grade **7**

# Assessment Prep
## for
# COMMON CORE MATHEMATICS

## Tips and Practice for the Math Standards

- Practice Assessments

- Multiple-Choice Questions

- Open-Ended Questions

- Test-Taking Tips

- Diagnostic Information

# Assessment Prep for Common Core Mathematics

**Grade 7**

## Tips and Practice for the Math Standards

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# Table of Contents

# Introduction to the Teacher

The time has come to raise the rigor in our children's mathematical education. The Common Core State Standards were developed to help guide educators and parents on how to do this by outlining what students are expected to learn at each grade level. The bar has been set high, but our students are up to the challenge.

More than 40 states have adopted the Common Core State Standards, and the school districts in those states are aligning their curriculums and state assessments to those standards. This workbook is designed to help you prepare your students for assessments based on the Common Core State Standards. It contains both multiple-choice and open-ended assessment questions that are similar to the types of questions students will encounter on their state assessments. We have also included test-taking tips and strategies that will help students perform well on these types of assessments.

Additionally, this book contains diagnostic information for the multiple-choice questions that will help you understand why your students selected particular incorrect answers. We believe that you will be able to use this information to identify the gaps in student knowledge and to inform your future instruction.

We hope that this book will be a valuable resource for you in preparing your students for assessments that are aligned with the Common Core State Standards!

— Karise Mace, Stephen Fowler, and Christine Henderson

# Test-Taking Strategies for Math Tests

Test anxiety affects many students. Here are some strategies you can teach your students to help alleviate the anxiety and help them become more relaxed test-takers. We have also included a sample problem in which we highlight how these strategies might be used.

## Multiple-Choice Tests

**Tip #1:    Read the problem thoroughly and determine the goal.**

Anxious test-takers have a tendency to read through problems quickly and then immediately scan the answer choices for what might be the correct answer. Encourage your students to be patient as they read through each problem so that they can determine what the problem is asking them to do. They may even wish to circle information that they think is important and underline the question.

**Example:** You have 12 yards of ribbon. It takes $\frac{2}{3}$ of a yard of ribbon to wrap a package.
<u>How many</u> packages can you wrap?

    A.  24 packages
    B.  18 packages
    C.  16 packages
    D.  12 packages

**Tip #2:    Estimate the answer.**

Students often "number surf." That is, they "grab" the numbers they see in the problem and start operating on them in an attempt to get one of the answer choices. Encourage your students to use estimation to determine the reasonableness of an answer.

**Estimate:** I know that $\frac{2}{3}$ is more than $\frac{1}{2}$ but less than 1. So, the number of packages must be between 12 and 24.

**Tip #3:    Use your estimate to quickly eliminate one or two of the choices.**

Once students have calculated an estimate, they can almost always use it to eliminate one or two unreasonable choices. Encourage them to cross these out with their pencils.

**Eliminate:** Because the number of packages must be between 12 and 24, I can eliminate choices **A** and **D**.

**Tip #4:    Solve the problem by working forward or backward.**

Some problems can be solved just as efficiently by working forward or backward. If students are unsure about how to use the information in the problem to get one of the answers, encourage them to start with one of the answers and work backward to see if they get the information in the problem.

**Working forward:**

12 yards $\div \frac{2}{3}$ yard/package =
$\frac{12}{1}$ x $\frac{3}{2}$ = 18 packages

The correct answer is choice **B**.

# Test-Taking Strategies for Math Tests

## Open-Ended Response Tests

The tips for solving open-ended response problems are similar to those for solving multiple-choice problems. However, because open-ended response questions are also used to assess the problem-solving process, students must learn how to communicate their process. These tips will help them learn to do that.

**Tip #1:    Read the problem thoroughly and determine the goal.**

Open-ended response problems are often multi-step. It is important to encourage your students to read these problems patiently and thoroughly so that they do not forget to complete the problem. It may be helpful for them to circle important information and underline the question.

> **Example:** Maggie has 110 feet of fencing and would like to use it to enclose a rectangular area that is 32 feet by 25 feet. Does she have enough fencing to do this? Explain your reasoning.

