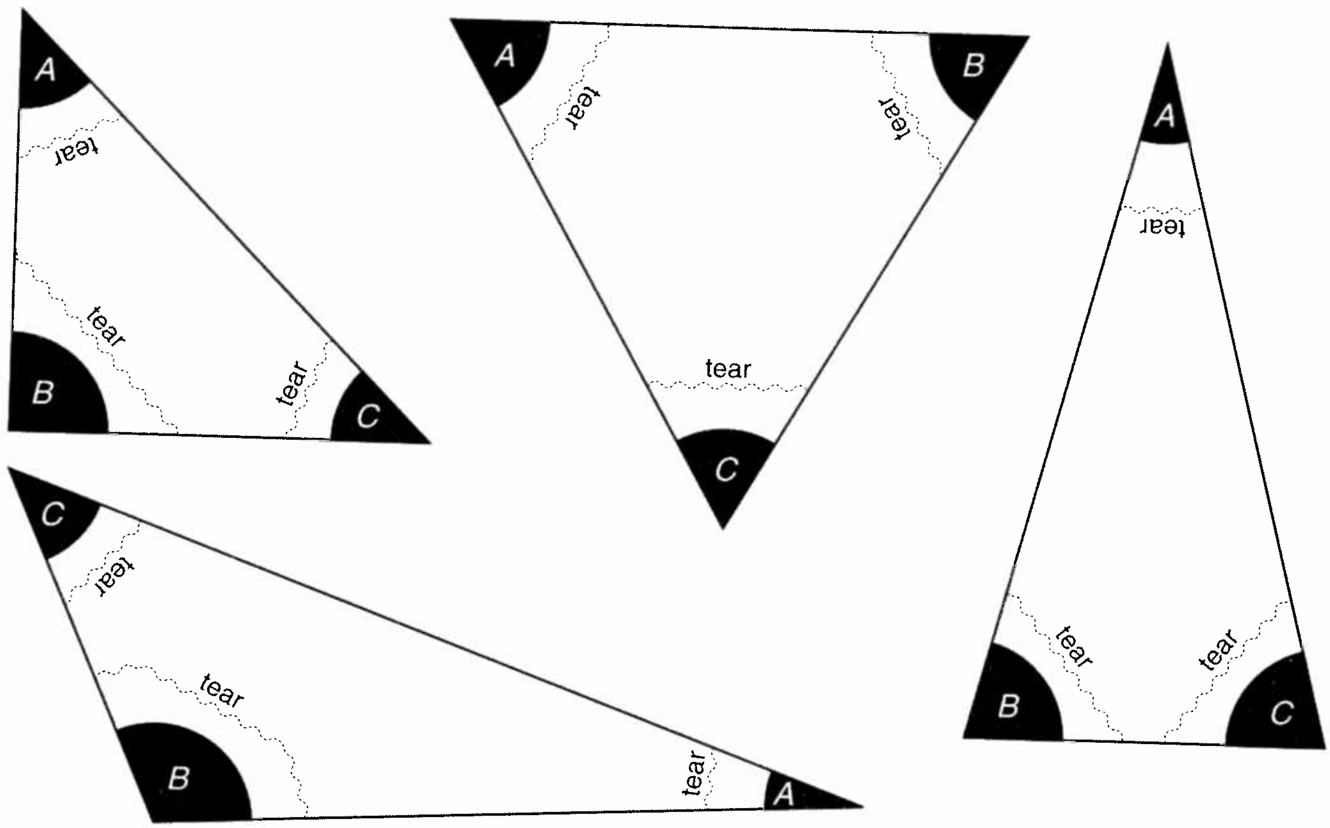
7. $\frac{3}{4}$ of 16 = ________ **8.** $\frac{3}{5}$ of 50 = ________ **9.** $\frac{1}{3}$ of 330 = ________

