Name Date Time

STUDY LINK 5•6

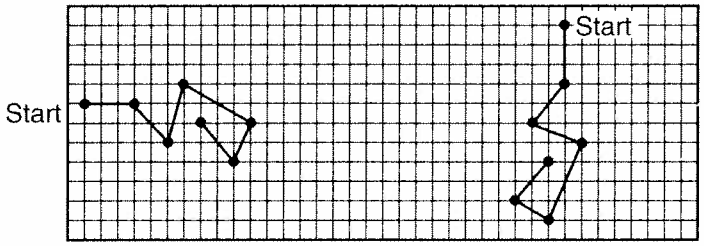
Congruent Figures and Copying

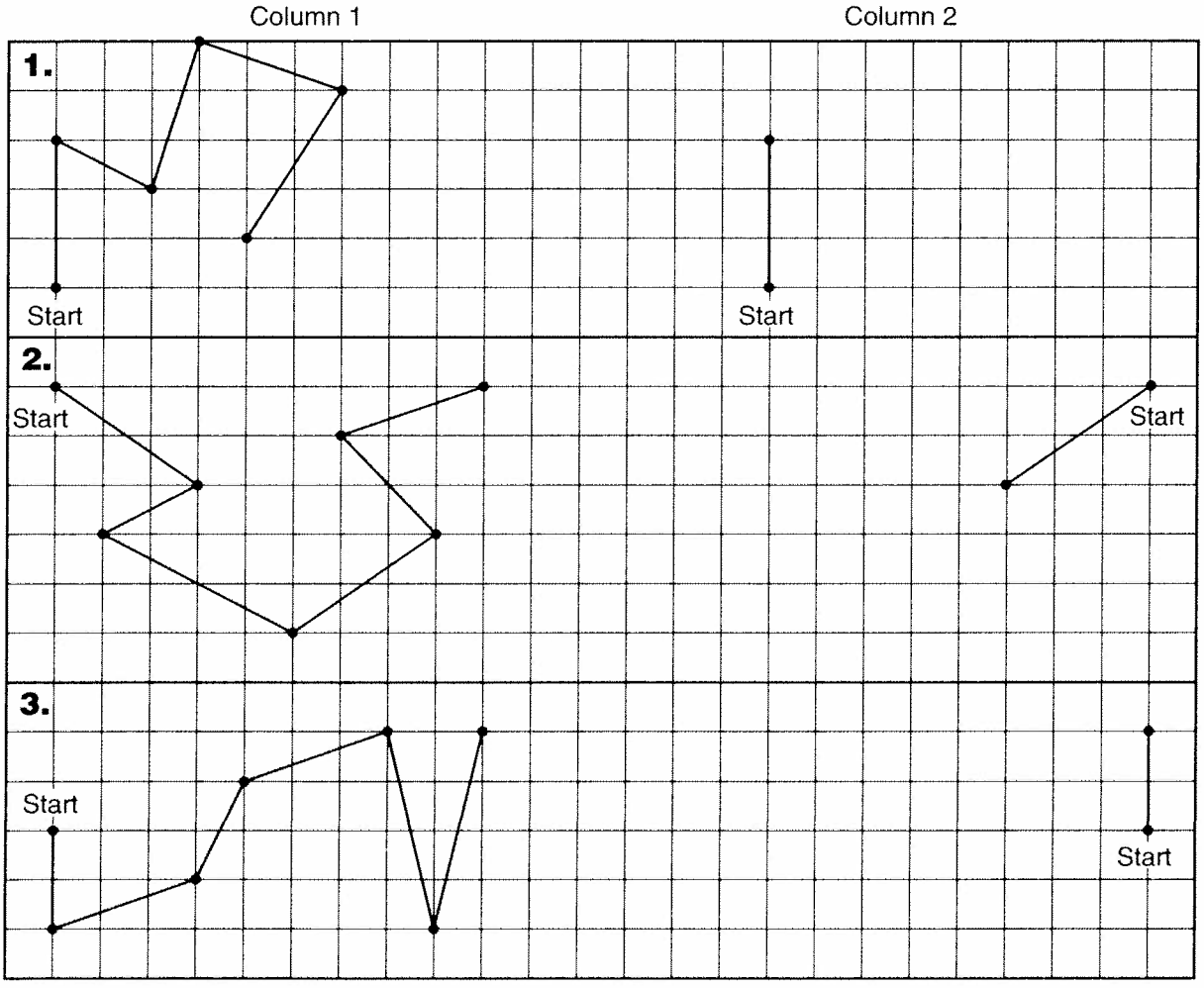
SRB 178

Column 1 below shows paths with the Start points marked. Complete each path in Column 2 so that it is congruent to the path in Column 1. Use the Start points marked in Column 2. In Problems 2 and 3, the copy will not be in the same position as the original path.

(*Hint:* If you have trouble, try tracing the path in Column 1 and then slide, flip, or rotate it so that its starting point matches the starting point in Column 2.)

Example: These two paths are congruent, but they are not in the same position.