**Tip #2:    Make a list of what you know and what you need to figure out.**

Making lists can help students keep their information organized. Encourage them to make two lists—one of the things they know and another of the things they need to figure out.

> **Things I know:**
> 1. Maggie has 110 feet of fencing.
> 2. The area to be enclosed is a rectangle.
> 3. The length of the rectangle is 32 feet, and the width is 25 feet.
>
> **Things I need to figure out:**
> 1. What is the perimeter of the area to be enclosed?
> 2. Whether or not Maggie has enough fencing to enclose the area

**Tip #3:    Devise a plan for solving the problem.**

While students do not always need to write out their problem-solving plan, it is important for them to form one. Many open-ended response problems ask students to explain their problem-solving process. Encourage students to write down their plan as part of this explanation.

> **Plan:** I am going to calculate the perimeter of the rectangular area and compare it to the amount of fencing Maggie has.

**Tip #4:    Carry out your plan.**

As students begin to carry out their plan, encourage them to show their work!

**Tip #5:    Check your work.**

Students like to skip this step, but it is one of the most important ones in the problem-solving process. Encourage your students to take time to check their work and to make sure that they actually solved the problem they were asked to solve.

> **Carry out the plan:**
>
> $P = 2l + 2w$
>
> $\quad = 2(32) + 2(25)$
>
> $\quad = 114$
>
> The perimeter of the rectangular area is 114 feet. Maggie does *not* have enough fencing to enclose it because she only has 110 feet of fencing.

# Geometry

## Problem Correlation to CCSS Grade 7 Geometry Standards

| MC Problem # | 7.G.A.1 | 7.G.A.2 | 7.G.A.3 | 7.G.B.4 | 7.G.B.5 | 7.G.B.6 |
|---|---|---|---|---|---|---|
| 1 | | | • | | | |
| 2 | | | | • | | |
| 3 | • | | | | | |
| 4 | | • | | | | |
| 5 | | | | | | • |
| 6 | | | | | • | |
| 7 | • | | | | | |
| 8 | | • | | | | |
| 9 | | | • | | | |
| 10 | | | | • | | |
| 11 | | | | | • | |
| 12 | | | | | | • |
| 13 | | | | | • | |
| 14 | | | | • | | |
| 15 | | | • | | | |
| 16 | | • | | | | |
| 17 | • | | | | | |
| 18 | | | | • | | |
| 19 | | | | | | • |
| 20 | | | | | | • |
| **Open-Ended Problem #** | **7.G.A.1** | **7.G.A.2** | **7.G.A.3** | **7.G.B.4** | **7.G.B.5** | **7.G.B.6** |
| 1 | | | | • | | |
| 2 | • | | | | | |
| 3 | | | | | | • |
| 4 | | | | | • | |
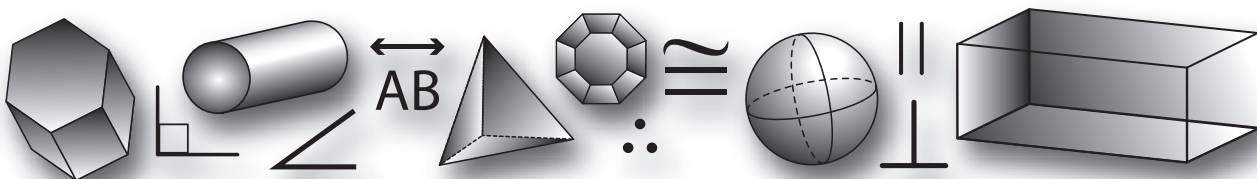
Name: _____     Date: _____
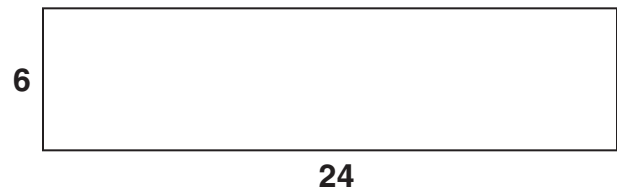
# Geometry: Multiple-Choice Assessment Prep

**Directions:** Circle the choice that best answers the question.

**1.** Which answer best describes the two-dimensional shape obtained by horizontally slicing the right hexagonal prism as shown?
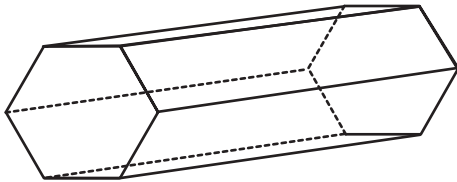


   **A.** Trapezoid

   **B.** Hexagon

   **C.** Rectangle

   **D.** Parallelogram

**2.** The midfield circle on a soccer field has a diameter of 60 ft. Esteban runs once around the midfield circle. To the nearest foot, how far does Esteban run?