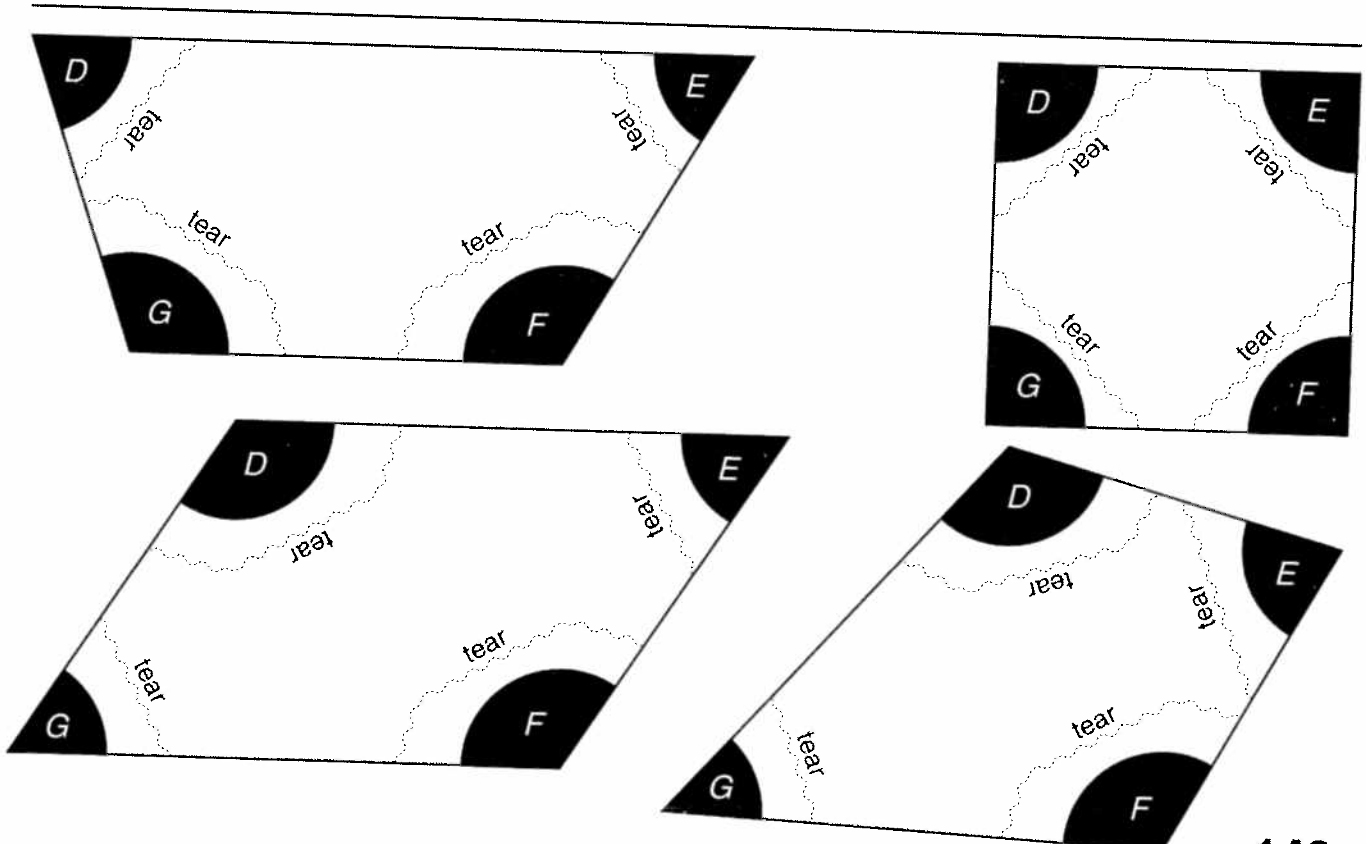
Name Date Time

LESSON 5•2

Angle Measures: Triangles and Quadrangles

Cut out any or all of the triangles and quadrangles on this page.





Name _______________ Date _______________ Time _______________

LESSON 5•2

Finding Sums of Angle Measures

1. Cut out one of the triangles on *Math Masters*, page 149. Carefully cut or tear off each angle. Use point *P* at the right to position the angles so they touch but do not overlap. The shaded regions should form a semicircle. Use tape or glue to hold the angles in place.

• *P*

2. Notice that the combined shaded regions form an angle. How many degrees does this angle measure? _______

3. Compare your results with those of other students. What do your triangles seem to have in common?

____

____

4. Complete the following statement.
The sum of the measures of the angles of any triangle is _______°.

5. Cut out one of the quadrangles on *Math Masters*, page 149. Carefully cut or tear off each angle. Use point *Q* at the right to position the angles so they touch but do not overlap. The shaded regions should form a circle. Use tape or glue to hold the angles in place.

