

# KENTUCKY

GLENCOE  
MATHEMATICS

# Geometry

Correlation with Kentucky  
Core Content  
for Mathematics Assessment  
and  
Responses to Standards for  
Mathematics Evaluation  
Instrument

[www.geometryonline.com](http://www.geometryonline.com)

Adoption Group IV  
Commonwealth of Kentucky  
2003-2009

<b>Number/Computation</b>	
<b>Concepts</b>	
<b>OBJECTIVES</b>	<b>PAGE REFERENCES</b>
<p><b>MA-H-1.1.1</b> Students will describe properties of, define, give examples of, and apply real numbers to both real-world and mathematical situations, and understand that irrational numbers cannot be represented by terminating or repeating decimals.</p>	<p>SE: 524 Also see <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-1.1.2</b> Students will recognize, define, give examples of, and apply to both real-world and mathematical situations finite arithmetic and geometric sequences and series.</p>	<p>See <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-1.1.3</b> Students will understand how matrices are used to represent real-world data.</p>	<p><b>Sample Demonstrator: 506</b> SE: 506-511 Also see <i>Glencoe Algebra 1</i>.</p>

*See page 27 for a list of codes used for TWE pages.*

**Sample Demonstrator**  
**Number/Computation: Concepts**  
**MA-H-1.1.1 to MA-H-1.1.3**

## 9-7 Transformations with Matrices

### What You'll Learn

- Use matrices to determine the coordinates of translations and dilations.
- Use matrices to determine the coordinates of reflections and rotations.

### Vocabulary

- column matrix
- vertex matrix
- translation matrix
- reflection matrix
- rotation matrix

### How can matrices be used to make movies?

Many movie directors use computers to create special effects that cannot be easily created in real life. A special effect is often a simple image that is enhanced using transformations. Complex images can be broken down into simple polygons, which are moved and resized using matrices to define new vertices for the polygons.



**TRANSLATIONS AND DILATIONS** In Lesson 9-6, you learned that a vector can be represented by the ordered pair  $(x, y)$ . A vector can also be represented by a **column matrix**  $\begin{bmatrix} x \\ y \end{bmatrix}$ . Likewise, polygons can be represented by placing all of the column matrices of the coordinates of the vertices into one matrix, called a **vertex matrix**.

Triangle  $PQR$  with vertices  $P(3, 5)$ ,  $Q(1, -2)$ , and  $R(-4, 4)$  can be represented by the vertex matrix at the right.

$$\Delta PQR = \begin{bmatrix} P & Q & R \\ 3 & 1 & -4 \\ 5 & -2 & 4 \end{bmatrix} \begin{matrix} \leftarrow \text{x-coordinates} \\ \leftarrow \text{y-coordinates} \end{matrix}$$

Like vectors, matrices can be used to perform translations. You can use matrix addition and a **translation matrix** to find the coordinates of a translated figure.

### Study Tip

**Translation Matrix**  
A translation matrix contains the same number of rows and columns as the vertex matrix of a figure.

### Example 1 Translate a Figure

Use a matrix to find the coordinates of the vertices of the image of  $\square ABCD$  with  $A(3, 2)$ ,  $B(1, -3)$ ,  $C(-3, -1)$ , and  $D(-1, 4)$  under the translation  $(x, y) \rightarrow (x + 5, y - 3)$ .

Write the vertex matrix for  $\square ABCD$ .

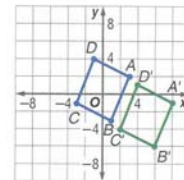
$$\begin{bmatrix} 3 & 1 & -3 & -1 \\ 2 & -3 & -1 & 4 \end{bmatrix}$$

To translate the figure 5 units to the right, add 5 to each  $x$ -coordinate. To translate the figure 3 units down, add  $-3$  to each  $y$ -coordinate. This can be done by adding the translation matrix  $\begin{bmatrix} 5 & 5 & 5 & 5 \\ -3 & -3 & -3 & -3 \end{bmatrix}$  to the vertex matrix of  $\square ABCD$ .

$$\begin{matrix} \text{Vertex Matrix} \\ \text{of } \square ABCD \end{matrix} \quad \begin{matrix} \text{Translation} \\ \text{Matrix} \end{matrix} \quad \begin{matrix} \text{Vertex Matrix} \\ \text{of } \square A'B'C'D' \end{matrix}$$

$$\begin{bmatrix} 3 & 1 & -3 & -1 \\ 2 & -3 & -1 & 4 \end{bmatrix} + \begin{bmatrix} 5 & 5 & 5 & 5 \\ -3 & -3 & -3 & -3 \end{bmatrix} = \begin{bmatrix} 8 & 6 & 2 & 4 \\ -1 & -6 & -4 & 1 \end{bmatrix}$$

The coordinates of  $\square A'B'C'D'$  are  $A'(8, -1)$ ,  $B'(6, -6)$ ,  $C'(2, -4)$ , and  $D'(4, 1)$ .



<b>Number/Computation</b>	
<b>Skills</b>	
<b>OBJECTIVES</b>	<b>PAGE REFERENCES</b>
<p><b>MA-H-1.2.1</b> Students will perform addition, subtraction, multiplication, and division with real numbers in problem-solving situations to specified accuracy.</p>	<p>SE: 5, 13-19, 21-27, 734-735 Also see <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-1.2.2</b> Students will simplify real number expressions such as those containing opposites, reciprocals, absolute values, exponents (integer), roots (square, cube), and factorials.</p>	<p><b>Sample Demonstrator: 744</b> SE: 5, 11, 13-19, 20-27, 744-745 Also see <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-1.2.3</b> Students will use matrix addition, subtraction, multiplication (no larger than 2 by 2), and scalar multiplication to solve real-world problems.</p>	<p>SE: 506-511, 752-753 Also see <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-1.2.4</b> Students will determine a specific term of a sequence given an explicit formula and write an explicit rule for the nth term of arithmetic and geometric sequences.</p>	<p>SE: <i>Spreadsheet Investigation 288</i> See <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-1.2.5</b> Students will use simple combinations and permutations to count discrete quantities.</p>	<p>See <i>Glencoe Algebra 1</i>.</p>

**Sample Demonstrator**  
**Number/Computation: Skills**  
**MA-H-1.2.1 to MA-H-1.2.5**

**Square Roots and Simplifying Radicals**

- A radical expression is an expression that contains a square root. The expression is in simplest form when the following three conditions have been met.
- No radicands have perfect square factors other than 1.
- No radicands contain fractions.
- No radicals appear in the denominator of a fraction.
- The **Product Property** states that for two numbers  $a$  and  $b \geq 0$ ,  $\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$ .

**Example 1** Simplify.

a.  $\sqrt{45}$   
 $\sqrt{45} = \sqrt{3 \cdot 3 \cdot 5}$  Prime factorization of 45  
 $= \sqrt{3^2} \cdot \sqrt{5}$  Product Property of Square Roots  
 $= 3\sqrt{5}$  Simplify.

b.  $\sqrt{3} \cdot \sqrt{3}$   
 $\sqrt{3} \cdot \sqrt{3} = \sqrt{3 \cdot 3}$  Product Property  
 $= \sqrt{9}$  or 3 Simplify.

c.  $\sqrt{6} \cdot \sqrt{15}$   
 $\sqrt{6} \cdot \sqrt{15} = \sqrt{6 \cdot 15}$  Product Property  
 $= \sqrt{3 \cdot 2 \cdot 3 \cdot 5}$  Prime factorization  
 $= \sqrt{3^2} \cdot \sqrt{10}$  Product Property  
 $= 3\sqrt{10}$  Simplify.

- For radical expressions in which the exponent of the variable inside the radical is *even* and the resulting simplified exponent is *odd*, you must use absolute value to ensure nonnegative results.

**Example 2**  $\sqrt{20x^3y^5z^6}$

$$\begin{aligned} \sqrt{20x^3y^5z^6} &= \sqrt{2^2 \cdot 5 \cdot x^3 \cdot y^5 \cdot z^6} && \text{Prime factorization} \\ &= \sqrt{2^2} \cdot \sqrt{5} \cdot \sqrt{x^3} \cdot \sqrt{y^5} \cdot \sqrt{z^6} && \text{Product Property} \\ &= 2 \cdot \sqrt{5} \cdot x \cdot \sqrt{x} \cdot y^2 \cdot \sqrt{y} \cdot |z^3| && \text{Simplify.} \\ &= 2xy^2|z^3|\sqrt{5xy} && \text{Simplify.} \end{aligned}$$

- The **Quotient Property** states that for any numbers  $a$  and  $b$ , where  $a \geq 0$  and  $b \geq 0$ ,

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

**Example 3** Simplify  $\sqrt{\frac{25}{16}}$ .

$$\begin{aligned} \sqrt{\frac{25}{16}} &= \frac{\sqrt{25}}{\sqrt{16}} && \text{Quotient Property} \\ &= \frac{5}{4} && \text{Simplify.} \end{aligned}$$

<b>Number/Computation</b>	
<b>Relationships</b>	
<b>OBJECTIVES</b>	<b>PAGE REFERENCES</b>
<p><b>MA-H-1.3.1</b> Students will understand how the following subsets of real numbers relate to each other: natural, whole, integers, rational, irrational, reals.</p>	<p>See <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-1.3.2</b> Students will understand how real number properties (identity, inverse, commutative, associative, distributive, closure) are used to simplify expressions and solve equations.</p>	<p><b>Sample Demonstrator: 94</b> SE: 94-100 Also see <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-1.3.3</b> Students will understand how to use equivalence relations (reflexive, symmetric, transitive) and order relations (less than, greater than, equal to) to solve problems using real numbers.</p>	<p><b>Sample Demonstrator: 94</b> SE: 94-100, 118-119, 247-253 TWE: EM 99 Also see <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-1.3.4</b> Students will understand how ratio and proportion can be used in a variety of mathematical contexts and to solve real-world problems.</p>	<p>SE: 282-287, 289-297, 298-305, 307-315, 316-322, 342-348 <i>Spreadsheet Investigation</i> 288 TWE: A 287, 297, 306, 315 EM 294</p>

**Sample Demonstrator**  
**Number/Computation: Relationships**  
**MA-H-1.3.1 to MA-H-1.3.4**

**2-6 Algebraic Proof**

**What You'll Learn**

- Use algebra to write two-column proofs.
- Use properties of equality in geometry proofs.