   **A.** 188 ft

   **B.** 377 ft

   **C.** 2,826 ft

   **D.** 60 ft

**3.** The rectangle shown below is scaled by a factor of $\frac{2}{3}$. What is the area of the new rectangle?

6

24

   **A.** 64

   **B.** 40

   **C.** 96

   **D.** 324

**4.** How many unique triangles can be constructed using angles measuring 40°, 60°, and 80°?

   **A.** None

   **B.** One

   **C.** Two

   **D.** Infinitely many
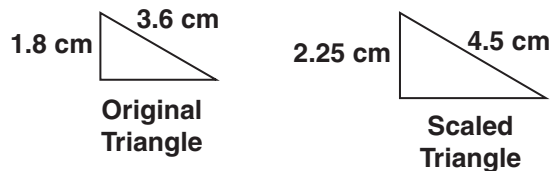
Name: _____   Date: _____

# Geometry: Multiple-Choice Assessment Prep

**Directions:** Circle the choice that best answers the question.

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**5.** A solid number cube made of plastic has an edge measuring $\frac{5}{8}$ in. How much plastic is needed to make the number cube?
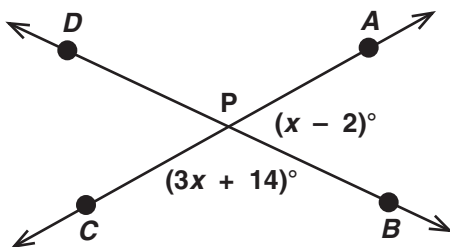
**A.** $\frac{75}{32}$ in.$^3$

**B.** $\frac{75}{32}$ in.$^2$

**C.** $\frac{25}{64}$ in.$^2$

**D.** $\frac{125}{512}$ in.$^3$

---

**7.** What factor is used to scale the triangle shown below?

3.6 cm
1.8 cm
**Original Triangle**

2.25 cm   4.5 cm
**Scaled Triangle**

**A.** 1.25

**B.** 0.8

**C.** 2

**D.** 0.5

---

**6.** Determine the measure of $\angle APD$:

D        A

P
$(x - 2)°$

$(3x + 14)°$

C        B

**A.** 40°

**B.** 140°

**C.** 42°

**D.** 158°

---

**8.** One side of a triangle measures 7.5 units. Another side measures 11.6 units. The third side has a length that is a whole number of units. What is the smallest possible length of the third side?
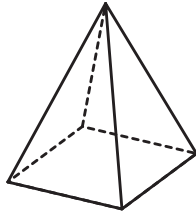
**A.** 4 units

**B.** 19 units

**C.** 5 units

**D.** 4.1 units

---

Name: _____  Date: _____

# Geometry: Multiple-Choice Assessment Prep

**Directions:** Circle the choice that best answers the question.

---

**9.** The right square pyramid below is sliced vertically. Which of the following figures cannot be the two-dimensional shape obtained?



**A.** Trapezoid

**B.** Square

**C.** Triangle

**D.** Any of these shapes is possible

---

**11.** Quadrilateral *MATH* is a rectangle. Determine the measure of $\angle HAT$.
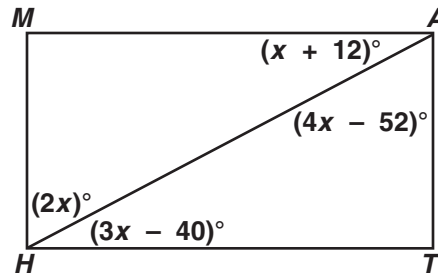


**A.** $26°$

**B.** $\left(33\frac{1}{3}\right)°$

**C.** $38°$

**D.** $52°$

---

**10.** Jin opens a shade umbrella with a diameter of $6\frac{1}{2}$ feet to sit beneath while at the beach. What is the best approximation of the area of sand shaded by Jin's umbrella when the sun is directly overhead?