• *Q*

6. Notice that the combined shaded regions form a figure. How many degrees are in this figure? _______

7. Compare your results with those of other students. What do your quadrangles seem to have in common?

____

____

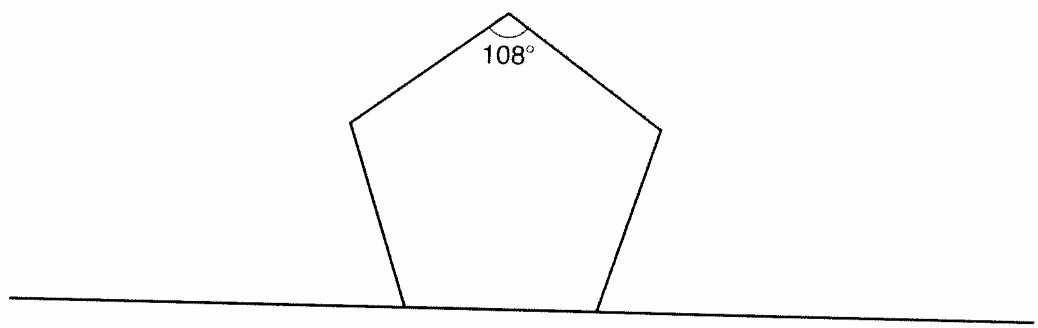
8. Complete the following statement.
The sum of the measures of the angles of any quadrangle is _______°.

Name Date Time

LESSON 5•2

Applying Angle Relationships

1. Extend each side of the regular pentagon in both directions to form a star. The first extension has been done for you. Then use what you know about angle relationships to find and label the measures of each interior angle in your completed star.



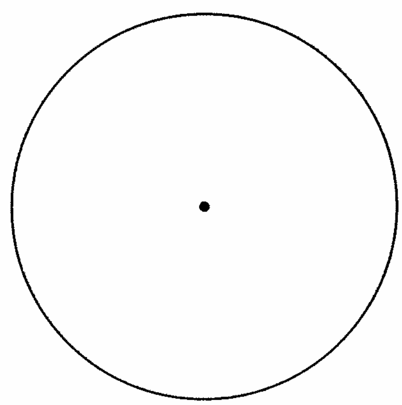
2. Describe the angle relationships you used to determine the measures of the interior angles.

Name Date Time

LESSON 5·3

Graphing Votes

Candidate	Percent of Votes Received	Degree Measure of Sector (to nearest degree)
Connie	28%	0.28 * 360° = 100.8° ≈ 101°
Josh		______ * 360° ≈ ______
Manuel		______ * 360° ≈ ______
Total	**100%**	**360°**



Name Date Time

LESSON 5·3

Pet Survey

Kind of Pet	Number of Pets	Fraction of Total Number of Pets	Decimal Equivalent (to nearest thousandth)	Percent of Total Number of Pets	Degree Measure of Sector
Dog	8	$\frac{8}{24}$	0.333	$33\frac{1}{3}$%	$\frac{1}{3}$ * 360° = 120°
Cat	6				____ * 360° = ____
Guinea pig or hamster	3				____ * 360° = ____
Bird	3				____ * 360° = ____
Other	4				____ * 360° = ____

Name Date Time

STUDY LINK 5·3

Circle Graphs

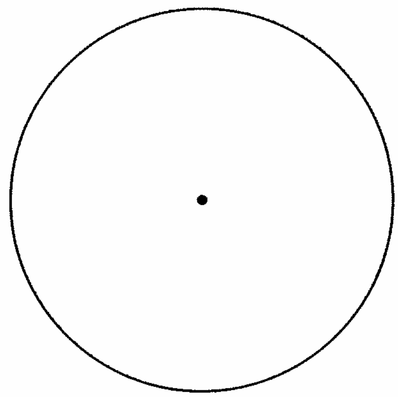
SRB 49 147

1. The table below shows a breakdown, by age group, of adults who listen to classical music.

a. Calculate the degree measure of each sector to the nearest degree.

b. Use a protractor to make a circle graph. Do *not* use the Percent Circle. Write a title for the graph.

Age	Percent of Listeners	Degree Measure
18–24	11%	
25–34	18%	
35–44	24%	
45–54	20%	
55–64	11%	
65+	16%	



Source: USA Today, Snapshot

2. On average, about 8 million adults listen to classical music on the radio each day.

a. Estimate how many adults between the ages of 35 and 44 listen to classical music on the radio each day.

About ______________________ (unit)

b. Estimate how many adults at least 45 years old listen to classical music on the radio each day.

About ______________________ (unit)

Practice

Order each set of numbers from least to greatest.