**Vocabulary**

- deductive argument
- two-column proof
- formal proof

**How is mathematical evidence similar to evidence in law?**

Lawyers develop their cases using logical arguments based on evidence to lead a jury to a conclusion favorable to their case. At the end of a trial, a lawyer will make closing remarks summarizing the evidence and testimony that they feel proves their case. These closing arguments are similar to a proof in mathematics.



**ALGEBRAIC PROOF** In algebra, you learned to use properties of equality to solve algebraic equations and to verify relationships. Algebra is a system of mathematics with sets of numbers, operations, and properties that allow you to perform algebraic operations.

**Concept Summary Properties of Equality for Real Numbers**

<b>Reflexive Property</b>	For every number $a$ , $a = a$ .
<b>Symmetric Property</b>	For all numbers $a$ and $b$ , if $a = b$ , then $b = a$ .
<b>Transitive Property</b>	For all numbers $a$ , $b$ , and $c$ , if $a = b$ and $b = c$ , then $a = c$ .
<b>Addition and Subtraction Properties</b>	For all numbers $a$ , $b$ , and $c$ , if $a = b$ , then $a + c = b + c$ and $a - c = b - c$ .
<b>Multiplication and Division Properties</b>	For all numbers $a$ , $b$ , and $c$ , if $a = b$ , then $a \cdot c = b \cdot c$ and if $c \neq 0$ , $\frac{a}{c} = \frac{b}{c}$ .
<b>Substitution Property</b>	For all numbers $a$ and $b$ , if $a = b$ , then $a$ may be replaced by $b$ in any equation or expression.
<b>Distributive Property</b>	For all numbers $a$ , $b$ , and $c$ , $a(b + c) = ab + ac$ .

**Study Tip**

**Commutative and Associative Properties**

Throughout this text, we shall assume the Commutative and Associative Properties for addition and multiplication.

The properties of equality can be used to justify each step when solving an equation. A group of algebraic steps used to solve problems form a **deductive argument**.

**Example 1 Verify Algebraic Relationships**

Solve  $3(x - 2) = 42$ .

Algebraic Steps	Properties
$3(x - 2) = 42$	Original equation
$3x - 6 = 42$	Distributive Property
$3x - 6 + 6 = 42 + 6$	Addition Property
$3x = 48$	Substitution Property
$\frac{3x}{3} = \frac{48}{3}$	Division Property
$x = 16$	Substitution Property

## Geometry/Measurement

### Concepts

OBJECTIVES	PAGE REFERENCES
<p><b>MA-H-2.1.1</b> Students will describe properties of and give examples of geometric transformations and apply geometric transformations (translations, rotations, reflections, dilations), with and without a coordinate plane, to both real-world and mathematical situations.</p>	<p>SE: 463-468, 470-475, 476-480, 481-488, 490-496, 506-509 <i>Geometry Activity</i> 462, 489 TWE: A 469, 475, 482, 497</p>
<p><b>MA-H-2.1.2</b> Students will define, describe properties of, give examples of, and apply to both real-world and mathematical situations spatial relationships such as betweenness, parallelism, and perpendicularity.</p>	<p><b>Sample Demonstrator: 133</b> SE: 14-19, 40, 126-131, 133-138, 139-144, 151-157, 159-164 <i>Geometry Activity</i> 44, 132 <i>Graphing Calculator Investigation</i> 158 TWE: A 131, 138, 144, 157 MC 133, 139, 159</p>
<p><b>MA-H-2.1.3</b> Students will define, describe properties of, give examples of, and apply to both real-world and mathematical situations angle relationships such as linear pairs, vertical, complementary, supplementary, corresponding, and alternate interior angles.</p>	<p><b>Sample Demonstrator: 133</b> SE: 37-43, 107-114, 120, 126-131, 133-138 <i>Geometry Software Investigation</i> 132 TWE: A 43, 131 MC 37</p>
<p><b>MA-H-2.1.4</b> Students will describe properties of, define, give examples of, and apply to both real-world and mathematical situations ratio measures including slope and rate.</p>	<p>SE: 139-144, 145-150, 168-169, 289-297, 342-348 <i>Spreadsheet Investigation</i> 288 TWE: MC 139</p>
<p><b>MA-H-2.1.5</b> Students will describe properties of, define, give examples of, and apply to both real-world and mathematical situations right triangle trigonometric measures (sine, cosine, tangent).</p>	<p>SE: 364-370, 371-376, 377-382, 383-390 <i>Geometry Software Investigation</i> 384 TWE: DI 372 T 365</p>

**Sample Demonstrator**  
**Geometry/Masurement: Concepts**  
**MA-H-2.1.1 to MA-H-2.1.5**

## 3-2 Angles and Parallel Lines

### What You'll Learn

- Use the properties of parallel lines to determine congruent angles.
- Use algebra to find angle measures.

### How can angles and lines be used in art?

In the painting, the artist uses lines and transversals to create patterns. The figure on the painting shows two parallel lines with a transversal passing through them. There is a special relationship between the angle pairs formed by these lines.



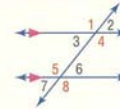
*The Order of Tradition II* by T.C. Stuart

**PARALLEL LINES AND ANGLE PAIRS** In the figure above,  $\angle 1$  and  $\angle 2$  are corresponding angles. When the two lines are parallel, there is a special relationship between these pairs of angles.

### Postulate 3.1

**Corresponding Angles Postulate** If two parallel lines are cut by a transversal, then each pair of corresponding angles is congruent.

**Examples:**  $\angle 1 \cong \angle 5$ ,  $\angle 2 \cong \angle 6$ ,  $\angle 3 \cong \angle 7$ ,  $\angle 4 \cong \angle 8$



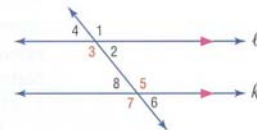
### Study Tip

**Look Back**  
To review **vertical angles**, see Lesson 1-6.

### Example 1 Determine Angle Measures

In the figure,  $m\angle 3 = 133$ . Find  $m\angle 5$ .

- $\angle 3 \cong \angle 7$  Corresponding Angles Postulate
- $\angle 7 \cong \angle 5$  Vertical Angles Theorem
- $\angle 3 \cong \angle 5$  Transitive Property
- $m\angle 3 = m\angle 5$  Definition of congruent angles
- $133 = m\angle 5$  Substitution



In Example 1, alternate interior angles 3 and 5 are congruent. This suggests another special relationship between angles formed by two parallel lines and a transversal. Other relationships are summarized in Theorems 3.1, 3.2, and 3.3.

## Geometry/Measurement

Skills	
OBJECTIVES	PAGE REFERENCES
<p><b>MA-H-2.2.1</b> Students will perform transformations (reflections, translations, rotations, dilations) on figures.</p>	<p>SE: 463-468, 470-475, 476-480, 481-488, 490-496, 506-509 <i>Geometry Activity</i> 462, 489</p> <p>TWE: A 469, 475, MC 463, 490</p>
<p><b>MA-H-2.2.2</b> Students will classify two-dimensional and three-dimensional geometric figures according to their characteristics such as lengths of sides; angle measures; and number of sides, faces, edges, and vertices. Students will describe the intersection of a plane with a three-dimensional geometric figure.</p>	<p>SE: 45-50, 404-409, 411-416, 417-422, 424-430, 431-437, 439-444, 636-642 <i>Geometry Software Investigation</i> 51-52</p> <p>TWE: MC 45</p>
<p><b>MA-H-2.2.3</b> Students will determine height and distance using methods of indirect measurement such as similar triangles (including shadow or mirror method) and right triangle relationships (including trigonometric ratios).</p>	<p>SE: 289-297, 298-305, 307-315, 316-322, 325-331, 364-370, 371-376, 377-382, 383-390</p> <p>TWE: A 297, 370 E 294, 321</p>
<p><b>MA-H-2.2.4</b> Students will use Pythagorean relationships to solve problems in real-world and mathematical situations.</p>	<p>SE: 350-356, 357-363 <i>Geometry Activity</i> 28, 349</p> <p>TWE: MC 350</p>
<p><b>MA-H-2.2.5</b> Students will apply the concepts of congruence and similarity to solve real-world and mathematical problems (not including proofs).</p>	<p>SE: 31, 108, 192-198, 289-297, 298-305, 307-315, 316-322, 325-331, 707-713</p> <p>TWE: A 106 MC 101</p>

OBJECTIVES	PAGE REFERENCES
<p><b>MA-H-2.2.6</b> Students will calculate surface area and volume of rectangular prisms, pyramids, cylinders, cones, and spheres in problem settings using given formulas.</p>	<p>SE: 643-648, 649-654, 655-658, 660-665, 666-669, 671-676, 688-694, 696-701, 702-706 <i>Spreadsheet Investigation 695</i></p> <p>TWE: A 706 MC 688, 696, 702</p>
<p><b>MA-H-2.2.7</b> Students will apply formulas for the slope of a line, distance between two points, and midpoint of a segment to solve problems.</p>	<p><b>Sample Demonstrator: 139</b></p> <p>SE: 21-27, 91, 139-144, 145-146, 180, 715 <i>Geometry Activity 20</i></p> <p>TWE: A 27 MC 37</p>

**Sample Demonstrator**  
**Geometry/Measurement: Skills**  
**MA-H-2.2.1 to MA-H-2.2.7**

## 3-3 Slopes of Lines

### What You'll Learn

- Find slopes of lines.
- Use slope to identify parallel and perpendicular lines.