**A.** 33 square feet

**B.** 133 square feet

**C.** 20 square feet

**D.** 11 square feet

---

**12.** A feeding trough is in the shape of a right triangular prism. The triangular end of the trough measures 3 ft across and is $1\frac{1}{4}$ ft deep. The feeding trough is 40 feet long. How much cattle feed can the trough hold?
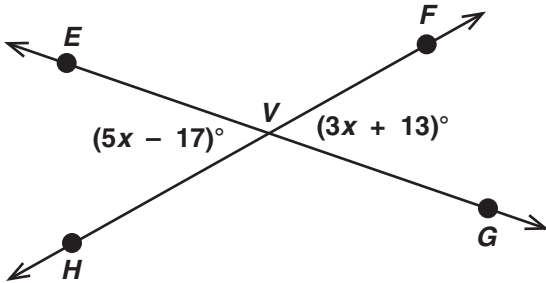
**A.** 150 ft³

**B.** 75 ft³

**C.** 300 ft³

**D.** 120 ft²

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Name: _____     Date: _____

# Geometry: Multiple-Choice Assessment Prep

**Directions:** Circle the choice that best answers the question.

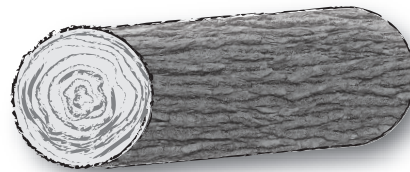---

**13.** Determine the measure of $\angle EVF$:



$(5x - 17)°$        $(3x + 13)°$

**A.** 58°

**B.** 122°

**C.** 15°

**D.** 98°

---

**15.** The trunk of a fallen tree lies on the ground as shown below. Clayton cuts the log to obtain a circular piece to use as the seat of a stool. In what direction does Clayton cut the fallen tree?



**A.** Diagonally

**B.** Horizontally

**C.** Vertically

**D.** Clayton cannot make the necessary cut.

---

**14.** Maria has a circular flower garden in her backyard. The stone path around the garden measures 1,413 cm. To the nearest thousand, what is the area of Maria's flower garden?

**A.** 499,000 cm²

**B.** 256,000 cm²

**C.** 636,000 cm²

**D.** 159,000 cm²

---

**16.** Which of the following sets of conditions can be used to construct a triangle?

**A.** Sides measuring 28, 46, and 74 units

**B.** Three obtuse angles

**C.** Three sides measuring 180 cm each

**D.** Two right angles

---

Name: _____ Date: _____

# Geometry: Multiple-Choice Assessment Prep

**Directions:** Circle the choice that best answers the question.

**17.** A small airport expands its rectangular runway by a scale factor of $\frac{3}{2}$. The new runway is $\frac{3}{4}$ mi long and covers $\frac{1}{24}$ mi². What is the width of the original runway?

**A.** $\frac{1}{27}$ mi

**B.** $\frac{1}{12}$ mi

**C.** $\frac{1}{48}$ mi

**D.** $\frac{3}{64}$ mi

**18.** Nelson's bicycle has 26-inch diameter wheels. Nelson pedals his bicycle enough for the wheels to complete exactly 250 revolutions. To the nearest hundred, how far does Nelson travel?

**A.** 132,700 inches

**B.** 20,400 inches

**C.** 6,500 inches

**D.** 40,800 inches

**19.** Ye builds a plywood storage box in the shape of a right trapezoidal prism as shown below. How much plywood does Ye use?