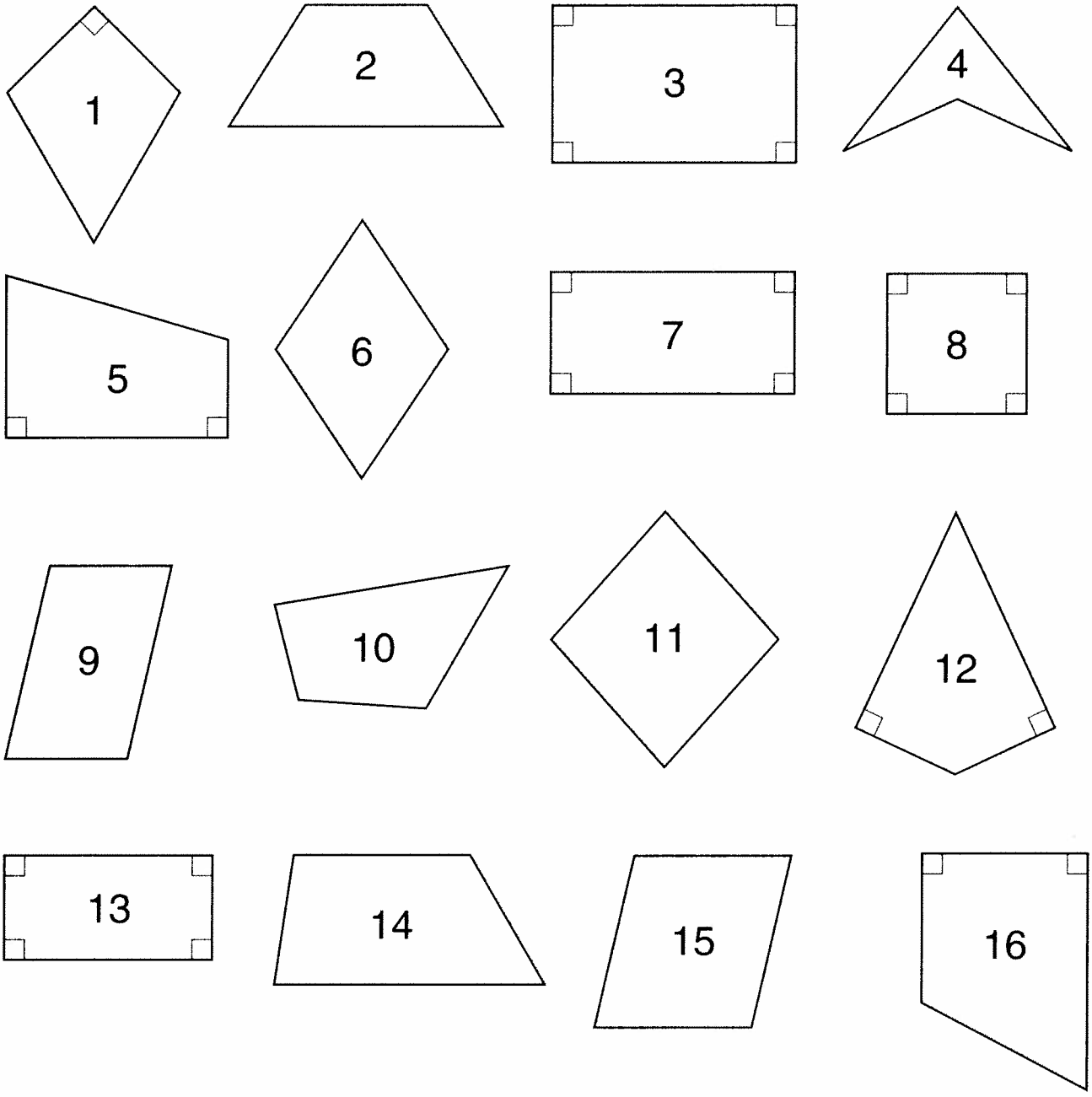


Name Date Time

LESSON 5•6

Quadrangles and Congruence

Cut out the 16 quadrangles and the 6 set labels.