3. 7, 0.07, −7, 0.7, 0 ______________________

4. 0.25, 0.75, 0.2, $\frac{4}{5}$, $\frac{4}{4}$, 0.06, 0.18, $\frac{1}{10}$

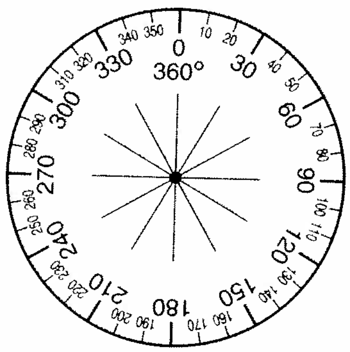
____

Name ____________________ Date ____________ Time ____________

LESSON 5·3 Fractions of 360°

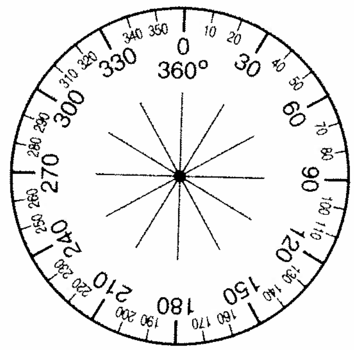
Shade each fractional part. Then record the number of degrees in each shaded region.

1. Shade $\frac{1}{2}$ of the circle.



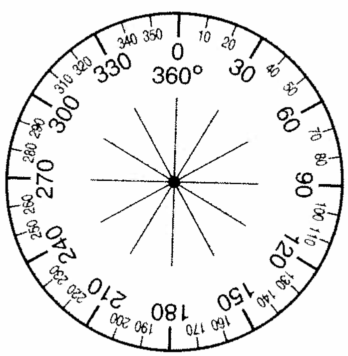
$\frac{1}{2}$ of 360° = ________°

2. Shade $\frac{1}{4}$ of the circle.



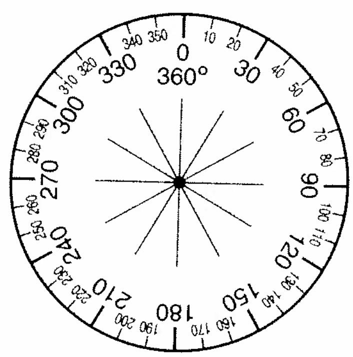
$\frac{1}{4}$ of 360° = ________°

3. Shade $\frac{1}{6}$ of the circle.



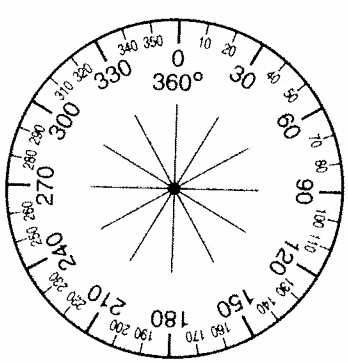
$\frac{1}{6}$ of 360° = ________°

4. Shade $\frac{1}{3}$ of the circle.



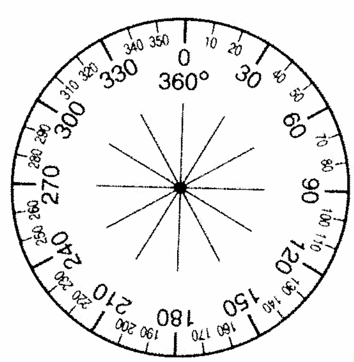
$\frac{1}{3}$ of 360° = ________°

5. Shade $\frac{1}{12}$ of the circle.



$\frac{1}{12}$ of 360° = ________°

6. Shade $\frac{3}{4}$ of the circle.



$\frac{3}{4}$ of 360° = ________°

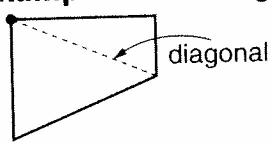
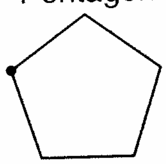
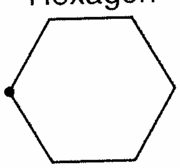
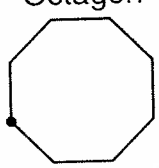
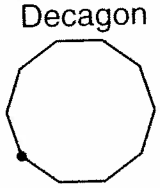
Name ______________________ Date ______________ Time ______________

LESSON 5·3

Sums of Angle Measures in Polygons

A *diagonal* is a line segment that connects two vertices of a polygon and is *not* a side. You can draw diagonals from one vertex to separate polygons into triangles.