### Vocabulary

- slope
- rate of change

### How is slope used in transportation?

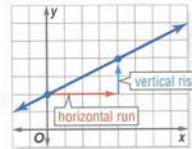
Traffic signs are often used to alert drivers to road conditions. The sign at the right indicates a hill with a 6% grade. This means that the road will rise or fall 6 feet vertically for every 100 horizontal feet traveled.



**SLOPE OF A LINE** The **slope** of a line is the ratio of its vertical rise to its horizontal run.

$$\text{slope} = \frac{\text{vertical rise}}{\text{horizontal run}}$$

In a coordinate plane, the slope of a line is the ratio of the change along the  $y$ -axis to the change along the  $x$ -axis.



### Key Concept

### Slope

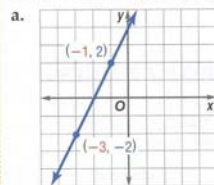
The slope  $m$  of a line containing two points with coordinates  $(x_1, y_1)$  and  $(x_2, y_2)$  is given by the formula

$$m = \frac{y_2 - y_1}{x_2 - x_1}, \text{ where } x_1 \neq x_2.$$

The slope of a line indicates whether the line rises to the right, falls to the right, or is horizontal. The slope of a vertical line, where  $x_1 = x_2$ , is undefined.

### Example 1 Find the Slope of a Line

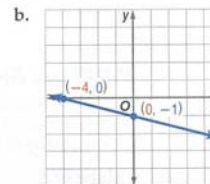
Find the slope of each line.



Use the  $\frac{\text{rise}}{\text{run}}$  method.

From  $(-3, -2)$  to  $(-1, 2)$ , go up 4 units and right 2 units.

$$\frac{\text{rise}}{\text{run}} = \frac{4}{2} \text{ or } 2$$



Use the slope formula.

Let  $(-4, 0)$  be  $(x_1, y_1)$  and  $(0, -1)$  be  $(x_2, y_2)$ .

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{-1 - 0}{0 - (-4)} \text{ or } -\frac{1}{4} \end{aligned}$$

### Study Tip

#### Slope

Lines with positive slope *rise* as you move from left to right, while lines with negative slope *fall* as you move from left to right.

<b>Geometry/Measurement</b>	
<b>Relationships</b>	
<b>OBJECTIVES</b>	<b>PAGE REFERENCES</b>
<p><b>MA-H-2.3.1</b> Students will solve real-world geometry problems by using algebra.</p>	<p>SE: 7, 10, 23, 32, 33, 34, 39, 40, 42, 48, 49, 93, 94-95, 99, 181, 191, 197, 198, 219, 220, 221, 226</p>
<p><b>MA-H-2.3.2</b> Students will apply algebra to solve problems involving geometric figures in a coordinate plane.</p>	<p>SE: 47, 162, 163, 180, 183, 201, 222-226, 241-244, 252, 287, 295, 302, 305, 306, 311, 313, 352, 354, 359, 368, 369, 447-451, 714-719</p> <p>TWE: A 206</p>
<p><b>MA-H-2.3.3</b> Students will understand how figures in a coordinate plane and their resulting images under a transformation are algebraically and geometrically related. Students will describe elements that change and elements that do not change under these transformations.</p>	<p>SE: 464-468, 470-475, 476-481, 492-497</p> <p>TWE: DI 471, 478</p>
<p><b>MA-H-2.3.4</b> Students will understand how a change in one or more dimensions of a geometric shape affects perimeter, area, volume, or surface area.</p>	<p><b>Sample Demonstrator: 707</b></p> <p>SE: 610-616, 660-665, 666-670, 671-676, 688-694, 696-701, 702-706, 707-713</p> <p>TWE: A 665 MC 610, 660</p>

**Sample Demonstrator**  
**Geometry/Masurement: Relationships**  
**MA-H-2.3.1 to MA-H-2.3.4**

## 13-4 Congruent and Similar Solids

### What You'll Learn

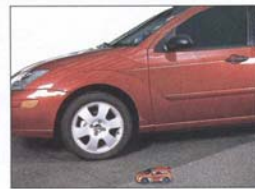
- Identify congruent or similar solids.
- State the properties of similar solids.

### Vocabulary

- similar solids
- congruent solids

### How are similar solids applied to miniature collectibles?

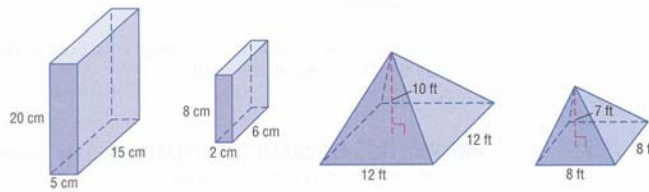
People collect miniatures of race cars, farm equipment, and monuments such as the Statue of Liberty and the Washington Monument. The scale factors commonly used for miniatures include 1:16, 1:24, 1:32, 1:43, and 1:64. One of the smallest miniatures has a scale factor of 1:1000. If a car is 108 inches long, then a 1:24 scale model would be  $108 \div 24$  or 4.5 inches long.



### Study Tip

**Spheres**  
 All spheres are similar just like all circles are similar.

**CONGRUENT OR SIMILAR SOLIDS** **Similar solids** are solids that have exactly the same shape but not necessarily the same size. You can determine if two solids are similar by comparing the ratios of corresponding linear measurements. In two similar polyhedra, all of the corresponding faces are similar, and all of the corresponding edges are proportional.



Similar Solids

Nonsimilar Solids

### Study Tip

**Look Back**  
 To review **scale factor**, see lesson 6-2 and 9-5.

In the similar solids above,  $\frac{8}{20} = \frac{2}{5} = \frac{6}{15}$ . Recall that the ratio of the measures is called the *scale factor*.

If the ratio of corresponding measurements of two solids is 1:1, then the solids are congruent. For two solids to be congruent, all of the following conditions must be met.

### Key Concept

### Congruent Solids

Two solids are congruent if:

- the corresponding angles are congruent,
- the corresponding edges are congruent,
- the corresponding faces are congruent, and
- the volumes are equal.

**Congruent solids** are exactly the same shape and exactly the same size. They are a special case of similar solids. They have a scale factor of 1.

## Probability/Statistics

### Concepts

OBJECTIVES	PAGE REFERENCES
<p><b>MA-H-3.1.1</b> Students will understand how standard deviation measures the scatter of a discrete set of real-world data.</p>	<p>SE: 3 Also see <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-M-3.1.2</b> Students will recognize that curve fitting (linear, quadratic, exponential) can be used as a method of describing and predicting from a set of data or scatter plot. Students will recognize the appropriate curve for a particular set of data.</p>	<p>See <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-M-3.1.3</b> Students will describe and give examples of various sampling techniques and biases in data collection.</p>	<p>See <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-3.1.4</b> Students will understand the differences between combinations and permutations.</p>	<p>See <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-3.1.5</b> Students will understand differences between theoretical and experimental probability.</p>	<p><b>Sample Demonstrator: 622</b> SE: 260, 527, 622-627, 630, 700, 705 TWE: 622</p>

**Sample Demonstrator**  
**Probability/Statistics: Concepts**  
**MA-H-3.1.1 to MA-H-3.1.5**

## 11-5 Geometric Probability

### What You'll Learn

- Solve problems involving geometric probability.
- Solve problems involving sectors and segments of circles.

### Vocabulary

- geometric probability
- sector
- segment

### How can geometric probability help you win a game of darts?

To win at darts, you have to throw a dart at either the center or the part of the dartboard that earns the most points. In games, probability can sometimes be used to determine chances of winning. Probability that involves a geometric measure such as length or area is called **geometric probability**.



### Study Tip

**Look Back**  
 To review **probability with line segments**, see page 20.

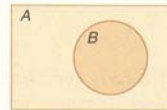
**GEOMETRIC PROBABILITY** In Chapter 1, you learned that the probability that a point lies on a part of a segment can be found by comparing the length of the part to the length of the whole segment. Similarly, you can find the probability that a point lies in a part of a figure by comparing the area of the part to the area of the whole figure.

### Key Concept

### Probability and Area

If a point in region  $A$  is chosen at random, then the probability  $P(B)$  that the point is in region  $B$ , which is in the interior of region  $A$ , is

$$P(B) = \frac{\text{area of region } B}{\text{area of region } A}$$



When determining geometric probability with targets, we assume

- that the object lands within the target area, and
- it is equally likely that the object will land anywhere in the region.