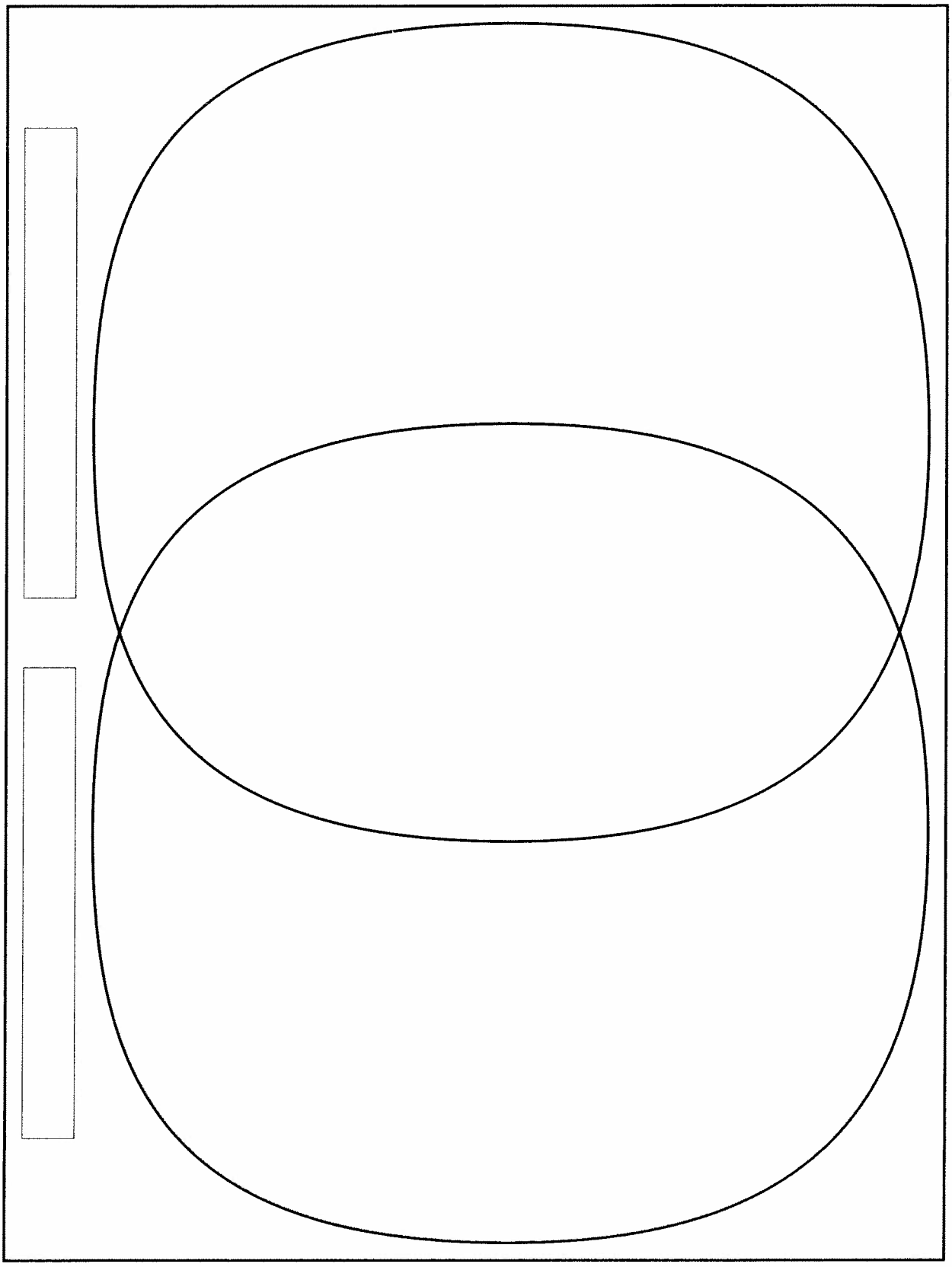


(A) All Right Angles	(B) All Pairs Opposite Sides Congruent
(A) All Sides Congruent	(B) At Least 2 Acute Angles
(C) Adjacent Sides Congruent	(C) At Least 1 Right Angle

LESSON 5•6

Quadrangles and Congruence *continued*

Cut out the quadrangles and set labels from *Math Masters*, page 164. Place the two A, B, or C set labels in the placeholders above the rings and sort the quadrangles accordingly.



Name Date Time

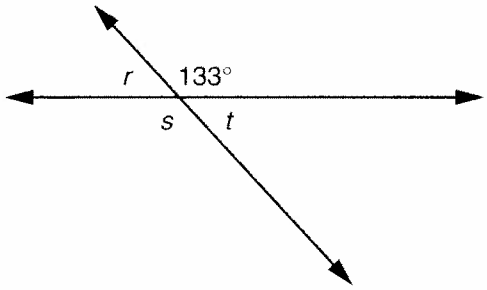
STUDY LINK 5•7

Angle Relationships

SRB 163 233

Write the measures of the angles indicated in Problems 1–6.
Do not use a protractor.

1.

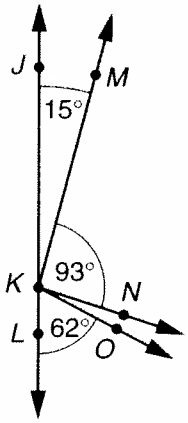


m∠*r* = _____

m∠*s* = _____

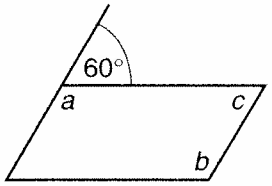
m∠*t* = _____

2. ∠*JKL* is a straight angle.



m∠*NKO* = _____

3.

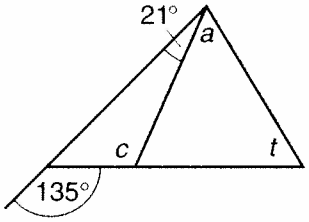


m∠*a* = _____

m∠*b* = _____

m∠*c* = _____

4. Angles *a* and *t* have the same measure.

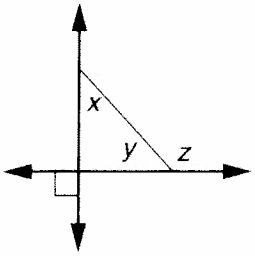


m∠*a* = _____

m∠*c* = _____

m∠*t* = _____

5. Angles *x* and *y* have the same measure.

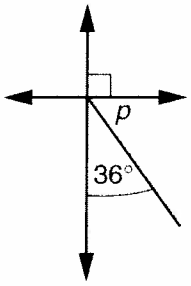


m∠*x* = _____

m∠*y* = _____

m∠*z* = _____

6.



