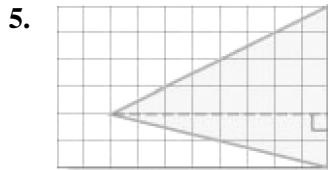


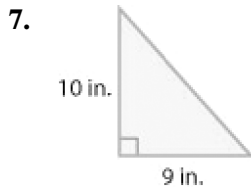
10-4 Area of Triangles - Practice and Problem Solving

Find the area of each triangle.

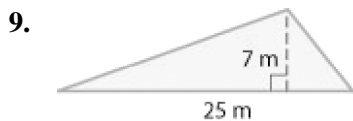


$$b = 6 \text{ units}, h = 8 \text{ units}$$

$$\begin{aligned} A &= \frac{1}{2}bh \\ &= \frac{1}{2}(6)(8) \\ &= 24 \text{ units}^2 \end{aligned}$$



$$\begin{aligned} A &= \frac{1}{2}bh \\ &= \frac{1}{2}(9)(10) \\ &= 45 \text{ in.}^2 \end{aligned}$$



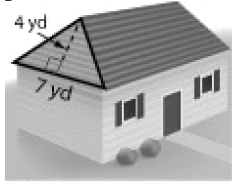
$$\begin{aligned} A &= \frac{1}{2}bh \\ &= \frac{1}{2}(25)(7) \\ &= 87.5 \text{ m}^2 \end{aligned}$$

11. height: 14 in., base: 35 in.

$$\begin{aligned} A &= \frac{1}{2}bh \\ &= \frac{1}{2}(35)(14) \\ &= 245 \text{ in.}^2 \end{aligned}$$

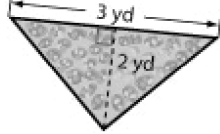
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13. **ROOFING** Ansley is going to help his father shingle the roof of their house. What is the area of the triangular portion of one end of the roof to be shingled?



$$\begin{aligned} A &= \frac{1}{2}bh \\ &= \frac{1}{2}(7)(4) \\ &= 14 \text{ yd}^2 \end{aligned}$$

15. **FLOWER BEDS** A flower bed in a parking lot is shaped like a triangle as shown. Find the area of the flower bed in square feet. If one bag of topsoil covers 10 square feet, how many bags are needed to cover this flower bed?



Convert yards to feet.

$$3 \text{ yd} = (3 \text{ yd})(3 \text{ ft/yd}) \text{ or } 9 \text{ ft}$$

$$2 \text{ yd} = (2 \text{ yd})(3 \text{ ft/yd}) \text{ or } 6 \text{ ft}$$

$$\begin{aligned} A &= \frac{1}{2}bh \\ &= \frac{1}{2}(9)(6) \\ &= 27 \text{ ft}^2 \end{aligned}$$

The number of bags of topsoil needed is
 $27 \div 10$ or about 3 bags.

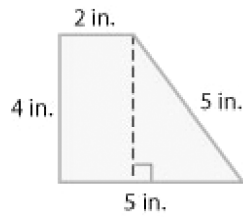
17. **REASONING** Which is smaller, a triangle with an area of 1 square foot or a triangle with an area of 64 square inches?

A triangle with $A = 1$ square feet has $A = 144$ square inches because the dimensions would increase by a factor of $12 \times 12 = 144$. So, 64 square inches is smaller.

COMPOSITE FIGURES Find the perimeter and area of each figure.

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19.



$$P = 2 + 5 + 5 + 4 \text{ or } 16 \text{ in.}$$

The figure consists of a triangle and a rectangle.