The Princeton Review

#### Test-Taking Tip

**Analyze the Question**  
 If allowed, circle or underline key words as you read the test question.

### Example 1 Probability with Area

**Grid In Test Item**

A square game board has black and white stripes of equal width as shown. What is the chance that a dart thrown at the board will land on a white stripe?



#### Read the Test Item

You want to find the probability of landing on a white stripe, not a black stripe.

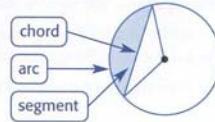
## Probability/Statistics

### Skills

OBJECTIVES	PAGE REFERENCES
<p><b>MA-H-3.2.1</b> Students will analyze, interpret results, make decisions, and draw conclusions based on a set of data.</p>	<p>SE: 18 Also see <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-3.2.2</b> Students will plot a set of bivariate data and select an appropriate curve (linear, quadratic, exponential) of best fit.</p>	<p>See <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-3.2.3</b> Students will organize, display and interpret statistical models (tables, graphs) of bivariate data.</p>	<p>SE: 18 Also see <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-3.2.4</b> Students will interpret the results of a probability simulation, draw conclusions, and make predictions.</p>	<p><b>Sample Demonstrator: 624</b> SE: 527, 622-627, 630, 700, 705 TWE: A 627</p>
<p><b>MA-H-3.2.5</b> Students will represent probabilities in multiple ways such as fractions, decimals, percentages, and geometric area models.</p>	<p><b>Sample Demonstrator: 624</b> SE: 527, 549, 550, 622-627, 630, 700, 705 TWE: MC 622 E 626</p>
<p><b>MA-H-3.2.6</b> Students will determine probabilities in situations involving replacement and non-replacement.</p>	<p><b>Sample Demonstrator: 624</b> SE: 260, 622-627, 630, 700, 705</p>

**Sample Demonstrator**  
**Probability/Statistics: Skills**  
**MA-H-3.2.1 to MA-H-3.2.6**

The region of a circle bounded by an arc and a chord is called a **segment** of a circle. To find the area of a segment, subtract the area of the triangle formed by the radii and the chord from the area of the sector containing the segment.



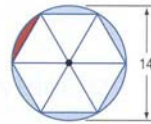
**Example 3** *Probability with Segments*

A regular hexagon is inscribed in a circle with a diameter of 14.

- a. Find the area of the red segment.

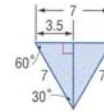
**Area of the sector:**

$$\begin{aligned} A &= \frac{N}{360} \pi r^2 && \text{Area of a sector} \\ &= \frac{60}{360} \pi (7^2) && N = 60, r = 7 \\ &= \frac{49}{6} \pi && \text{Simplify.} \\ &\approx 25.66 && \text{Use a calculator.} \end{aligned}$$



**Area of the triangle:**

Since the hexagon was inscribed in the circle, the triangle is equilateral, with each side 7 units long. Use properties of 30°-60°-90° triangles to find the apothem. The value of  $x$  is 3.5, the apothem is  $x\sqrt{3}$  or  $3.5\sqrt{3}$  which is approximately 6.06.



Next, use the formula for the area of a triangle.

$$\begin{aligned} A &= \frac{1}{2}bh && \text{Area of a triangle} \\ &= \frac{1}{2}(7)(6.06) && b = 7, h = 6.06 \\ &\approx 21.22 && \text{Simplify.} \end{aligned}$$

**Area of the segment:**

$$\begin{aligned} \text{area of segment} &= \text{area of sector} - \text{area of triangle} \\ &\approx 25.66 - 21.22 && \text{Substitution} \\ &\approx 4.44 && \text{Simplify.} \end{aligned}$$

- b. Find the probability that a point chosen at random lies in the red region.

Divide the area of the sector by the area of the circle to find the probability. First, find the area of the circle. The radius is 7, so the area is  $\pi(7^2)$  or about 153.94 square units.

$$\begin{aligned} P(\text{blue}) &= \frac{\text{area of segment}}{\text{area of circle}} \\ &\approx \frac{4.44}{153.94} \\ &\approx 0.03 \end{aligned}$$


The probability that a random point is on the red segment is about 0.03 or 3%.

## Probability/Statistics

### Relationships

OBJECTIVES	PAGE REFERENCES
<b>MA-H-3.3.1</b> Students will understand how outliers affect measures of central tendency.	<b>Sample Demonstrator: 3</b> SE: 3 Also see <i>Glencoe Algebra 1</i> .
<b>MA-H-3.3.2</b> Students will describe how sampling techniques can influence results.	See <i>Glencoe Algebra 1</i> .
<b>MA-H-3.3.3</b> Students will understand and reason about the use and misuse of statistics and statistical representations such as type of graph and choice of scale.	See <i>Glencoe Algebra 1</i> .
<b>MA-H-3.3.4</b> Students will use data and curve of best fit to make and defend predictions.	See <i>Glencoe Algebra 1</i> .

**Sample Demonstrator**  
**Probability/Statistics: Relationships**  
**MA-H-3.3.1 to MA-H-3.3.4**



Web Quest Internet Project

### When Is Weather Normal?

Source: USA TODAY, October 8, 2000

“Climate normals are a useful way to describe the average weather of a location. Several statistical measures are computed as part of the normals, including measures of central tendency, such as mean or median, of dispersion or how spread out the values are, such as the standard deviation or inter-quartile range, and of frequency or probability of occurrence.” In this project, you will explore how latitude, longitude, and *degree distance* relate to differences in temperature for pairs of U.S. cities.

Log on to [www.geometryonline.com/webquest](http://www.geometryonline.com/webquest).  
 Begin your WebQuest by reading the Task.

Continue working on your WebQuest as you study Unit 1.

Lesson	1-3	2-1	3-5
Page	23	65	155

USA TODAY Snapshots®

#### Coldest cities in the USA

City	Mean temperature
International Falls, Minn.	36.4
Duluth, Minn.	38.2
Caribou, Maine	38.9
Marquette, Mich.	39.2
Sault Ste. Marie, Mich.	39.7
Williston, N.D.	40.1
Fargo, N.D.	40.5
Alamosa, Colo.	41.2
Bismarck, N.D.	41.3
St. Cloud, Minn.	41.4

Source: Planet101.com
By Lori Joseph and Keith Simmons, USA TODAY

**Unit 1** Lines and Angles **3**

## Algebraic Ideas

### Concepts

OBJECTIVES	PAGE REFERENCES
<p><b>MA-M-4.1.1</b> Students will understand the concept of a function and roles of independent and dependent variables.</p>	<p>See <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-4.1.2</b> Students will describe, give examples of, and recognize differences among expressions, equations, and inequalities.</p>	<p>SE: 736-738, 739-740 Also see <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-4.1.3</b> Students will understand systems of linear equations (2 equations in 2 variables) and representations of linear systems.</p>	<p><b>Sample Demonstrator: 742</b> SE: 742-743 Also see <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-4.1.4</b> Students will identify linear, quadratic, absolute value, and exponential functions from graphs and equations.</p>	<p>SE: 741 Also see <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-4.1.5</b> Students will apply direct and inverse variation to both real-world and mathematical problems.</p>	<p>See <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-4.1.6</b> Students will recognize, give examples of, and apply the laws of exponents.</p>	<p>See <i>Glencoe Algebra 1</i>.</p>

**Sample Demonstrator**  
**Algebraic Ideas: Concepts**  
**MA-H-4.1.1 to MA-H-4.1.6**

**Solving Systems of Linear Equations**

- Two or more equations that have common variables are called a **system of equations**. The solution of a system of equations in two variables is an ordered pair of numbers that satisfies both equations. A system of two linear equations can have zero, one, or an infinite number of solutions. There are three methods by which systems of equations can be solved: graphing, elimination, and substitution.

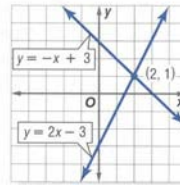
**Example 1** Solve each system of equations by graphing. Then determine whether each system has *no solution*, *one solution*, or *infinitely many solutions*.

a.  $y = -x + 3$   
 $y = 2x - 3$

The graphs appear to intersect at (2, 1).  
 Check this estimate by replacing  $x$  with 2 and  $y$  with 1 in each equation.

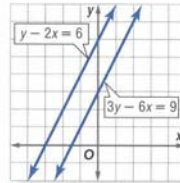
Check:  $y = -x + 3$        $y = 2x - 3$   
 $1 \stackrel{?}{=} -2 + 3$        $1 \stackrel{?}{=} 2(2) - 3$   
 $1 = 1 \checkmark$        $1 = 1 \checkmark$

The system has one solution at (2, 1).



b.  $y - 2x = 6$   
 $3y - 6x = 9$

The graphs of the equations are parallel lines. Since they do not intersect, there are no solutions of this system of equations. Notice that the lines have the same slope but different  $y$ -intercepts. Equations with the same slope *and* the same  $y$ -intercepts have an infinite number of solutions.



- It is difficult to determine the solution of a system when the two graphs intersect at noninteger values. There are algebraic methods by which an exact solution can be found. One such method is **substitution**.