m∠*p* = _____

Practice

7. 0.09 * 0.03 = _____

8. 0.15 * 0.8 = _____

9. 0.07 * 0.07 = _____

10. 0.75 * 0.3 = _____

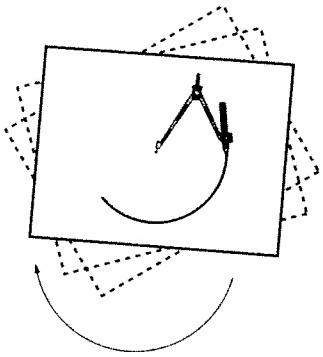
Name Date Time

LESSON 5•7

Circle Constructions

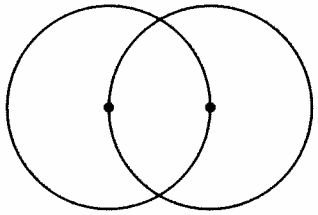
Use the directions and the pictures below to make one or both of the constructions. You may need to make several versions of the construction before you are satisfied with your work. Cut out your best constructions and tape or glue them to another sheet of paper.

Construction #1



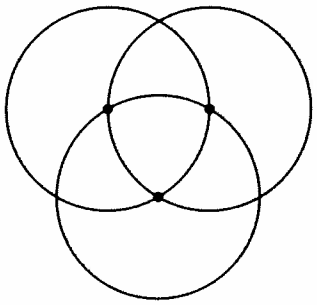
Step 1 Draw a small point that will be the center of the circle. Press the compass anchor firmly on the center of the circle.

Step 2 Hold the compass at the top and rotate the pencil around the anchor. The pencil must go all the way around to make a circle. You may find it easier to firmly hold the compass in place and carefully turn the paper under the compass.



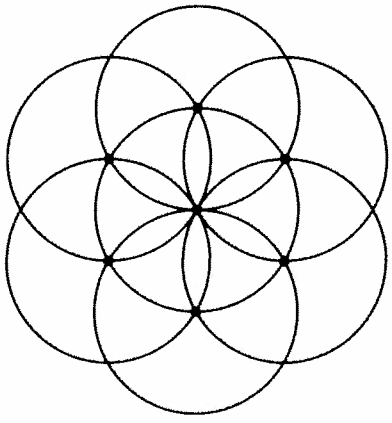
Step 3 Without changing the opening of the compass, draw another circle that passes through the center of the first circle. Mark the center of the second circle.

Step 4 Repeat Step 3 to draw a third circle that passes through the center of each of the first two circles.



Construction #2

Follow the steps to make the three circles from Construction #1. Then draw more circles to create the construction shown at the right.



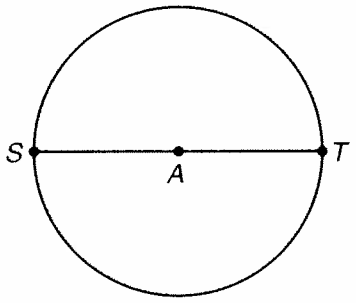
Name Date Time

LESSON 5•7

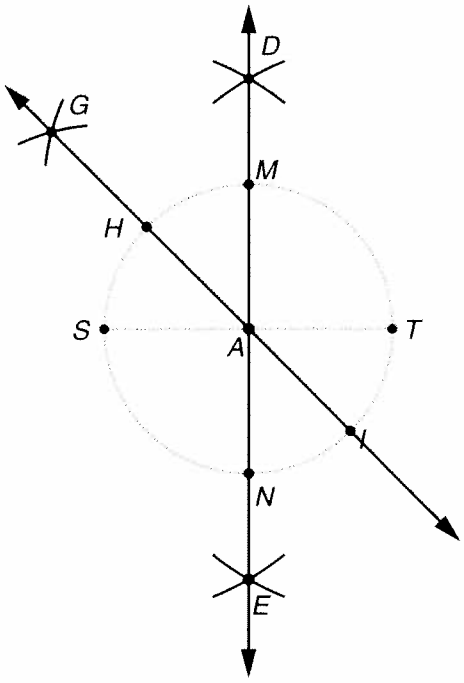
Octagon Construction

Use the directions and the pictures to construct an octagon.

Step 1 Draw a circle with a compass. Label the center of the circle *A*. Then draw a diameter through *A*. Label the two points where the diameter intersects the circle *S* and *T*.



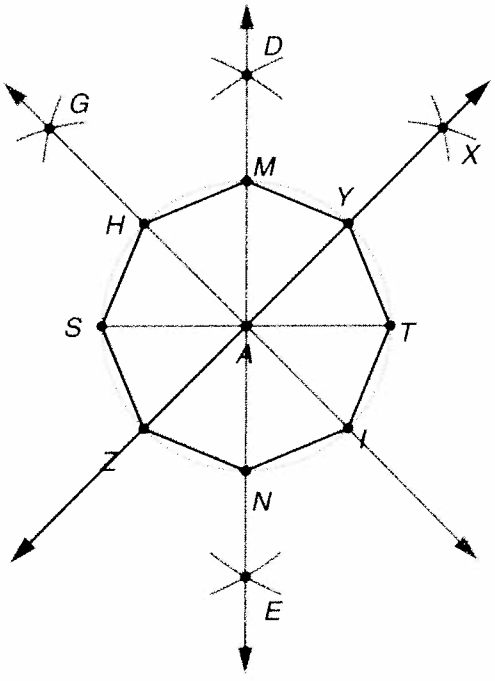
Step 2 Use the length of $\overline{ST}$ to set the compass opening. Then place the anchor of your compass on *S* and draw an arc below the circle and another arc above the circle. Without changing the compass opening, place the compass anchor on *T* and draw another set of arcs above and below the circle. Label the points where the arcs intersect as *D* and *E*. Draw a line through *D* and *E*. Label the points where $\overleftrightarrow{DE}$ intersects the circle as *M* and *N*.