1. Draw diagonals from the given vertex to separate each polygon into triangles. Then complete the table.

Polygon	Number of Sides (n)	Number of Triangles	Sum of Angle Measures
Example: Quadrangle 	4	2	2 * 180° = 360°
Pentagon 			______ * ______ = ______°
Hexagon 			______ * ______ = ______°
Octagon 			______ * ______ = ______°
Decagon 			______ * ______ = ______°

2. a. Study your completed table. Use any patterns you notice to write a formula to find the sum of the angle measures in any polygon (n-gon).

Formula ______________________

b. Use the formula to find the sums of the angle measures in a

heptagon. ______° nonagon. ______° dodecagon. ______°

Name Date Time

STUDY LINK 5•4

More Polygons on a Coordinate Grid

SRB 166 169 234

For each polygon described below, some vertices are plotted on the grid. Either one vertex or two vertices are missing.

- Plot and label the missing vertex or vertices on the grid. (There may be more than one place you can plot a point.)
- Write an ordered number pair for each vertex you plot.
- Draw the polygon.

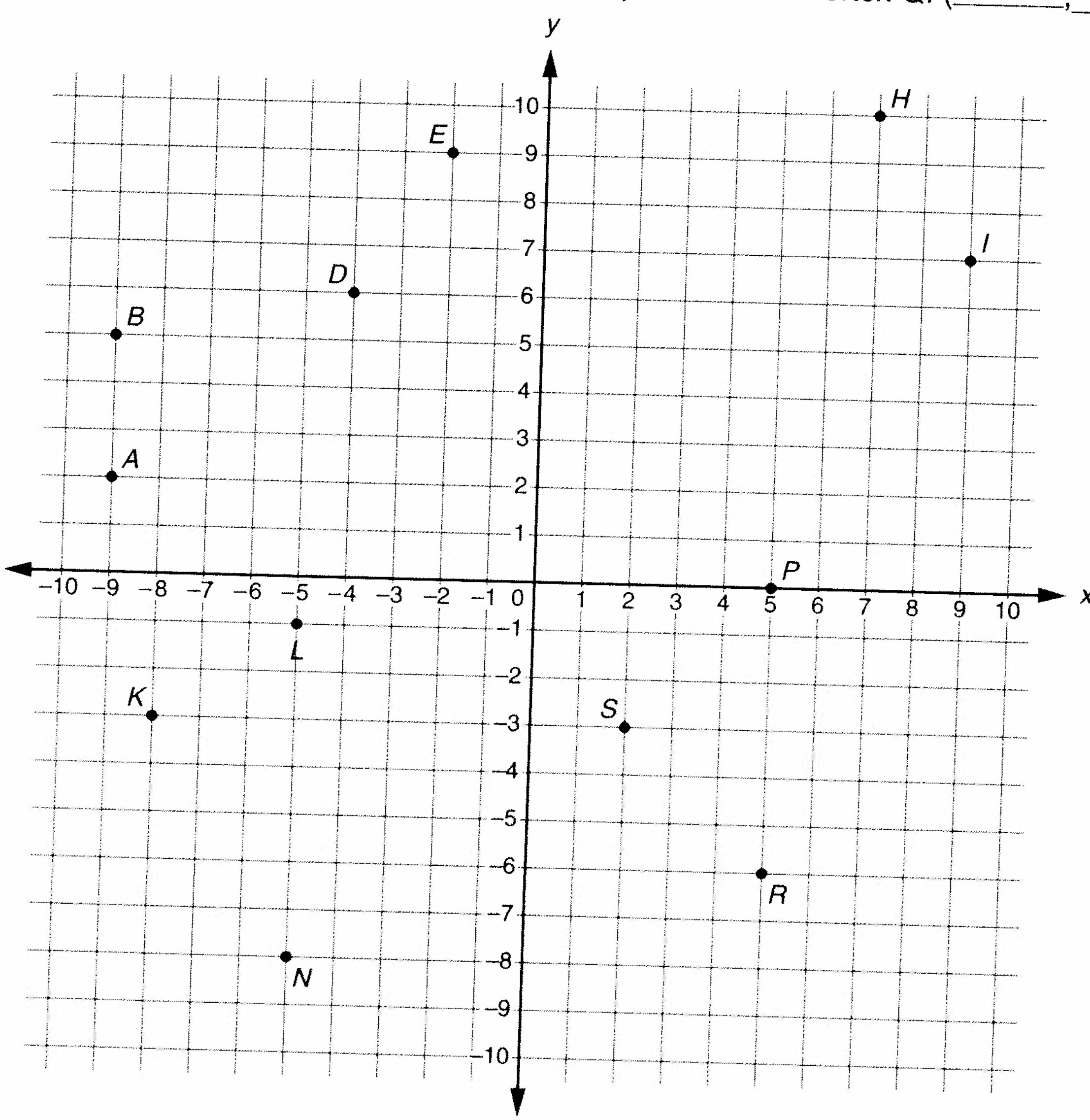
1. Right triangle *ABC* Vertex *C:* (______,______)