**Example 2** Use substitution to solve the system of equations.

$y = -4x$   
 $2y + 3x = 8$

Since  $y = -4x$ , substitute  $-4x$  for  $y$  in the second equation.

$$\begin{aligned} 2y + 3x &= 8 && \text{Second equation} \\ 2(-4x) + 3x &= 8 && y = -4x \\ -8x + 3x &= 8 && \text{Simplify.} \\ -5x &= 8 && \text{Combine like terms.} \\ \frac{-5x}{-5} &= \frac{8}{-5} && \text{Divide each side by } -5. \\ x &= -\frac{8}{5} && \text{Simplify.} \end{aligned}$$

Use  $y = -4x$  to find the value of  $y$ .

$$\begin{aligned} y &= -4x && \text{First equation} \\ y &= -4\left(-\frac{8}{5}\right) && x = -\frac{8}{5} \\ y &= \frac{32}{5} && \text{Simplify.} \end{aligned}$$

The solution is  $\left(-\frac{8}{5}, \frac{32}{5}\right)$ .

## Algebraic Ideas

### Skills

OBJECTIVES	PAGE REFERENCES
<b>MA-H-4.2.1</b> Students will solve linear equations and linear inequalities.	<b>Sample Demonstrator: 737</b> SE: 13-19, 107-112, 737-738, 739-740 TWE: A 150
<b>MA-H-4.2.2</b> Students will graph the equation of a line.	SE: 145-149, 741 TWE: MC 145 Also see <i>Glencoe Algebra 1</i> .
<b>MA-H-4.2.3</b> Students will solve systems of linear equations (2 equations in 2 variables) including systems that arise from real-world problems.	SE: 742-743 Also see <i>Glencoe Algebra 1</i> .
<b>MA-H-4.2.4</b> Students will create tables of numerical values of functions including linear, quadratic, absolute value, exponential, and simple piecewise such as some long distance phone rates.	See <i>Glencoe Algebra 1</i> .
<b>MA-H-4.2.5</b> Students will determine the domain and range of a function, the slope and intercepts of a linear function, and the maximum/minimum and intercepts of a quadratic function.	SE: 139-144, 145-149, 741 Also see <i>Glencoe Algebra 1</i> .
<b>MA-H-4.2.6</b> Students will determine approximate solutions to quadratic equations.	SE: 750-751 Also see <i>Glencoe Algebra 1</i> .

OBJECTIVES	PAGE REFERENCES
<p><b>MA-H-4.2.7</b> Students will add, subtract, and multiply polynomial expressions, and students will factor polynomial expressions using the greatest common monomial factor.</p>	<p>SE: 746-747, 750-751 Also see <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-4.2.8</b> Students will use direct and inverse variation to solve real-world problems.</p>	<p>See <i>Glencoe Algebra 1</i>.</p>

**Sample Demonstrator**  
**Algebraic Ideas: Skills**  
**MA-H-4.2.1 to MA-H-4.2.8**

### Solving Linear Equations

- If the same number is added to or subtracted from each side of an equation, the resulting equation is true.

**Example 1** Solve each equation.

a.  $x - 7 = 16$   
 $x - 7 = 16$  Original equation  
 $x - 7 + 7 = 16 + 7$  Add 7 to each side.  
 $x = 23$  Simplify.

b.  $m + 12 = -5$   
 $m + 12 = -5$  Original equation  
 $m + 12 + (-12) = -5 + (-12)$  Add  $-12$  to each side.  
 $m = -17$  Simplify.

c.  $k + 31 = 10$   
 $k + 31 = 10$  Original equation  
 $k + 31 - 31 = 10 - 31$  Subtract 31 from each side.  
 $k = -21$  Simplify.

- If each side of an equation is multiplied or divided by the same number, the resulting equation is true.

**Example 2** Solve each equation.

a.  $4d = 36$   
 $4d = 36$  Original equation  
 $\frac{4d}{4} = \frac{36}{4}$  Divide each side by 4.  
 $x = 9$  Simplify.

b.  $-\frac{t}{8} = -7$   
 $-\frac{t}{8} = -7$  Original equation.  
 $-8\left(-\frac{t}{8}\right) = -8(-7)$  Multiply each side by  $-8$ .  
 $t = 56$  Simplify.

c.  $\frac{3}{5}x = -8$   
 $\frac{3}{5}x = -8$  Original equation.  
 $\frac{5}{3}\left(\frac{3}{5}x\right) = \frac{5}{3}(-8)$  Multiply each side by  $\frac{5}{3}$ .  
 $t = -\frac{40}{3}$  Simplify.

- To solve equations with more than one operation, often called *multi-step equations*, undo operations by working backward.

**Example 3** Solve each equation.

a.  $12 - m = 20$   
 $12 - m = 20$  Original equation  
 $12 - m - 12 = 20 - 12$  Subtract 12 from each side.  
 $-m = 8$  Simplify.  
 $m = -8$  Divide each side by  $-1$ .

## Algebraic Ideas

### Relationships

OBJECTIVES	PAGE REFERENCES
<p><b>MA-H-4.3.1</b> Students will write and solve linear equations describing real-world situations.</p>	<p>SE: 13-19, 107-112, 737-738 TWE: A 150</p>
<p><b>MA-H-4.3.2</b> Students will understand how formulas, tables, graphs, and equations of functions relate to each other.</p>	<p><b>Sample Demonstrator: 145</b> SE: 139-144, 145-149, 737-738 TWE: A 11 Also see <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-4.3.3</b> Students will demonstrate how slope shows rate of change in linear functions arising from real-world situations.</p>	<p>SE: 139-144, 168-169 TWE: A 144</p>
<p><b>MA-H-4.3.4</b> Students will show how changes in parameters affect graphs of functions [e.g., compare the graphs <math>y = x^2</math>, <math>y = 2x^2</math>, <math>y = (x - 4)^2</math>, and <math>y = x^2 + 3</math>].</p>	<p>See <i>Glencoe Algebra 1</i>.</p>
<p><b>MA-H-4.3.5</b> Students will show how equations and graphs are models of the relationship between two real-world quantities (e.g., the relationship between degrees Celsius and degrees Fahrenheit).</p>	<p><b>Sample Demonstrator: 145</b> SE: 145-149 Also see <i>Glencoe Algebra 1</i>.</p>

**Sample Demonstrator**  
**Algebraic Ideas: Relationships**  
**MA-H-4.3.1 to MA-H-4.1.5**

## 3-4 Equations of Lines

### What You'll Learn

- Write an equation of a line given information about its graph.
- Solve problems by writing equations.

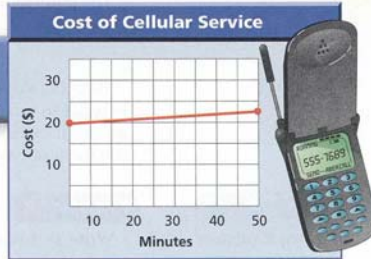
### Vocabulary

- slope-intercept form
- point-slope form

### How

**can the equation of a line describe the cost of cellular telephone service?**

A certain cellular phone company charges a flat rate of \$19.95 per month for service. All calls are charged \$0.07 per minute of air time  $t$ . The total charge  $C$  for a month can be represented by the equation  $C = 0.07t + 19.95$ .



**WRITE EQUATIONS OF LINES** You may remember from algebra that an equation of a line can be written given any of the following:

- the slope and the  $y$ -intercept,
- the slope and the coordinates of a point on the line, or
- the coordinates of two points on the line.

The graph of  $C = 0.07t + 19.95$  has a slope of 0.07, and it intersects the  $y$ -axis at 19.95. These two values can be used to write an equation of the line. The **slope-intercept form** of a linear equation is  $y = mx + b$ , where  $m$  is the slope of the line and  $b$  is the  $y$ -intercept.

$$y = mx + b \quad C = 0.07t + 19.95$$

↖ slope ↗  
↖ y-intercept ↗

### Example 1 Slope and $y$ -Intercept

Write an equation in slope-intercept form of the line with slope of  $-4$  and  $y$ -intercept of 1.

$y = mx + b$     Slope-intercept form

$y = -4x + 1$      $m = -4, b = 1$

The slope-intercept form of the equation of the line is  $y = -4x + 1$ .