2.4 m     1.3 m     1 m     1.5 m     1.2 m
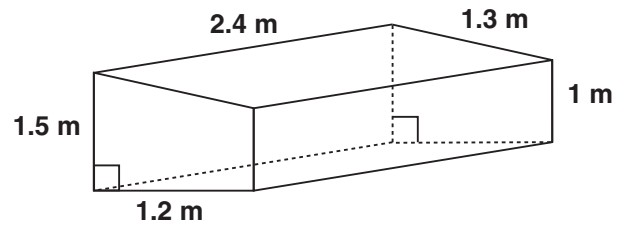
**A.** 3.6 m³

**B.** 4.32 m³

**C.** 15.75 m²

**D.** 15 m²

**20.** An aerial view of a public swimming pool is shown below. Which is the best approximation of its area?



12 ft     30 ft     7 ft     10 ft     60 ft
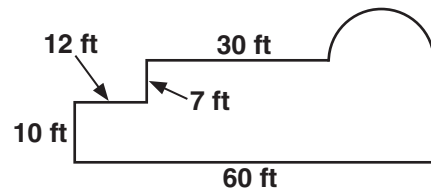
**A.** 1,445 ft²

**B.** 1,147 ft²

**C.** 1,063 ft²

**D.** 757 ft²

Name: _____  Date: _____

# Geometry: Open-Ended Response Assessment Prep

**Directions:** Answer the question completely. Show your work and explain your reasoning.

| |
|---|
| **Problem 1:** A pizza shop sells its medium cheese pizza for $8.95 and its large cheese pizza for $12.95. The diameters of the pizzas are 12 inches and 16 inches, respectively. Which is the better deal? |

| **Show your work.** | **Explain your reasoning.** |
|---|---|
| | |

Name: _____  Date: _____

# Geometry: Open-Ended Response Assessment Prep

**Directions:** Answer the question completely. Show your work and explain your reasoning.

---

**Problem 2:** The scale drawing below shows the route April drives to her cousin's house. In the figure, one inch represents $2\frac{1}{2}$ miles. How far does April drive to visit her cousin?



**Show your work.**

**Explain your reasoning.**

---

Name: _____ Date: _____

# Geometry: Open-Ended Response Assessment Prep

**Directions:** Answer the question completely. Show your work and explain your reasoning.

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**Problem 3:** The competition swimming pool shown below is resurfaced with quartz aggregate that costs $7.50 per square foot. What is the total cost of resurfacing the walls and floor of the pool?
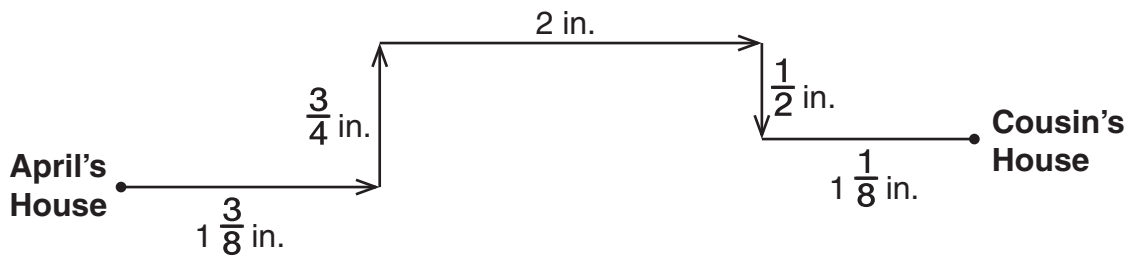