Find the area of the rectangle.

$$\begin{aligned} A_R &= lw \\ &= (4)(2) \\ &= 8 \text{ in.}^2 \end{aligned}$$

Find the base of the triangle.

$$b = 5 - 2 \text{ or } 3 \text{ in.}$$

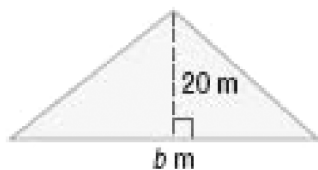
Find the area of the triangle.

$$\begin{aligned} A_T &= \frac{1}{2}bh \\ &= \frac{1}{2}(3)(4) \\ &= 6 \text{ in.}^2 \end{aligned}$$

Find the area of the figure.

$$\begin{aligned} A &= A_R + A_T \\ &= 8 + 6 \\ &= 14 \text{ in.}^2 \end{aligned}$$

21. **FIND THE ERROR** Dolores and Demetrius are finding the base of the triangle shown. Its area is 100 square meters. Who is correct? Explain.



| Dolores |
|----------------------------|
| $100 = \frac{1}{2}(b)(20)$ |
| $100 = 10b$ |
| $10 = b$ |

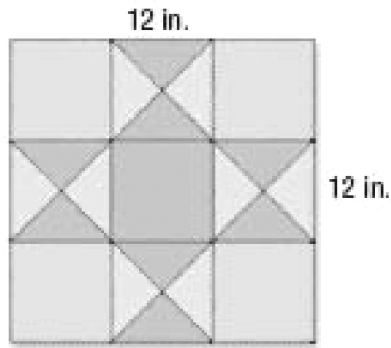
| Demetrius |
|---------------|
| $100 = (b)20$ |
| $100 = 20b$ |
| $5 = b$ |

Dolores; The formula is $\frac{1}{2}bh$, not bh

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CHALLENGE Use the information below.

All the triangles and squares in the quilt pattern shown are congruent.



23. Calculate the area of one triangle and then find the area of all the triangles.

$$A = \frac{1}{2} \times 4 \times 2$$

$$A = 4$$

There are 16 triangles, so multiply the area of one by 16.

$$16 \times 4 = 64 \text{ in}^2$$

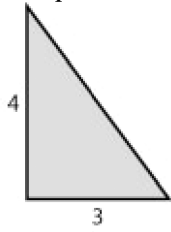
25. What is the total area of the figure? Is your answer reasonable?

144 in^2 ; Sample answer: The total area of the triangles and smaller squares is $64 \text{ in}^2 + 80 \text{ in}^2$ or 144 in^2 . The area of the large square is $12 \text{ in.} \times 12 \text{ in.}$ or 144 in^2 . The areas are equal.

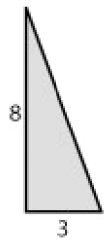
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27. **WRITING IN MATH** Draw a triangle and label its base and height. Draw another triangle that has the same base, but a height twice that of the first triangle. Find the area of each triangle. Then write a ratio that expresses the area of the first triangle to the area of the second triangle.

Sample answer:



$$\begin{aligned} A_1 &= \frac{1}{2}bh \\ &= \frac{1}{2}(3)(4) \\ &= 6 \text{ units}^2 \end{aligned}$$

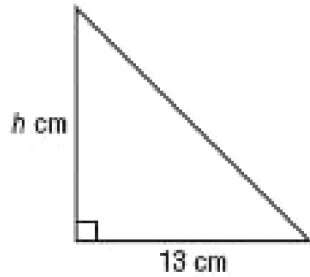


$$\begin{aligned} A_2 &= \frac{1}{2}bh \\ &= \frac{1}{2}(3)(8) \\ &= 12 \text{ units}^2 \end{aligned}$$

$$\begin{aligned} \frac{A_1}{A_2} &= \frac{6}{12} \\ &= \frac{1}{2} \text{ or } 1:2 \end{aligned}$$

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29. Norma cut a triangle out of construction paper for an art project.



The area of the triangle is 84.5 square centimeters. What is the height of the triangle?

F 6.5 cm

G 13 cm

H 26 cm

J 169 cm

$$A = \frac{1}{2}bh$$

$$84.5 = \frac{1}{2}(13)(h)$$

$$h = 84.5 \div 6.5$$

$$h = 13$$

The answer is G.

31. Find the circumference of a circle with a radius of 5 meters. Round to the nearest tenth.

$$C = 2\pi r$$

$$= 2\pi(5)$$

$$\approx 31.4 \text{ m}$$

33. **PREREQUISITE SKILL** A bookstore arranges its best-seller books in the front window. In how many ways can four best-seller books be arranged in a row? Use the *act it out* strategy.

The four best-seller books can be arranged in a row in 24 ways.