Another method used to write an equation of a line is the point-slope form of a linear equation. The **point-slope form** is  $y - y_1 = m(x - x_1)$ , where  $(x_1, y_1)$  are the coordinates of any point on the line and  $m$  is the slope of the line.

$$y - y_1 = m(x - x_1)$$

given point  $(x_1, y_1)$   
↑ slope

### Codes Used for TWE Pages

A	Assess
DI	Daily Intervention
EM	Enrichment Masters
MC	5-Minute Check
T	Teach

## **LESSON PLAN CORRELATIONS**

<b>Chapter 1 Points, Lines, Planes, and Angles</b>	
<b>LESSON</b>	<b>KENTUCKY OBJECTIVES</b>
<b>1-1</b> Points, Lines, and Planes	MA-H-1.2.2, MA-H-2.3.1
<b>1-2</b> Linear Measure and Precision	MA-H-1.2.1, MA-H-1.2.2, MA-H-2.1.2, MA-H-3.2.1, MA-H-3.2.3, MA-H-4.2.1, MA-H-4.3.1, MA-H-4.3.2
<b>1-3</b> Distance and Midpoints	MA-H-1.2.1, MA-H-1.2.2, MA-H-2.2.4, MA-H-2.2.7, MA-H-2.3.1
<b>1-4</b> Angle Measure	MA-H-2.2.5, MA-H-2.3.1
<b>1-5</b> Angle Relationships	MA-H-2.1.2, MA-H-2.1.3, MA-H-2.3.1
<b>1-6</b> Polygons	MA-H-2.2.1, MA-H-2.3.2

<b>Chapter 2 Reasoning and Proof</b>	
<b>LESSON</b>	<b>KENTUCKY OBJECTIVES</b>
<b>2-1</b> Inductive Reasoning and Conjecture	Supports Kentucky and National Math Standards and Objectives
<b>2-2</b> Logic	Supports Kentucky and National Math Standards and Objectives
<b>2-3</b> Conditional Statements	Supports Kentucky and National Math Standards and Objectives
<b>2-4</b> Deductive Reasoning	Supports Kentucky and National Math Standards and Objectives
<b>2-5</b> Postulates and Paragraph Proofs	MA-H-2.2.7, MA-H-2.3.1
<b>2-6</b> Algebraic Proof	MA-H-1.3.2, MA-H-1.3.3, MA-H-2.3.1
<b>2-7</b> Proving Segment Relationships	Supports Kentucky and National Math Standards and Objectives
<b>2-8</b> Proving Angle Relationships	MA-H-2.1.3, MA-H-2.2.5, MA-H-4.2.1, MA-H-4.3.1

<b>Chapter 3 Addition and Subtraction Equations</b>	
<b>LESSON</b>	<b>KENTUCKY OBJECTIVES</b>
<b>3-1</b> Parallel Lines and Transversals	MA-H-2.1.2, MA-H-2.1.3
<b>3-2</b> Angles and Parallel Lines	MA-H-2.1.2, MA-H-2.1.3
<b>3-3</b> Slopes of Lines	MA-H-2.1.4, MA-H-2.2.7, MA-H-4.2.5, MA-H-4.3.2, MA-H-4.3.3
<b>3-4</b> Equations of Lines	MA-H-2.1.4, MA-H-2.2.7, MA-H-4.2.2, MA-H-4.2.5, MA-H-4.3.2, MA-H-4.3.5
<b>3-5</b> Proving Lines Parallel	MA-H-2.1.2
<b>3-6</b> Perpendiculars and Distance	MA-H-2.1.2, MA-H-2.3.2

<b>Chapter 4 Congruent Triangles</b>	
<b>LESSON</b>	<b>KENTUCKY OBJECTIVES</b>
<b>4-1</b> Classifying Triangles	MA-H-2.2.7, MA-H-2.3.1, MA-H-2.3.2
<b>4-2</b> Angles of Triangles	MA-H-2.3.1
<b>4-3</b> Congruent Triangles	MA-H-2.2.5, MA-H-2.3.1
<b>4-4</b> Proving Congruence—SSS, SAS	MA-H-2.3.2
<b>4-5</b> Proving Congruence—ASA, AAS	MA-H-2.2.5
<b>4-6</b> Isosceles Triangles	MA-H-2.3.1
<b>4-7</b> Triangles and Coordinate Proof	MA-H-2.3.2

<b>Chapter 5 Relationships in Triangles</b>	
<b>LESSON</b>	<b>KENTUCKY OBJECTIVES</b>
<b>5-1</b> Bisectors, Medians, and Altitudes	MA-H-2.3.2
<b>5-2</b> Inequalities and Triangles	MA-H-1.3.3, MA-H-2.3.2
<b>5-3</b> Indirect Proof	MA-H-2.2.3, MA-H-3.1.5, MA-H-3.2.6
<b>5-4</b> The Triangle Inequality	Supports Kentucky and National Math Standards and Objectives
<b>5-5</b> Inequalities Involving Two Triangles	Supports Kentucky and National Math Standards and Objectives

<b>Chapter 6 Proportions and Similarity</b>	
<b>LESSON</b>	<b>KENTUCKY OBJECTIVES</b>
<b>6-1</b> Proportions	MA-H-1.3.4, MA-H-2.3.2
<b>6-2</b> Similar Polygons	MA-H-1.3.4, MA-H-2.1.4, MA-H-2.2.3, MA-H-2.2.5, MA-H-2.3.2
<b>6-3</b> Similar Triangles	MA-H-1.3.4, MA-H-2.2.3, MA-H-2.2.5, MA-H-2.3.2
<b>6-4</b> Parallel Line and Proportional Parts	MA-H-1.3.4, MA-H-2.2.3, MA-H-2.2.5, MA-H-2.3.2
<b>6-5</b> Parts of Similar Triangles	MA-H-1.3.4, MA-H-2.2.3, MA-H-2.2.5
<b>6-6</b> Fractal and Self-Similarity	MA-H-2.2.3, MA-H-2.2.5

<b>Chapter 7 Right Triangles and Trigonometry</b>	
<b>LESSON</b>	<b>KENTUCKY OBJECTIVES</b>
<b>7-1</b> Geometric Mean	MA-H-1.3.4, MA-H-2.1.4
<b>7-2</b> The Pythagorean Theorem and Its Converse	MA-H-2.2.4, MA-H-2.3.2
<b>7-3</b> Special Right Triangles	MA-H-2.2.4, MA-H-2.3.2
<b>7-4</b> Trigonometry	MA-H-2.1.5, MA-H-2.2.3, MA-H-2.3.2
<b>7-5</b> Angles of Elevation and Depression	MA-H-2.1.5, MA-H-2.2.3
<b>7-6</b> The Law of Sines	MA-H-2.1.5, MA-H-2.2.3
<b>7-7</b> The Law of Cosines	MA-H-2.1.5, MA-H-2.2.3

<b>Chapter 8 Quadrilaterals and Circles</b>	
<b>LESSON</b>	<b>KENTUCKY OBJECTIVES</b>
<b>8-1</b> Angles of Polygons	MA-H-2.2.2
<b>8-2</b> Parallelograms	MA-H-2.2.2
<b>8-3</b> Tests for Parallelograms	MA-H-2.2.2
<b>8-4</b> Rectangles	MA-H-2.2.2
<b>8-5</b> Rhombi and Squares	MA-H-2.2.2
<b>8-6</b> Trapezoids	MA-H-2.2.2
<b>8-7</b> Coordinate Proof and Quadrilaterals	MA-H-2.3.2

<b>Chapter 9 Transformations</b>	
<b>LESSON</b>	<b>KENTUCKY OBJECTIVES</b>
<b>9-1</b> Reflections	MA-H-2.1.1, MA-H-2.2.1, MA-H-2.3.3
<b>9-2</b> Translations	MA-H-2.1.1, MA-H-2.2.1, MA-H-2.3.3
<b>9-3</b> Rotations	MA-H-2.1.1, MA-H-2.2.1, MA-H-2.3.3
<b>9-4</b> Tessellations	MA-H-2.1.1, MA-H-2.2.1
<b>9-5</b> Dilations	MA-H-2.1.1, MA-H-2.2.1, MA-H-2.3.3
<b>9-6</b> Vectors	Supports Kentucky and National Math Standards and Objectives
<b>9-7</b> Transformations with Matrices	MA-H-1.1.3, MA-H-1.2.3, MA-H-2.1.1, MA-H-2.2.1

<b>Chapter 10 Circles</b>	
<b>LESSON</b>	<b>KENTUCKY OBJECTIVES</b>
<b>10-1</b> Circles	MA-H-1.1.1, MA-H-3.1.5, MA-H-3.2.4, MA-H-3.2.5
<b>10-2</b> Angles and Arcs	Supports Kentucky and National Math Standards and Objectives
<b>10-3</b> Arcs and Chords	Supports Kentucky and National Math Standards and Objectives
<b>10-4</b> Inscribed Angles	MA-H-3.2.5
<b>10-5</b> Tangents	Supports Kentucky and National Math Standards and Objectives
<b>10-6</b> Secants, Tangents, and Angle Measures	Supports Kentucky and National Math Standards and Objectives
<b>10-7</b> Special Segments in a Circle	Supports Kentucky and National Math Standards and Objectives
<b>10-8</b> Equations of Circles	Supports Kentucky and National Math Standards and Objectives

<b>Chapter 11 Areas of Polygons and Circles</b>	
<b>LESSON</b>	<b>KENTUCKY OBJECTIVES</b>
<b>11-1</b> Areas of Parallelograms	MA-H-2.3.4
<b>11-2</b> Areas of Triangles, Trapezoids, and Rhombi	MA-H-2.3.4
<b>11-3</b> Areas of Regular Polygons and Circles	MA-H-2.3.4
<b>11-4</b> Areas of Irregular Figures	Supports Kentucky and National Math Standards and Objectives
<b>11-5</b> Geometric Probability	MA-H-3.1.5, MA-H-3.2.4, MA-H-3.2.5, MA-H-3.2.6

<b>Chapter 12 Surface Area</b>	
<b>LESSON</b>	<b>KENTUCKY OBJECTIVES</b>
<b>12-1</b> Three-Dimensional Figures	MA-H-2.2.1
<b>12-2</b> Nets and Surface Area	MA-H-2.2.6
<b>12-3</b> Surface Areas of Prisms	MA-H-2.2.6
<b>12-4</b> Surface Areas of Cylinders	MA-H-2.2.6
<b>12-5</b> Surface Areas of Pyramids	MA-H-2.2.6, MA-H-2.3.4
<b>12-6</b> Surface Areas of Cones	MA-H-2.2.6, MA-H-2.3.4
<b>12-7</b> Surface Areas of Spheres	MA-H-2.2.6, MA-H-2.3.4