2. Parallelogram *DEFG* Vertex *F:* (______,______) Vertex *G:* (______,______)

3. Scalene triangle *HIJ* Vertex *J:* (______,______)

4. Kite *KLMN* Vertex *M:* (______,______)

5. Square *PQRS* Vertex *Q:* (______,______)



Name Date Time

LESSON 5•4

X and O—Tic-Tac-Toe

Materials ☐ 4 each of number cards 0–10 (from the Everything Math Deck, if available)

☐ Coordinate Grid (*Math Masters,* p. 417)

Players 2

Object of the game To get 4 Xs or Os in a row, column, or diagonal on the coordinate grid.

Directions

1. Shuffle the cards and place the deck facedown on the playing surface.
2. In each round:
   - Player 1 draws 2 cards from the deck and uses the cards in any order to form an ordered pair. The player marks this ordered pair on the grid with an X and places the 2 cards in the discard pile.
   - Player 2 draws the next 2 cards from the deck and follows the same procedure, except that he or she uses an O to mark the ordered pair.
   - Players take turns drawing cards to form ordered pairs and marking the ordered pairs on the coordinate grid. If the 2 possible points that the player can make have already been marked, the player loses his or her turn.
3. The winner is the first player to get 4 Xs or 4 Os in a row, column, or diagonal.

Name Date Time

LESSON 5•4

Plotting Triangles and Quadrangles

Plot each of the described triangles and quadrangles on *Math Masters*, page 417. Record the coordinates of each vertex in the table below.

	Description	Coordinates of Each Vertex
Example:	Square with side measuring 3 units	(6, −6); (6, −3); (9, −3); (9, −6)
1.	A rhombus that is *not* a square, which has at least one vertex with a negative *x*-coordinate and a positive *y*-coordinate	
2.	An isosceles triangle that has an area of 2 square units	
3.	A rectangle that has a perimeter of 16 units	
4.	A right scalene triangle that has each vertex in a different quadrant	
5.	A kite that has one vertex at the origin	
6.	A parallelogram that has an area of 18 square units and one side on the *y*-axis	
7.	An obtuse scalene triangle that has at least two vertices with a negative *x*-coordinate and a negative *y*-coordinate	
8.	Write your own description.	

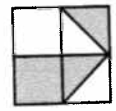
Name ______ Date ______ Time ______

STUDY LINK 5•5

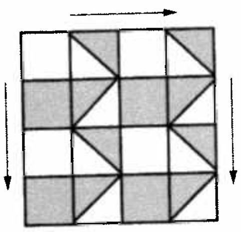
Transforming Patterns

SRB 180 181

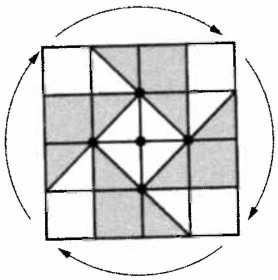
A pattern can be translated, reflected, or rotated to create many different designs. Consider the pattern at the right.



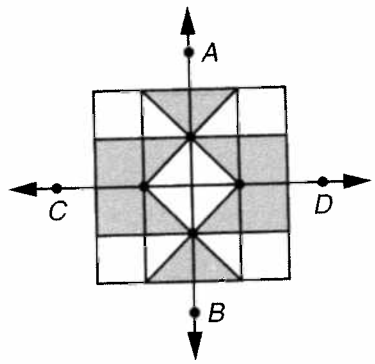
The following examples show how the pattern can be transformed to create different designs:



