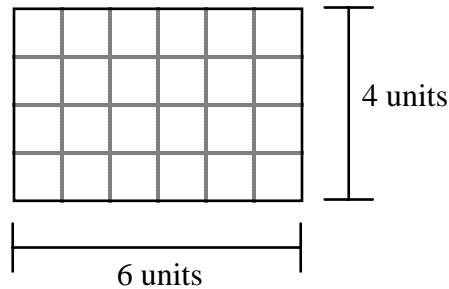


§6-2**AREA****Definition**

The area of a two-dimensional figure is a measure of the number of square units required to completely cover the figure.



It takes 24 square units to cover the rectangle shown above. Thus, the area of the rectangle is 24 square units. Be careful not to confuse area with perimeter. Remember, area is always measured in square units such as square feet (ft^2) or square inches (in^2).

Formulas**Areas of common shapes****Formulas**

Rectangles: the length times the width

$$A = lw.$$

Squares: the square of the length of the side

$$A = s^2$$

Parallelograms: the length of the base times the height

$$A = bh.$$

Trapezoids: one-half the height times the sum of the bases

$$A = \frac{1}{2}(b + B)h$$

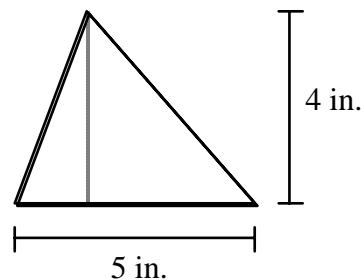
Triangles: one-half the length of the base times the height

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

Circle: π times the square of the radius

$$A = \pi r^2$$

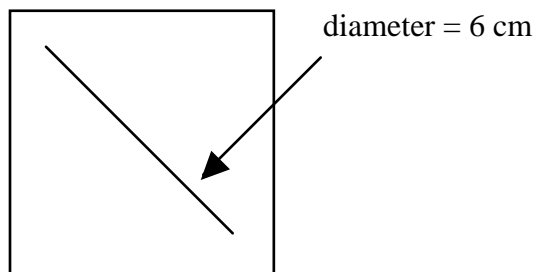
Example 1 Find the area of the triangle shown below.

**Solution**

The base of the triangle is 5 in. and the height of the triangle is 4 in. Thus

$$A = \frac{1}{2}bh = \frac{1}{2} \cdot 5 \cdot 4 = 10 \text{ square in.}$$

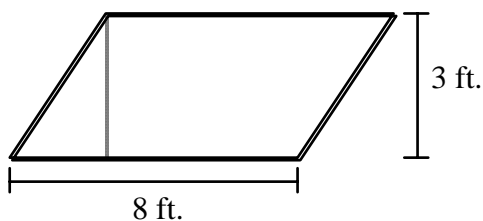
Example 2 For the diagram below, find the area of the square and the area of the circle.



Solution Since the circle is inscribed inside the square, the diameter of circle is equal in length to the side of the square. Thus the square has area $A = s^2 = 6^2 = 36$ square cm

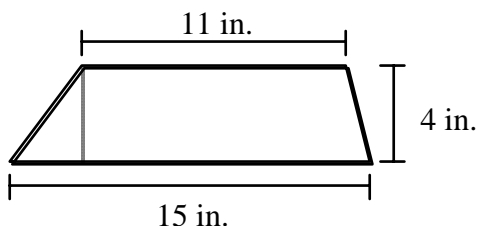
Since the diameter of the circle is 6 cm, the radius of the circle is 3 cm.
Thus $A = \pi r^2 = \pi 3^2 = 9\pi$ square cm.

Example 3 Find the area of the parallelogram shown below.



Solution The base of the parallelogram is 8 ft. and the height is 3 ft. Thus $A = bh = 8 \cdot 3 = 24$ square feet

Example 4 Find the area of the trapezoid shown below.



Solution The bases are 15 in. and 11 in. while the height is 4 in.
Thus $A = \frac{1}{2}(b + B)h = \frac{1}{2}(11 + 15)4 = \frac{1}{2}(26)4 = 52$ square inches

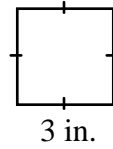
Theorem If all of the dimensions of a plane figure are multiplied by a factor a , then the area of the figure is multiplied by a factor of a^2 .

Example 5 If the radius of circle B is three times the radius of circle C , and the area of circle B is A , then what is the area of circle C ?

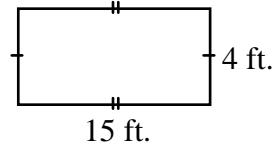
Solution Since the dimensions of circle C are 3 times that of circle B , the area of circle C must be $3^2 = 9$ times that of circle B . So circle C has an are of $9A$.

Find the area of each figure below.

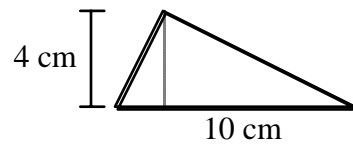
1.



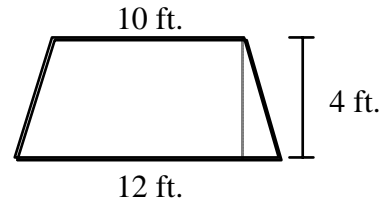
2.



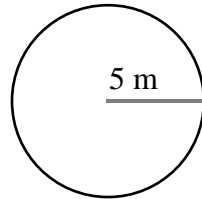
3.



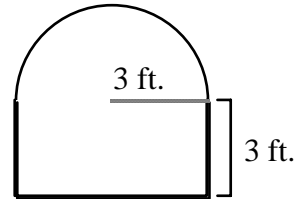
4.



5.

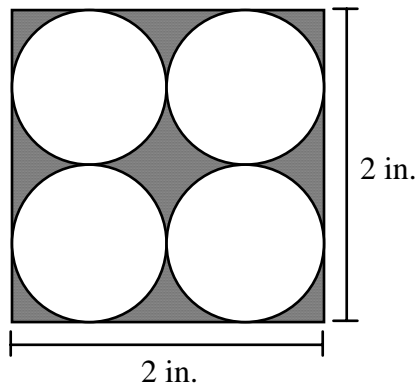


6.

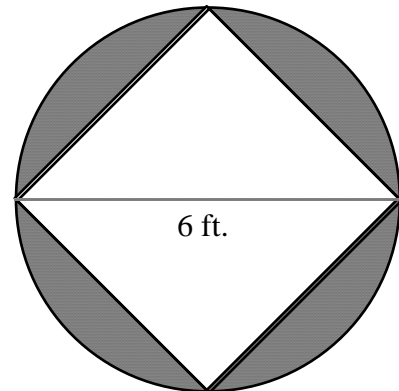


For each figure below find the area of the shaded region.

7.



8.



Solve each word problem below.

9. A certain square has a side which is 10 inches long. If a circle has the same area as the square then what is its radius?
10. A rectangle is twice as long as it is wide. If it has an area of 24.5 square centimeters, then what are the length and height?

1. 9 sq. in. 2. 60 sq. ft. 3. 20 sq. cm 4. 44 sq. ft.
5. 25π sq. m 6. $18 + \frac{9}{2}\pi$ sq. ft. 7. $4 - \pi$ sq. in.
8. $9\pi - 18$ sq. ft. 9. $\frac{10\sqrt{\pi}}{\pi}$ in. 10. width = 3.5 cm, length = 7 cm