

Geometry

Geometry Calculator Skills

When solving problems with formulas, you can generally save time by performing some or all of the operations on a calculator. Remember the order of operations when solving formulas and always check your work, either by reentering the key sequence or by estimating an answer and comparing your answer to the estimate.

Example 1: A pyramid has a height of 81 feet. The base is in the shape of a square with each side measuring 40 feet. What is the volume in cubic feet of the pyramid?

Use the formula for the volume of a pyramid: $\frac{1}{3}Bh$. Begin by calculating the area of the base: 40×40 , or 40^2 . Multiply that by the height, 81. In the last step, dividing by 3 is the same as multiplying by $\frac{1}{3}$.

Evaluate the exponent.
 40×2
 Multiply by 81.
 $\times 81$
 Divide by 3.
 $\div 3$ [enter]

The right side of the display shows the correct answer, 43,200.

To enter this formula using a fraction using one series of keystrokes on the TI-30XS MultiView™ calculator, enter the following: $\frac{1}{3} 1 \blacktriangledown 3 \times 40 \times 81$ [enter].

The right side of the display shows 43,200.

The volume of the pyramid is **43,200 square feet**.

You may need your calculator to find the exact answer to problems that involve the Pythagorean relationship. These problems can also be done in one series of keystrokes.

Example 2: A right triangle has legs 10 inches and 24 inches in length. What is the length of the hypotenuse?

Use the formula $a^2 + b^2 = c^2$. You will need to add the squares of the legs and then find the square root of the total.

Press: $10 \times 24 \times$ [enter]. The display will read 676. Then press $2nd \sqrt$ [enter]. The right side of the display shows 26.

The hypotenuse is 26 inches in length.

If you need to include the quantity pi (π) in a calculation, the TI-30XS MultiView™ calculator includes a π key, located three keys below the $2nd$ key on the left-hand side of the keypad.

Example 3: What is the area of a circle with radius 2.4 cm? Round your answer to the nearest tenth.

Use the formula $\text{Area} = \pi r^2$. Press $\pi \times 2.4 \times 2$ [enter] and then press [enter]. The right side of the display reads 18.09557368.

Round that to find the answer: **18.1 cm²**.

Key Ideas

- When a problem involves many calculations, use the order of operations to decide which operation to do first.
- Check your work by estimating an answer or by quickly repeating the keystrokes to see if the result is the same.

GED® TEST TIP

Watch the calculator display while you are entering all of these keystrokes. If you make a mistake, use the delete key to remove that mistake and then replace it with the correct number or function. Practice that with these examples.

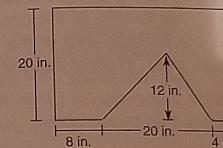
PRACTICE 9

A. Use your calculator to evaluate each formula.

- Find the perimeter of a rectangle with a length of 16 inches and a width of 5 inches.
 $\text{Perimeter} = 2 \times \text{length} + 2 \times \text{width}$
- Find the area of a triangle with a base of 26 centimeters and a height of 15 centimeters.
 $\text{Area} = \frac{1}{2} \times \text{base} \times \text{height}$
- What is the volume of a cube if the edge measures 3.5 feet? Round to the nearest cubic foot.
 $\text{Volume} = \text{edge}^3$
- Find the circumference of a circle with a diameter of 12 inches. Round to the nearest tenth.
 $\text{Circumference} = \pi \times \text{diameter}$
- Find the volume of a cone with a radius of 12 cm and a height of 20 cm. Round to the nearest cm³.
 $\text{Volume} = \frac{1}{3} \times \pi \times \text{radius}^2 \times \text{height}$

B. Choose the one best answer to each question. You MAY use your calculator.

Question 7 refers to the following drawing. Questions 9 and 10 refer to the drawing.



7. For a woodworking project, Paul cuts the shape shown above from plywood. What is the area in square inches of the piece?
 (Hint: Think of the shape as a triangle removed from a rectangle.)

- A. 400
 B. 480
 C. 520
 D. 640

All measurements are in centimeters.

9. How many cubic centimeters greater is the volume of Box A than the volume of Box B?

- A. 64
 B. 1,448
 C. 4,928
 D. 5,056

10. An advertiser plans to print advertisements on one side panel of each of the boxes (the shaded faces in the drawing). What is the total area, in square centimeters, that the advertiser will cover?