Translations

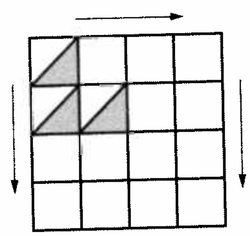


Rotations

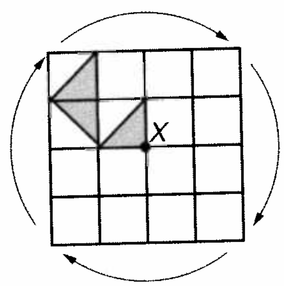


Reflections

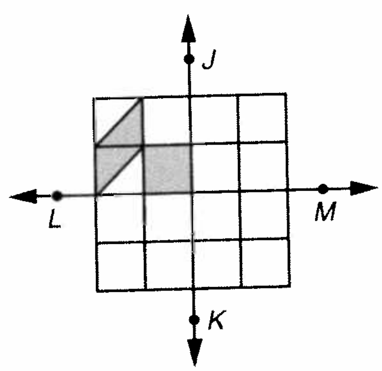
1. Translate the pattern at the right across 2 grid squares. Then translate the resulting pattern (the given pattern and its translation) down 2 grid squares.



2. Rotate the given pattern clockwise 90° around point *X*. Repeat 2 more times.



3. Reflect the given pattern over line *JK*. Reflect the resulting pattern (the given pattern and its reflection) over line *LM*.



Practice

4. 2^6 = ______ 5. 3^5 = ______ 6. 7^0 = ______ 7. 4^3 = ______

Name Date Time

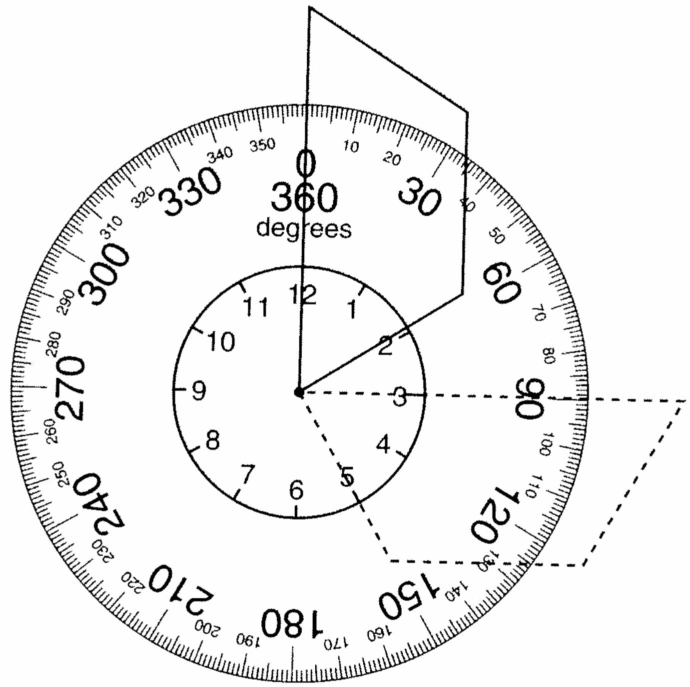
LESSON 5•5

Degrees and Directions of Rotation

When a figure is rotated, it is turned a certain number of degrees around a particular point. A figure can be rotated clockwise or counterclockwise.

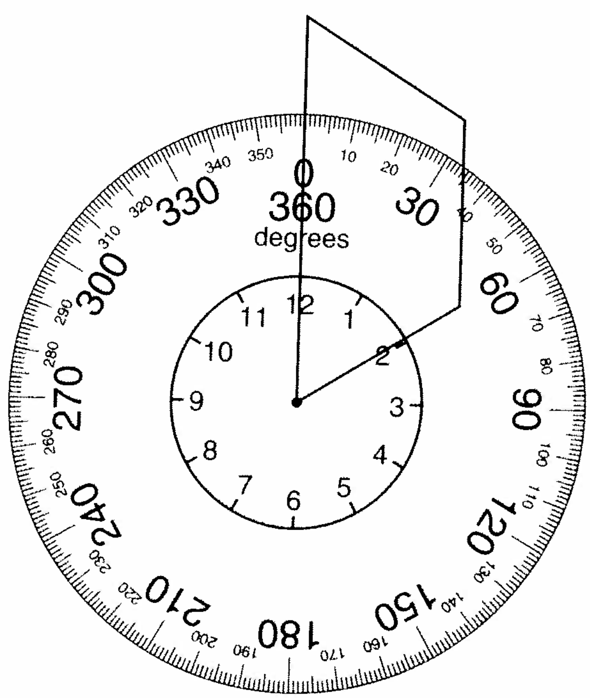
Position a trapezoid pattern block on the center point of the angle measurer as shown at the right. Then rotate the pattern block as indicated and trace it in its new position.