Step 3 Set the compass opening so that it is equal to the length of $\overline{SM}$. Then place the compass anchor on *S* and draw an arc; reposition the anchor on *M* and draw another arc. Label the point where the arcs intersect as *G*. Draw a line through *G* and *A*. Label the points where $\overleftrightarrow{GA}$ intersects the circle as *H* and *I*.

Step 4 Repeat Step 3, using the length of $\overline{MT}$ to set the compass opening. Label the points of intersection as *X*, *Y*, and *Z*.

Step 5 Connect the points on the circle to form an octagon.



Name Date Time

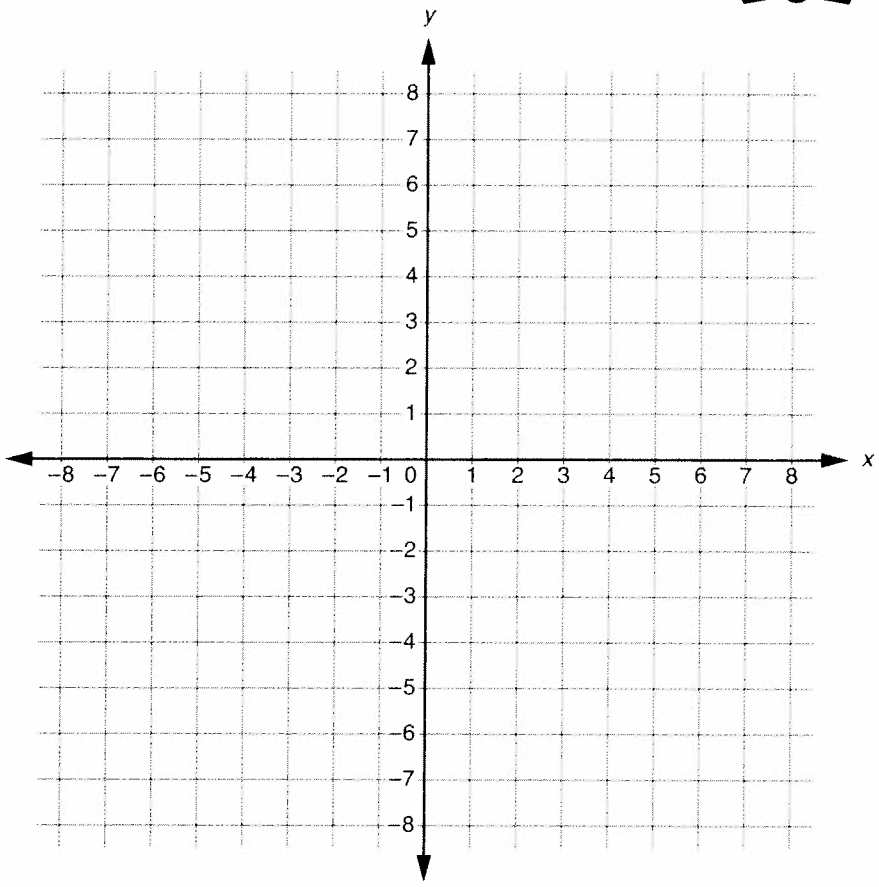
STUDY LINK 5•8

Isometry Transformations on a Grid

SRB 180 181 234

1. Graph and label the following points on the coordinate grid. Connect the points to form quadrangle *ABCD*.

A: (−2,1) *B:* (−6,2)
C: (−8,4) *D:* (−5,7)



2. Translate each vertex of *ABCD* (in Problem 1) 0 units to the left or right and 8 units down. Plot and connect the new points. Label them *A′*, *B′*, *C′*, and *D′*.

Record the coordinates of the image.

_____

_____

_____

_____

3. Reflect quadrangle *ABCD* across the *y*-axis. Plot and connect the new points. Label them *A″*, *B″*, *C″*, and *D″*. Record the coordinates of the image.

_____ _____ _____ _____

Try This

4. Rotate quadrangle *A″B″C″D″* 90° clockwise around point (0,0). Plot and connect the new points. Label them *A‴*, *B‴*, *C‴*, and *D‴*. Record the coordinates of the rotated image.