- A. 224
 B. 384
 C. 608
 D. 1448

Answers and explanations begin on page 684.

GEOMETRY

Combined Figures

Key Ideas

- Combined figures are made from two or more regular figures.
- To find the perimeter of a combined figure, add the lengths of all the sides.
- To find area or volume of a combined figure, break the figure into parts and find the area or volume of each part; then combine the results.

GED® TEST TIP

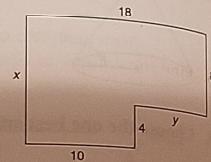
There is usually more than one way to break down a combined figure. Solve the problem the way that seems easiest to you. The answer will be the same.

Breaking Combined Figures into Parts

A combined figure puts together geometric figures to form a new shape. To find the perimeter of a combined figure, simply add the lengths of the sides. You may need to solve for one or more missing lengths.

Example 1: A family room has the dimensions shown in the diagram. All measures are in feet. What is the perimeter of the room?

1. Find the missing measures. Measurement x equals the combined lengths of the two opposite walls: $x = 8 + 4 = 12$ ft. You also know that $18 - 10 = y$, so $y = 8$ ft.

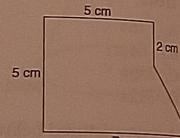


2. Add all distances to find the perimeter:
 $12 + 18 + 8 + 8 + 4 + 10 = 60$ ft.

To find the area or volume of a combined figure, break the figure into parts. Then apply the correct formula to each part.

Example 2: What is the area of the figure in square centimeters?

1. Divide the figure into two shapes and find any missing measurements. Here the figure is divided into a trapezoid and a rectangle.



2. Calculate the area of each shape.

$$\text{Rectangle: } A = lw \\ = 2(5) = 10 \text{ cm}^2$$

$$\text{Trapezoid: } A = \frac{1}{2}h(b_1 + b_2) \\ = \frac{1}{2}(3)(5 + 7) = 18 \text{ cm}^2$$

$$3. \text{ Combine: } 10 + 18 = 28 \text{ cm}^2.$$

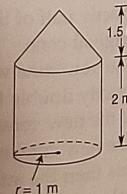
Example 3: Find the volume of the container shown below.

Break the figure into a cylinder and a cone and find the volume of each.

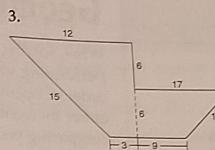
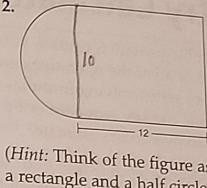
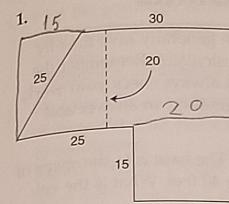
$$1. \text{ Cylinder: } V = \pi r^2 h \\ = (3.14)(1^2)(2) = 6.28 \text{ m}^3$$

$$2. \text{ Cone: } V = \frac{1}{3}\pi r^2 h \\ = \frac{1}{3}(3.14)(1^2)(1.5) = 1.57 \text{ m}^3$$

$$3. \text{ Combine: } 6.28 + 1.57 = 7.85 \text{ m}^3 \text{ or} \\ 7.85 \text{ cu m.}$$

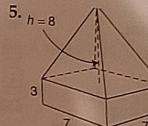
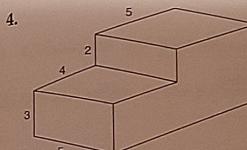
**PRACTICE 8**

- A. Find the perimeter and area of each figure.



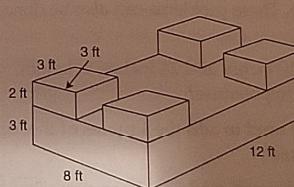
(Hint: Think of the figure as a rectangle and a half circle.)

- B. Find the volume of each figure to the nearest cubic unit.

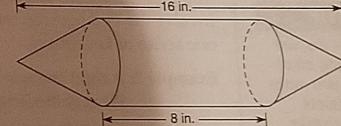


- C. Choose the one best answer to each question.

7. A slab of concrete will have four concrete blocks in each corner as shown in the drawing below.



8. A candy package is in the shape of a cylinder with a cone on each end.



If the radius of the cylinder is 2 inches and the cones are identical, what is the capacity of the container to the nearest cubic inch?

- A. 72
 B. 168
 C. 288
 D. 360

Answers and explanations begin on page 684.