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**Show your work.**
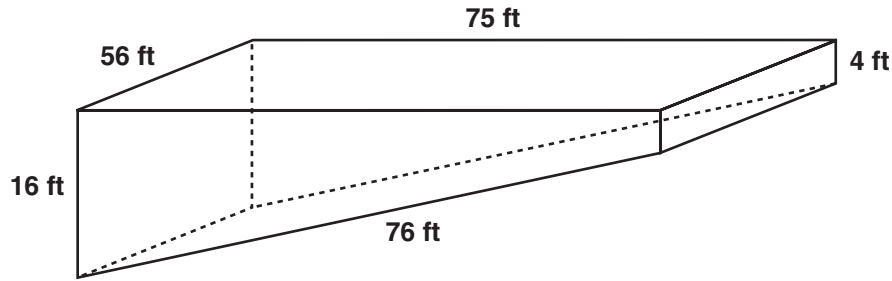
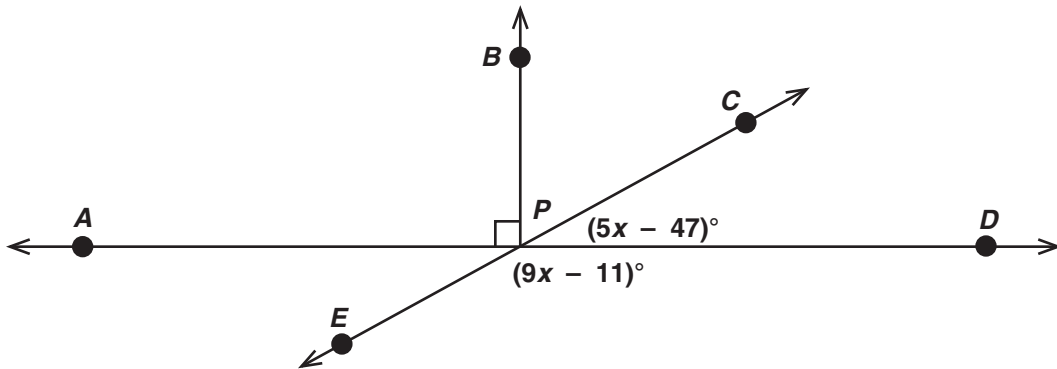**Explain your reasoning.**

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Name: _____ Date: _____

# Geometry: Open-Ended Response Assessment Prep

**Directions:** Answer the question completely. Show your work and explain your reasoning.

**Problem 4:** Determine the measure of $\angle BPC$ in the figure below.



| Show your work. | Explain your reasoning. |
| --- | --- |
| | |

# Geometry: Answers and Diagnostics

## Multiple Choice Questions

| Problem # | Correct Answer | Diagnostics |
|---|---|---|
| 1. | C | A. Student responded with front view of remaining shape after horizontal slicing.<br>B. Student responded with answer after vertical slicing.<br>D. Student did not provide best possible response. |
| 2. | A | B. Student interpreted given diameter as radius.<br>C. Student calculated area instead of circumference.<br>D. Student did not understand concept of diameter or circumference. |
| 3. | A | B. Student calculated perimeter of new rectangle.<br>C. Student multiplied area of given rectangle by $\frac{2}{3}$.<br>D. Student multiplied by $\frac{3}{2}$ instead of $\frac{2}{3}$. |
| 4. | D | A. Student added angles incorrectly to obtain sum not equal to 180°.<br>B. Student incorrectly concluded scaling side lengths also scales angle measures.<br>C. Student did not consider all possible side lengths. |
| 5. | D | A. Student calculated surface area and used incorrect units for surface area.<br>B. Student calculated surface area.<br>C. Student calculated area of one face of number cube. |
| 6. | B | A. Student incorrectly equated $\angle APD$ to $\angle APB$ instead of $\angle CPB$.<br>C. Student only solved for $x$.<br>D. Student incorrectly added 12 to solve correct equation ($4x + 12 = 180$). |
| 7. | A | B. Student divided original side by scaled side.<br>C. Student divided longer side by shorter side of the same triangle.<br>D. Student divided shorter side by longer side of the same triangle. |
| 8. | C | A. Student rounded down to 4 units, but side must be greater than 4.1 units.<br>B. Student added given side lengths instead of subtracting.<br>D. Student gave exact value rather than whole number as directed. |
| 9. | B | A. Student did not consider slicing down a face, cutting two edges.<br>C. Student did not consider slicing through only one edge or through the apex.<br>D. Student incorrectly considered slicing horizontally to obtain a square. |
| 10. | A | B. Student used diameter instead of radius when calculating area.<br>C. Student calculated circumference and used incorrect units.<br>D. Student did not multiply by $\pi$ when calculating area. |
| 11. | D | A. Student only solved for $x$.<br>B. Student incorrectly equated $\angle HAT$ to $\angle HAM$ instead of summing to 90°.<br>C. Student gave measure of $\angle HAM$ instead of $\angle HAT$. |
| 12. | B | A. Student did not multiply by $\frac{1}{2}$ when calculating area of triangular base.<br>C. Student multiplied by 2 rather than $\frac{1}{2}$ when calculating area of triangular base.<br>D. Student calculated area of top of trough instead of volume. |
| 13. | B | A. Student solved for either $\angle EVH$ or $\angle FVG$.<br>C. Student only solved for $x$.<br>D. Student summed $\angle EVH$ and $\angle FVG$ to 180° instead of equating them, then used $\angle FVG$ to determine measure of $\angle EVF$. |
| 14. | D | A. Student calculated area as $(\pi r)^2$ instead of $\pi r^2$.<br>B. Student guessed.<br>C. Student used diameter instead of radius when calculating area. |