_____ _____ _____ _____

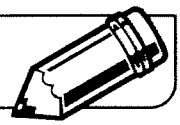
Practice

5. $300 * 0.001 =$ _____ **6.** $143 * 10^{-3} =$ _____ **7.** $35.9 * \frac{1}{1{,}000} =$ _____

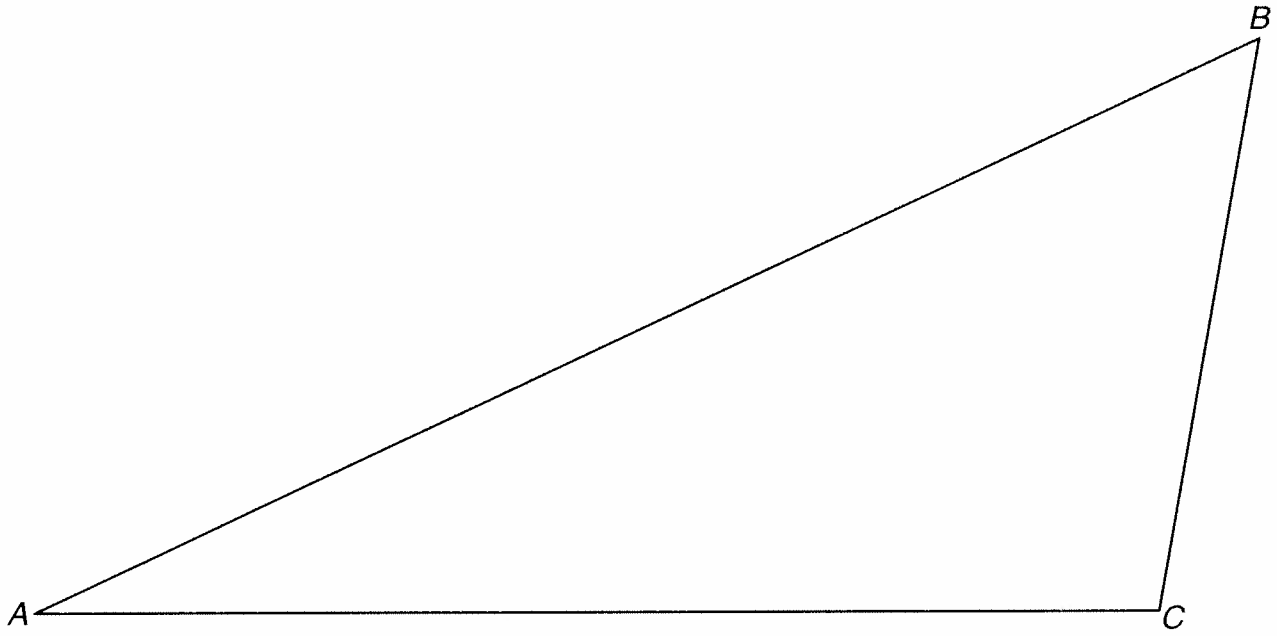
Name Date Time

LESSON 5·8

Inscribing a Circle in a Triangle



Follow the steps to inscribe a circle in triangle *ABC*.



Step 1 Construct the bisectors of $\angle A$ and $\angle B$. Then label the intersection of the angle bisectors as *P*.

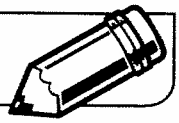
Step 2 Construct a line segment through point *P*, perpendicular to $\overline{AB}$. Label the point at which the line segment intersects $\overline{AB}$ as *Q*.

Step 3 Center the compass anchor on *P* and the pencil point on *Q*. Draw a circle through *Q*. The circle will be tangent to all three sides of the triangle.

Name Date Time

LESSON 5•8

Constructing Perpendicular Bisectors



1. Draw a large triangle. Construct perpendicular bisectors for each side of the triangle. What observations can you make?

2. Use a protractor and a ruler to draw a large square. Draw a diagonal. Then construct the perpendicular bisector of the diagonal. What observations can you make?

Name Date Time

STUDY LINK 5•9

Parallel Lines and a Transversal

SRB 163 230 231

1. Use a ruler and a straightedge to draw 2 parallel lines. Then draw another line that crosses both parallel lines.

2. Measure the 8 angles in your figure.
Write each measure inside the angle.

3. What patterns do you notice in your angle measures?

Practice

Remember: 1,000 milliliters (mL) = 1 liter (L)

4. 500 mL = _____ L

5. 2.5 L = _____ mL

6. 1,300 mL = _____ L

7. 0.95 L = _____ mL

8. 3,250 mL = _____ L

9. 0.045 L = _____ mL

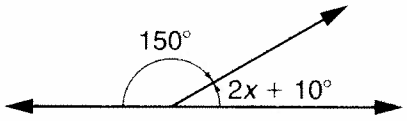
Name Date Time

LESSON 5•9

Angle Relationships and Algebra

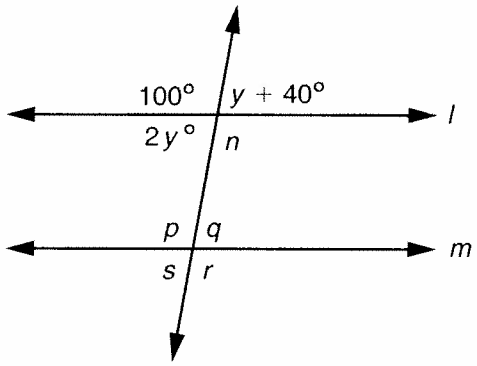
Apply your knowledge of angle relationships to find the missing values and angle measures. Do not use a protractor.

1.



x = _____ °

2.