Example: Rotate 90° clockwise.

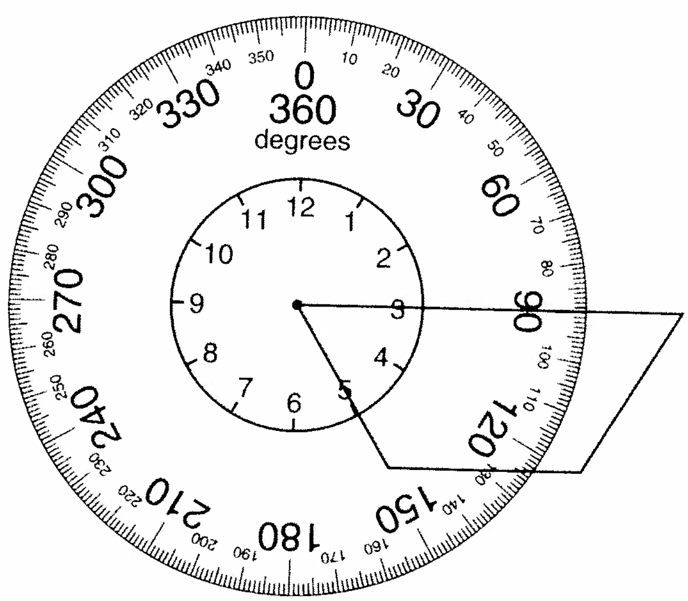


For each problem below, rotate and then trace the pattern block in its new position.

1. Rotate 90° counterclockwise.



2. Rotate 270° clockwise.



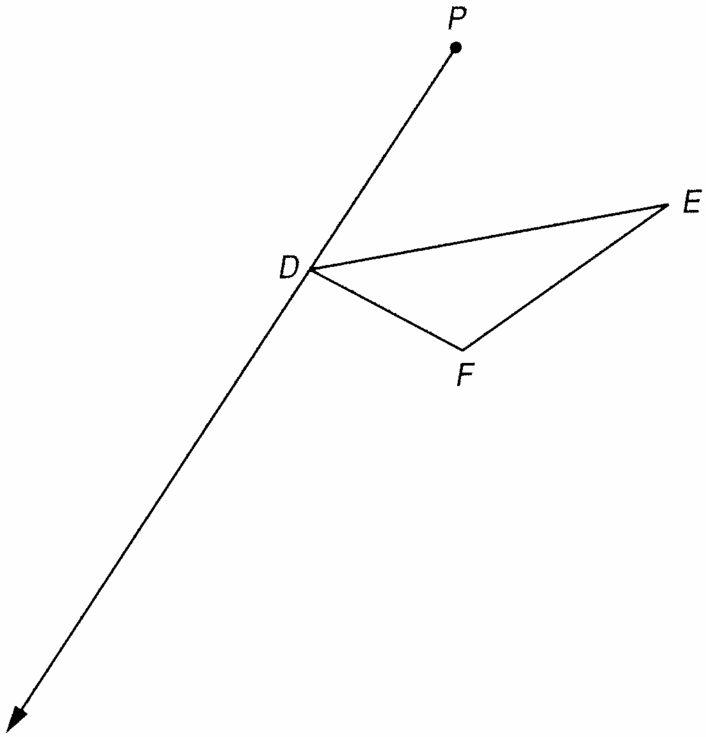
Name Date Time

LESSON 5•5

Scaling Transformations

Some scaling transformations produce a figure that is the same shape as the original figure but not necessarily the same size. Enlargements and reductions are types of scaling transformations.

Enlargement: Follow the steps to draw a triangle $D'E'F'$ with angles that are congruent to triangle DEF and sides that are twice as long as triangle DEF.



Step 1 Draw rays from P through each vertex. The first ray $\overrightarrow{PD}$ has been drawn for you.

Step 2 Measure the distance from point P to vertex D. Then locate the point on $\overrightarrow{PD}$ that is 2 times that distance. Label it D'.

Step 3 Use the same method from Step 2 to locate point F' on $\overrightarrow{PF}$ and point E' on $\overrightarrow{PE}$.

Step 4 Connect points D', E', and F'.

Reduction: Change Steps 2 and 3 to draw a triangle $D''E''F''$ with angles that are congruent to triangle DEF and sides that are half as long as triangle DEF.