# Geometry: Answers and Diagnostics

| 15. | C | A. Student did not properly take perspective of drawing into account.<br>B. Student confused the concepts of horizontal and vertical.<br>D. Student did not understand the question. |
|---|---|---|
| 16. | C | A. Student incorrectly concluded sum of two smaller sides equal to longest side forms a valid triangle (sum of two smaller sides must be less than longest side).<br>B. Student misinterpreted obtuse to mean acute.<br>D. Student did not consider third angle of triangle to obtain sum of 180°. |
| 17. | A | B. Student multiplied width of new runway by $\frac{3}{2}$ instead of dividing by $\frac{3}{2}$.<br>C. Student multiplied area by length to obtain width of new runway before dividing by correct scale factor of $\frac{3}{2}$.<br>D. Student multiplied area by length to obtain width of new runway instead of dividing, then multiplied width of new runway by $\frac{3}{2}$ instead of dividing by $\frac{3}{2}$. |
| 18. | B | A. Student calculated area instead of circumference.<br>C. Student multiplied diameter, not circumference, by 250.<br>D. Student interpreted given diameter as radius. |
| 19. | D | A. Student calculated volume instead of surface area.<br>B. Student calculated volume instead of surface area and calculated area of trapezoidal base as if it were a rectangle.<br>C. Student used top and bottom edges as bases of trapezoid, not parallel edges. |
| 20. | C | A. Student used diameter instead of radius for area of semicircle.<br>B. Student did not subtract rectangular cutout in top left corner of figure.<br>D. Student used 30 for length of larger rectangular region. |

## Open-Ended Response Questions

### Problem #1
Medium:  Area = 3.14(6)$^2$ = 113.04 sq in.; cost per sq in. = 8.95 ÷ 113.04 ≈ $0.079 = 7.9¢
Large:  Area = 3.14(8)$^2$ = 200.96 sq in.; cost per sq in. = 12.95 ÷ 200.96 ≈ $0.064 = 6.4¢
The large pizza is the better deal by approximately 1.5¢ per square inch.

### Problem #2

Total length of path in scale drawing: $1\frac{3}{8} + \frac{3}{4} + 2 + \frac{1}{2} + 1\frac{1}{8} = \frac{11}{8} + \frac{6}{8} + \frac{16}{8} + \frac{4}{8} + \frac{9}{8} = \frac{46}{8} = 5\frac{3}{4}$ in.

Total distance traveled: $\left(5\frac{3}{4}\right)\left(2\frac{1}{2}\right) = \left(\frac{23}{4}\right)\left(\frac{5}{2}\right) = \frac{115}{8} = 14\frac{3}{8}$ mi; April drives $14\frac{3}{8}$ miles to visit her cousin.

### Problem #3

Area of each trapezoidal side wall: $\frac{1}{2}$(16 + 4)(75) = $\frac{1}{2}$(20)(75) = 10(75) = 750
Deep wall: 16(56) = 896; shallow wall:  4(56) = 224; floor:  56(76) = 4,256
Total area to be resurfaced: 2(750) + 896 + 224 + 4,256 = 1,500 + 896 + 224 + 4,256 = 6,876 sq ft
Total cost: 6,876(7.50) = $51,570
The total cost to resurface the competition swimming pool is $51,570.

### Problem #4
$m\angle CPD + m\angle EPD = 180 \rightarrow (5x - 47) + (9x - 11) = 180 \rightarrow 14x - 58 = 180 \rightarrow 14x = 238 \rightarrow x = 17$
$m\angle CPD = 5x - 47 = 5(17) - 47 = 85 - 47 = 38°; m\angle BPC = 90 - m\angle CPD = 90 - 38 = 52°$
The measure of $\angle BPC$ is 52°.