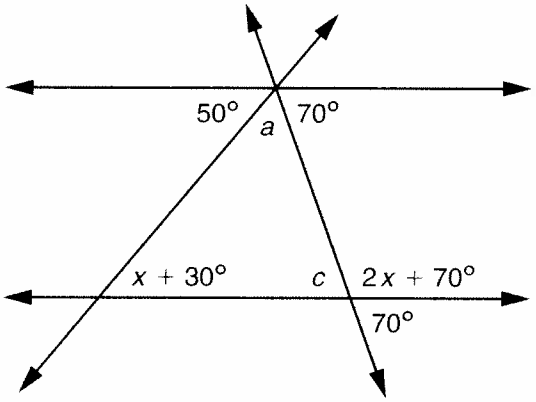
Lines l and m are parallel.

y = _____ °

m∠p = _____ ° m∠r = _____ °

m∠q = _____ ° m∠s = _____ °

3.



x = _____ °

m∠a = _____ ° m∠c = _____ °

4. Turn this page over. Using only a straightedge and a compass, design a problem that uses angle relationships. Create an answer key for your problem. Then ask a classmate to solve your problem.

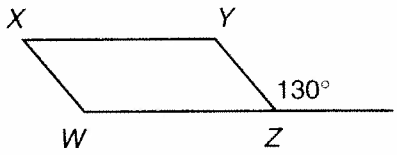
Name Date Time

STUDY LINK 5•10

Parallelogram Problems

All of the figures on this page are parallelograms.
Do not use a ruler or a protractor to solve Problems 1, 2, or 3.

1. a. The measure of $\angle X$ = _____°. Explain how you know.



_____

_____

_____

_____

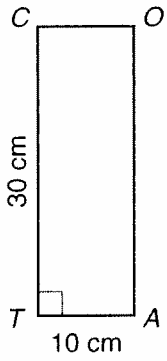
b. The measure of $\angle Y$ = _____°. Explain how you know.

_____

_____

_____

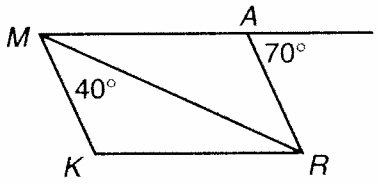
2. Alexi said that the only way to find the length of sides *CO* and *OA* is to measure them with a ruler. Explain why he is incorrect.



_____

_____

3. What is the measure of $\angle MAR$? _____°. Explain how you know.



_____

_____

4. Draw a parallelogram in which all sides have the same length and all angles have the same measure.

What is another name for this parallelogram? _____

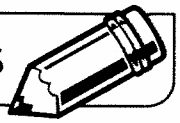
5. Draw a parallelogram in which all sides have the same length and no angle measures 90°.

What is another name for this parallelogram? _____

Name Date Time

LESSON 5•10

Using Quadrangles to Classify Quadrangles



Read each statement. Then decide if the statement is *always, sometimes,* or *never* true. If you write *sometimes,* identify a case for which the statement is true.

Example: A rectangle is a square. sometimes

A rectangle is a square when its 4 sides are the same length.

1. A square is a rectangle. _____
2. A rhombus is a trapezoid. _____
3. A square is a parallelogram. _____
4. A rhombus is a parallelogram. _____
5. A kite is a parallelogram. _____
6. A rhombus is a rectangle. _____
7. A square is a rhombus. _____
8. A trapezoid is a parallelogram. _____

Fill in the blank using *always, sometimes,* or *never.* If you write *sometimes,* identify a case for which the statement is true.

9. A rectangle _____ has consecutive sides that are congruent.

_____

_____

10. The diagonals of a rhombus are _____ congruent.

_____

_____

Name Date Time

STUDY LINK 5•11

Unit 6: Family Letter

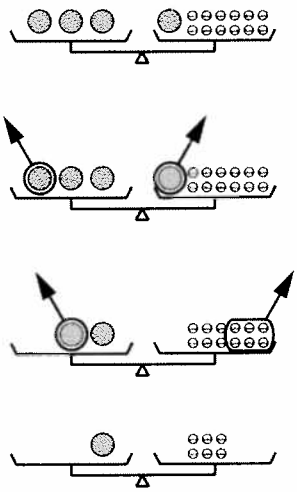
Number Systems and Algebra Concepts

In *Fourth* and *Fifth Grade Everyday Mathematics,* your child worked with addition and subtraction of positive and negative numbers. In this unit, students use multiplication patterns to help them establish the rules for multiplying and dividing with positive and negative numbers. They also develop and use an algorithm for the division of fractions.

In the rest of the unit, your child will explore beginning algebra concepts. First, the class reviews how to determine whether a number sentence is true or false. This involves understanding what to do with numbers that are grouped within parentheses and knowing in what order to calculate if the groupings of numbers are not made explicit by parentheses.

Students then solve simple equations by trial and error to reinforce what it means to solve an equation—to replace a variable with a number that will make the number sentence true.

Next, they solve pan-balance problems, first introduced in *Fifth Grade Everyday Mathematics,* to develop a more systematic approach to solving equations. For example, to find out how many marbles weigh as much as 1 orange in the top balance at the right, you can first remove 1 orange from each pan and then remove half the remaining oranges from the left side and half the marbles from the right side. The pans will still balance.



Students learn that each step in the solution of a pan-balance problem can be represented by an equation, thus leading to the solution of the original equation. You might ask your child to demonstrate how pan-balance problems work.

Finally, your child will learn how to solve inequalities—number sentences comparing two quantities that are not equal.

Please keep this Family Letter for reference as your child works through Unit 6.

Vocabulary

Important terms in Unit 6:

cover-up method An informal method for finding the solution of an open sentence by covering up a part of the sentence containing a variable.