<b>Chapter 13 Volume</b>	
<b>LESSON</b>	<b>KENTUCKY OBJECTIVES</b>
<b>13-1</b> Volumes of Prisms and Cylinders	MA-H-2.2.6, MA-H-2.3.4
<b>13-2</b> Volumes of Pyramids and Cones	MA-H-2.2.6, MA-H-2.3.4, MA-H-3.1.5, MA-H-3.2.4, MA-H-3.2.5, MA-H-3.2.6
<b>13-3</b> Volumes of Spheres	MA-H-2.2.6, MA-H-2.3.4, MA-H-3.1.5, MA-H-3.2.4, MA-H-3.2.5, MA-H-3.2.6
<b>13-4</b> Congruent and Similar Solids	MA-H-2.2.5, MA-H-2.3.4
<b>13-5</b> Coordinates in Space	MA-H-2.3.2

**STANDARDS FOR MATHEMATICS  
EVALUATION INSTRUMENT**

<b>Content/Process</b>	<b>Comments</b>
<p>1. Material is comprehensive and includes content emphasized in Kentucky’s Learning Goals and Academic Expectations and supported by the Core Content for Assessment, Program of Studies, and relevant National Standards.</p>	<p>Content emphasized in Kentucky’s Learning Goals and Academic Expectations is covered in Core Content statements MA-H-2.1.1, MA-H-2.1.2, MA-H-2.1.3, MA-H-2.1.5, MA-H-2.2.2, MA-H-2.2.3, MA-H-2.2.4, MA-H-2.2.5, MA-H-2.2.6, MA-H-2.2.7, MA-H-2.3.1, MA-H-2.3.2, MA-H-2.3.3 and MA-H-2.3.4. A correlation to NCTM standards can be found in the Teacher’s Wraparound Edition on pages T24-T25.</p>

Content/Process	Comments
2. Content appears to be free from factual errors.	<i>Glencoe Geometry</i> is the product of ongoing classroom-oriented research that involves students, teachers, curriculum supervisors, administrators, parents, and college-level mathematics educators. Prior to publication of any Glencoe program, typical research activities include a review of educational research and recommendations made by groups such as NCTM; mail surveys of mathematics educators, discussion groups involving mathematics teachers, department heads, and supervisors; focus groups involving mathematics educators; face-to-face interviews with mathematics educators; telephone surveys of mathematics educators; in-depth analysis of manuscript by a wide range of reviewers and consultants; and field tests in which students and teachers use pre-publication manuscript in the classroom.
3. Content makes connections to other content areas across the curriculum.	There is an emphasis on integrating number and operations, algebra, measurement, data analysis and probability.
4. Concepts and application of skills to real-life situations are introduced when appropriate.	Relevant, real-life applications are a part of every lesson. Practical problem solving is linked to students' real-life interests. <b>WebQuest Internet Projects</b> are included in the <b>Investigations and Project Masters</b> and enable students to become more deeply engaged in a problem situation.

<b>Content/Process</b>	<b>Comments</b>
5. Content appears to be free of social, ethnic, racial, religious, gender, and geographical bias.	Relevant, real-life applications are a part of every lesson. Practical problem solving is linked to students' real-life interests.
6. Material is flexible and accommodates various learning styles, interest/ability levels, and intelligences, including adaptations and accommodations for students with special needs.	<i>Glencoe Geometry</i> introduces new concepts in a variety of ways to meet the needs of all learners. In addition to more traditional instructional experiences, <i>Glencoe Geometry</i> encourages students to <b>do</b> mathematics.
7. Reading level is appropriate for interest and ability level of intended student group; level remains consistent throughout.	The readability level is 9.5 Dale Chall.

Content/Process	Comments
<p>8. Content reflects research-based practices (e.g., hands-on activities, technology, problem-solving situations).</p>	<p><b>Geometry Activities</b> features give students hands-on experience, with a partner or group, in discovering mathematical concepts for themselves and taking responsibility for their own learning. Practical problem solving is linked to students' real-life interests. Students are given multiple opportunities to utilize the world of technology in studying and exploring mathematics. Graphing calculators and CD-ROM multimedia technology provide tools for both problem solving and discovery. The variety of integrated technology supports diverse learning styles.</p>
<p>9. Concepts are explored in depth and reinforced throughout.</p>	<p>The content addresses the basic terms of geometry, reasoning, proof with an emphasis on two-column proof, perpendicular and parallel lines, triangles and congruence, triangle inequalities, quadrilaterals, proportion and similarity, basic trigonometry, circles, area, surface area, volume, coordinate graphing, loci, and transformations. The other strands-number and operations, algebra, measurement, data analysis and probability-are incorporated where appropriate.</p>

Assessment	Comments
<p>1. Student assessment is aligned with the instructional program. Assessment activities are similar to learning activities.</p>	<p>The curriculum alignment to Kentucky Core Content Standards promotes the ability of students to perform well on CATS tests and other standardized tests. Forms of self-assessment in the Student Edition include <b>Practice Quizzes</b>, <b>Standardized Test Practice</b>, <b>WebQuest Internet Projects</b>, and a chapter <b>Practice Test</b>.</p>
<p>2. Assessment activities examine the extent to which students have internalized and made sense of mathematical concepts and whether they can use mathematics to communicate their ideas.</p>	<p>Every chapter has a <b>Study Guide and Review</b> section that includes a <b>Vocabulary and Concept Check</b>, and a <b>Lesson-by-Lesson Review</b> that includes a Concept Summary, Examples and Review Exercises for each lesson.</p>
<p>3. Assessment activities provide opportunities for students to demonstrate knowledge and skills in real-life situations and interdisciplinary applications.</p>	<p>Every chapter has a <b>Study Guide and Review</b> section that includes a <b>Vocabulary and Concept Check</b>, and a <b>Lesson-by-Lesson Review</b> that includes a Concept Summary, Examples and Review Exercises for each lesson. Every lesson has an <b>Open-Ended Assessment</b> suggestion in the Teacher’s Wraparound Edition that involves writing, speaking, or modeling.</p>

Assessment	Comments
<p>4. A variety of assessments (e.g., diagnostic, formative, summative, open response, multiple choice, individual, small group, oral, demonstrations, presentations, self and peer, performance, portfolio prompts) is included.</p>	<p>In the Student Edition, every lesson has a <b>Mixed Review</b> that includes a test practice item. Every chapter has <b>Math Journals</b>, a <b>Chapter Project</b>, a <b>Mid-Chapter Self Test</b>, <b>Standardized Test Practice</b>, a <b>Chapter Test</b>, a <b>Study Guide and Assessment</b>, <b>Applications and Problem Solving</b>, and an <b>Alternative Assessment</b>, which includes a <b>Portfolio</b> suggestion. Every lesson includes a <b>5-Minute Check Transparency</b> that covers the previous lesson or chapter, and an <b>Open-Ended Assessment</b> suggestion in the Teacher’s Wraparound Edition that involves writing, speaking, or modeling. The <b>Assessment and Evaluation Masters</b> include multiple-choice tests, free-response tests, a calculator-based test, a performance assessment, a mid-chapter test, quizzes, cumulative review, and mathematics learning assessment items. The <b>TestCheck and Worksheet Builder CD-ROM</b>, correlated to the Kentucky Core Content Standards for Geometry, allows teachers to create customized tests and quizzes with any combination of free-response, multiple-choice, short-answer, and open-ended items. The <b>TestCheck and Worksheet Builder</b> also contains special banks of questions for SAT, ACT, and TIMMS. <b>Preparing for CATS Practice and Sample Test Workbook</b> gives students practice by objective and sample tests representative of CATS. <i>Glencoe Geometry</i> provides integrated and ongoing test preparation throughout the year to help reduce student anxiety and improve student performance.</p>

Assessment	Comments
<p>5. Assessment activities provide opportunities for student integration of technology in the assessment process.</p>	<p>The <b>TestCheck and Worksheet Builder CD-ROM</b> contains special banks of questions for SAT, ACT, and TIMMS. <b>Preparing for CATS Practice and Sample Test Workbook</b> gives students practice by objective and sample tests representative of CATS. <i>Glencoe Geometry</i> provides integrated and ongoing test preparation throughout the year to help reduce student anxiety and improve student performance.</p>

Organization and Structure	Comments
<p>1. Organization is logical and allows for spiraling of content.</p>	<p><i>Glencoe Geometry</i> is composed of 13 chapters, each having 5 to 8 lessons. Each lesson follows a straight forward format. The lesson begins with <i>What You'll Learn</i> and <i>Why...?</i>, which provides the objective of the lesson and a relevant benefit of learning the concept. Completely worked-out examples with clear explanations parallel the exercises in the <b>Check for Understanding</b> and <b>Practice and Apply</b> sections. Check for Understanding exercises are designed to be completed in class. In the <b>Concept Check</b> exercises, students define, describe, and explain mathematical concepts. The <b>Guided Practice</b> exercises present a representative sample of the exercises in the <b>Practice and Apply</b> exercises. Each lesson contains a <b>Critical Thinking</b> exercise in which students explain, justify, and prove mathematical relationships. Word problems in the <b>Practice and Apply</b> exercises apply geometric concepts to both real-life and mathematical problem situations. The <b>Maintain Your Skills</b> exercises are spiraled and cumulative, and conclude with a <b>Getting Ready for the Next Lesson</b> section.</p>
<p>2. Language is clear and concise with correct grammar and sentence structure.</p>	<p>Prior to publication of any Glencoe program, an in-depth analysis of manuscript by a wide range of reviewers and consultants is conducted. Field tests in which students and teachers use pre-publication manuscript in the classroom also helps ensure accuracy.</p>

<b>Organization and Structure</b>	<b>Comments</b>
3. Vocabulary and key terms are clearly defined and easily accessible within each lesson.	Vocabulary words are found in highlighted, boldface type where they are defined in the lesson.
4. Visual illustrations (e.g., graphs, charts, models) and examples are clearly presented and content-related.	Graphs, charts, and models are used throughout the book to illustrate concepts. Completely worked-out examples with clear explanations parallel the exercises in the <b>Check for Understanding</b> and <b>Practice and Apply</b> sections.
5. Illustrations and language reflect diversity (e.g., racial, ethnic, culture, age, gender, disabilities).	Relevant, real-life applications are a part of every lesson. Practical problem solving is linked to students' real-life interests.
6. Legible type, length of lines, spacing, page layout, and width of margins contribute to overall appearance and use.	Prior to publication of any Glencoe program, an in-depth analysis of manuscript by a wide range of reviewers and consultants is conducted. Field tests in which students and teachers use pre-publication manuscript in the classroom also helps ensure accuracy.