Division of Fractions Property A property of dividing that says division by a fraction is the same as multiplication by the *reciprocal* of the fraction. Another name for this property is the "invert and multiply rule." For example:

$$5 \div 8 = 5 * \frac{1}{8} = \frac{5}{8}$$
$$15 \div \frac{3}{5} = 15 * \frac{5}{3} = \frac{75}{3} = 25$$
$$\frac{1}{2} \div \frac{3}{5} = \frac{1}{2} * \frac{5}{3} = \frac{5}{6}$$

In symbols: For a and nonzero b, c, and d,

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} * \frac{d}{c}$$

If $b = 1$, then $\frac{a}{b} = a$ and the property is applied as in the first two examples above.

equivalent equations Equations with the same solution. For example, $2 + x = 4$ and $6 + x = 8$ are equivalent equations with solution 2.

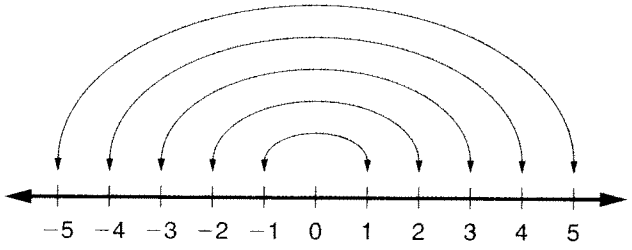
inequality A number sentence with a *relation symbol* other than $=$, such as $>$, $<$, $\geq$, $\leq$, $\neq$, or $\approx$.

integer A number in the set {..., −4, −3, −2, −1, 0, 1, 2, 3, 4, ...}. A whole number or its *opposite*, where 0 is its own opposite.

Multiplication Property of −1 A property of multiplication that says multiplying any number by −1 gives the opposite of the number. For example, $-1 * 5 = -5$ and $-1 * -3 = -(-3) = 3$. Some calculators apply this property with a [+/−] key that toggles between a positive and negative value in the display.

open sentence A number sentence with one or more variables. An open sentence is neither true nor false. For example, $9 + \_\_ = 15$, $? - 24 < 10$, and $7 = x + y$ are open sentences.

opposite of a number *n* A number that is the same distance from zero on the number line as n, but on the opposite side of zero. In symbols, the opposite of a number n is $-n$, and, in *Everyday Mathematics*, OPP(n). If n is a negative number, $-n$ is a positive number. For example, the opposite of $-5 = 5$. The sum of a number n and its opposite is zero; $n + -n = 0$.



order of operations Rules that tell the order in which operations in an expression should be carried out. The conventional order of operations is:

1. Do the operations inside grouping symbols. Work from the innermost set of grouping symbols outward. Inside grouping symbols, follow Rules 2–4.
2. Calculate all the expressions with exponents.
3. Multiply and divide in order from left to right.
4. Add and subtract in order from left to right.

For example: $5^2 + (3 * 4 - 2)/5 = 5^2 + (12 - 2)/5$
$= 5^2 + 10/5$
$= 25 + 10/5$
$= 25 + 2$
$= 27$

reciprocals Two numbers whose product is 1. For example, 5 and $\frac{1}{5}$, $\frac{3}{5}$ and $\frac{5}{3}$, and 0. 2 and 5 are all pairs of multiplicative inverses.

trial-and-error method A method for finding the solution of an equation by trying a sequence of test numbers.

Do-Anytime Activities

To work with your child on concepts taught in this unit, try these interesting and engaging activities:

1. If your child helps with dinner, ask him or her to identify uses of positive and negative numbers in the kitchen. For example, negative numbers might be used to describe the temperature in the freezer. Positive numbers are used to measure liquid and dry ingredients. For a quick game, you might imagine a vertical number line with the countertop as 0; everything above is referenced by a positive number, and everything below is referenced by a negative number. Give your child directions for getting out items by using phrases such as this: "the −2 mixing bowl"; that is, the bowl on the second shelf below the counter.
2. If your child needs extra practice adding and subtracting positive and negative numbers, ask him or her to bring home the directions for the *Credits/Debits Game*. Play a few rounds for review.
3. After your child has completed Lesson 6, ask him or her to explain to you what the following memory device means: *Please Excuse My Dear Aunt Sally.* It represents the rule for the order of operations: parentheses, exponents, multiplication, division, addition, subtraction. Your family might enjoy inventing another memory device that uses the same initial letters; for example, *Please Excuse My Devious Annoying Sibling; Perhaps Everything Might Drop Again Soon,* and so on.

Building Skills Through Games

In Unit 6, your child will work on his or her understanding of algebra concepts by playing games like the ones described below.

Algebra Election See *Student Reference Book*, pages 304 and 305.
Two teams of two players will need 32 *Algebra Election* cards, an Electoral Vote map, 1 six-sided die, 4 pennies or other small counters, and a calculator. This game provides practice with solving equations.

Credits/Debits Game (Advanced Version) See *Student Reference Book*, page 308.
Two players use a complete deck of number cards and a recording sheet to play the advanced version of the *Credits/Debits Game*. This game provides practice with adding and subtracting positive and negative integers.

Top-It See *Student Reference Book*, pages 337 and 338.
Top-It with Positive and Negative Numbers provides practice finding sums and differences of positive and negative numbers. One or more players need 4 each of number cards 0–9 and a calculator to play this *Top-It* game.