Organization and Structure	Comments
7. Student materials seem durable and conducive to daily student use (e.g., size, weight).	The very best materials are used in all Glencoe products. The materials are easy for students to use, both in school and at home.
8. Textbook includes appropriate and sufficient glossary, index, and appendices.	The <b>Student Handbook</b> can be found on pp. 728-R92. It contains sections on <b>Prerequisite Skills, Extra Practice, Mixed Problem Solving and Proof, Postulates, Theorems, and Corollaries, English-Spanish Glossary, Selected Answers, and the Index.</b>

Organization and Structure	Comments
<p>9. Materials are organized into units of study (or similar structures) with daily lessons that include worthwhile, real-world tasks.</p>	<p><i>Glencoe Geometry</i> is composed of 13 chapters, each having 5 to 8 lessons. Each lesson follows a straight forward format. The lesson begins with <i>What You'll Learn</i> and <i>Why...?</i>, which provides the objective of the lesson and a relevant benefit of learning the concept. Completely worked-out examples with clear explanations parallel the exercises in the <b>Check for Understanding</b> and <b>Practice and Apply</b> sections. Check for Understanding exercises are designed to be completed in class. In the <b>Concept Check</b> exercises, students define, describe, and explain mathematical concepts. The <b>Guided Practice</b> exercises present a representative sample of the exercises in the <b>Practice and Apply</b> exercises. Each lesson contains a <b>Critical Thinking</b> exercise in which students explain, justify, and prove mathematical relationships. Word problems in the <b>Practice and Apply</b> exercises apply geometric concepts to both real-life and mathematical problem situations. The <b>Maintain Your Skills</b> exercises are spiraled and cumulative, and conclude with a <b>Getting Ready for the Next Lesson</b> section.</p>
<p>10. Materials can be easily understood by students and parents.</p>	<p>The reading level of <i>Glencoe Geometry</i> is on target at 8.1 Dale Chall. In addition, the material presented is interesting and related to students' lives. The Glencoe Math Website helps parents get involved with their child's learning by providing challenging activities such as problems of the week and group activities.</p>

Student Experiences	Comments
1. The program emphasizes students <i>doing</i> mathematics rather than <i>memorizing</i> mathematics.	Doing mathematics is so much more effective than memorizing mathematics! That is why <i>Glencoe Geometry</i> gives teachers and students several opportunities to engage in projects of varying lengths that put mathematics in motion. These opportunities include the <b>WebQuest Internet Projects</b> found throughout the book.
2. Both group and individual activities are included.	<i>Glencoe Geometry</i> offers multiple opportunities for students to learn cooperatively as well as individually. In addition to more traditional instructional experiences, <b>Geometry Activities</b> features give students hands-on experience, with a partner or group, in discovering mathematical concepts.
3. Materials and activities provide authentic applications that allow students to make meaningful connections across the curriculum, to real-world situations, and to interrelated mathematical concepts.	Practical problem solving is linked to students' real-life interests. There is an emphasis on integrating algebra, geometry, measurement, proportional reasoning, statistics, probability, technology, and problem solving. In addition, interdisciplinary connections are a part of every lesson.

<b>Student Experiences</b>	<b>Comments</b>
4. Materials and activities encourage students to explore and investigate mathematical ideas through various problem-solving techniques.	Practical problem solving is linked to students' real-life interests. Students are given multiple opportunities to utilize the world of technology in studying and exploring mathematics. Use of the graphing calculator is integrated throughout the program in various ways, as is the use of computer software.
5. Materials and activities ask students to read, write, and discuss mathematics.	In the <b>Concept Check</b> exercises found in each lesson, students define, describe, explain, and write about mathematical concepts. A <b>Writing in Math</b> exercise can be found in the <b>Practice and Apply</b> exercises in each lesson.
6. Materials and activities ask students to reflect upon, clarify, justify, and generalize their mathematical ideas.	Each lesson contains a <b>Critical Thinking</b> exercise in which students explain, justify, and prove mathematical relationships. Students are shown how to organize information about each chapter by using a <b>Foldables Study Organizer</b> .

Technology	Comments
1. In order for students to focus on decision-making, reflection, reasoning, and problem solving, instructional activities incorporate the use of technology (e.g., calculators, probes, computers) and include instructions on how to use the technology tools.	Students are given multiple opportunities to utilize the world of technology in studying and exploring mathematics. Graphing calculators and CD-ROM multimedia technology provide tools for both problem solving and discovery. The variety of integrated technology supports diverse learning styles.
2. Various forms of media are included (e.g., CDs, videos, computer software)	The <b>TestCheck and Worksheet Builder CD-ROM</b> , correlated to the Kentucky Core Content Standards for Geometry, allows teachers to create customized tests and quizzes with any combination of free-response, multiple-choice, short-answer, and open-ended items. The <b>TestCheck and Worksheet Builder</b> also contains special banks of questions for SAT, ACT, and TIMMS. <b>Preparing for CATS Practice and Sample Test Workbook</b> gives students practice by objective and sample tests representative of CATS. <i>Glencoe Geometry</i> provides integrated and ongoing test preparation throughout the year to help reduce student anxiety and improve student performance.
3. Student materials are available online.	Free access to <b>Glencoe Math Website</b> and <b>Online Study Tools</b> is provided with the program.

Resource Materials	Comments
1. Teacher materials coordinate easily with student materials (e.g., additional resources included at point of need, student pages shown, manipulatives appropriate for indicated lesson, instructional technology indicated).	Each lesson in the Teacher’s Wraparound Edition (TWE) begins with <b>Chapter Resource Manager</b> , which includes instructional technology. A list of blackline masters for each lesson is included at the beginning of each chapter. A list of blackline masters for each lesson is included at the beginning of each chapter. Each student page is shown in the TWE on the same pages as related teacher’s materials.
2. Activities are included that adapt to the various learning styles, intelligences, and interest/ability levels.	In the TWE, ideas for <b>Daily Intervention</b> are provided for each lesson. Helpful ancillary materials include the <b>Study Guide and Intervention, Reading to Learn Mathematics</b> , and <b>GeomPASS:Tutorial Plus</b> .
3. Extension activities including adaptations and accommodations for students with special needs.	In the TWE, ideas for <b>Daily Intervention</b> are provided for each lesson. Helpful ancillary materials include the <b>Study Guide and Intervention, Reading to Learn Mathematics</b> , and <b>GeomPASS:Tutorial Plus</b> .
4. Resources provide objectives, background information, common student errors, hints, advice for lesson implementation and real-world connections, connections within mathematics, and references (e.g., solutions manuals, study guides).	The following features are provided throughout the TWE: <b>Daily Intervention, Tips for New Teachers, and Why...?</b> . Ancillary materials include <b>Answer Key Maker software, Answer Key Transparencies, Real-World Transparencies, Graphing Calculator and Computer Masters, Teaching Geometry with Manipulatives Masters, School-to-Career Masters, and Study Guide and Intervention Masters</b> .

Resource Materials	Comments
5. Suggestions are made for integration of themes and/or interdisciplinary instruction.	The TWE includes features such as <b>Career Choices</b> and <b>More About...</b> . Ancillary materials include <b>Real-World Transparencies</b> and <b>School-to-Career Masters</b> .
6. Suggestions are made for family and community involvement and school/home communication.	The Glencoe Math Website helps parents get involved with their child’s learning by providing challenging activities such as problems of the week and group activities.
7. The included media are durable, easy to use, and have technical merit.	All included media are made to last and can be easily incorporated into lessons.
8. Teacher resources are available online.	Free access to <b>Glencoe Math Website</b> and <b>Online Study Tools</b> , as well as is provided with the program.



***Marcia L. Rieder***

*Kentucky Sales Representative*

*2005 Crooked Creek Court*

*Crestwood, Kentucky 40014*

*Tel 502 241 6701*

*Fax 502 243 9769*

[marcia\\_rieder@mcgraw-hill.com](mailto:marcia_rieder@mcgraw-hill.com)

***South Central Region***

*6510 Jimmy Carter Boulevard*

*Norcross, GA 30071*

*Tel 770 613 0281*

*Toll Free 800 731 2365*