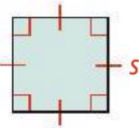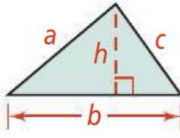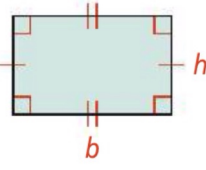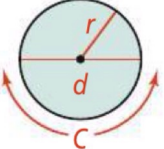# <u>Perimeter, Circumference, and Area</u>

Def: The <mark>perimeter</mark> of a polygon is the sum of the lengths of its sides.
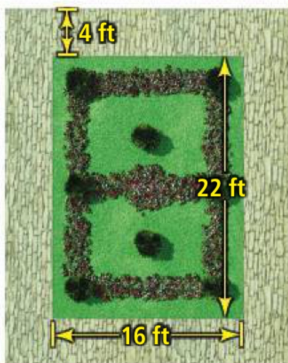
Def: The <mark>area</mark> of a polygon is the number of square units it encloses (use formulas).

take note

Key Concept   Perimeter, Circumference, and Area

Square
side length s

$P = 4s$
$A = s^2$

Triangle
side lengths a, b, and c,
base b, and height h

$P = a + b + c$
$A = \frac{1}{2}bh$

Rectangle
base b and height h

$P = 2b + 2h$, or
$2(b + h)$
$A = bh$

Circle
radius r and diameter d

$C = \pi d$, or $C = 2\pi r$
$A = \pi r^2$

Ex 1a) The botany club members are designing a rectangular garden for the courtyard of their school. They plan to place a fence around the outside of the brick path surrounding the garden. How much edging material will they need?
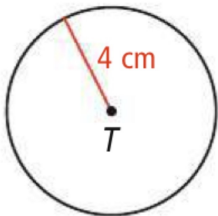
<u>Perimeter</u>

4 ft

22 ft

16 ft

Ex 1b) You want to frame a picture that is 5 inches by 7 inches with a
        one-inch wide frame.

· What is the perimeter of the picture?

·

·

·

·

·

·

· What is the perimeter of the outside edge of the frame?

Note: The formulas for a circle involve the special number pi (π). Pi is
       the ratio of any circle's circumference to its diameter. Pi is an
       irrational number, so you cannot write it as a terminating decimal
       (3.1415926...). For an approximate answer, you can write it
       as...

        ‣ 3.14   or

        ‣ $\dfrac{22}{7}$

Ex 2a) What is the circumference of the circle in terms of π? What is the circumference of the circle to the nearest tenth?

$$C = 2\pi r \qquad C = \pi d$$

15 in.
M
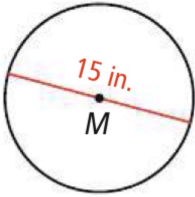
Ex 2b) What is the circumference of the circle in terms of π? What is the circumference of the circle to the nearest tenth?

4 cm
T

Ex 2c) What is the circumference of the circle with radius 24 meters in terms of π?
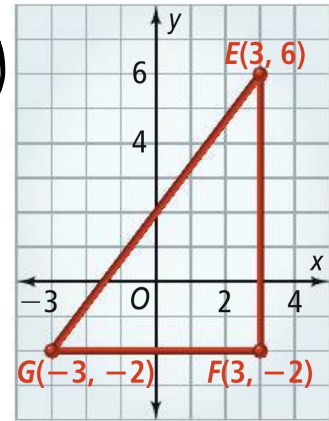
Ex 2d) What is the circumference of the circle with diameter 24 meters to the nearest tenth?

Ex 3a) What is the perimeter of $\triangle EFG$?

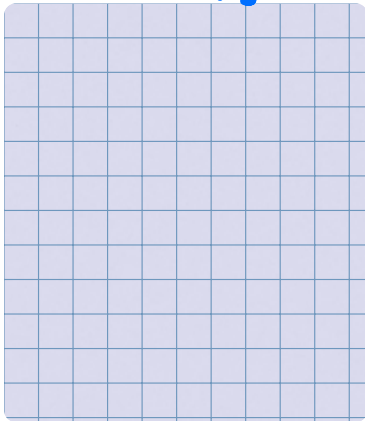$$d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$$

$G(-3, -2)$

$E(3, 6)$

E(3, 6)

−3

O   2   4

x

G(−3, −2)   F(3, −2)

l

Ex 3b) Graph the quadrilateral JKLM with vertices J(-3,-3), K(1,-3), L(1, 4), and M(-3, 1). What is the perimeter of JKLM?
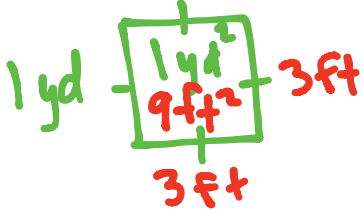
$x_1 y_1$ $x_2 y_2$

$$d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$$

Ex 4a) You want to make a rectangular poster similar to one that is 2.5 feet wide and 5 feet high. To the nearest square yard, how much material do you need?

5ft

2.5ft

1 yd

1 yd — 1 yd² / 9ft² — 3ft

3ft

Area of Rectangle = l·w

A =

$3 ft = 1 yd$

$9 ft^2 = 1 yd^2$

A =

Ex 4b) You are designing a banner that will be 3 yards wide and 8 feet high. How much paper do you need to make the banner? Give your answer in square feet.
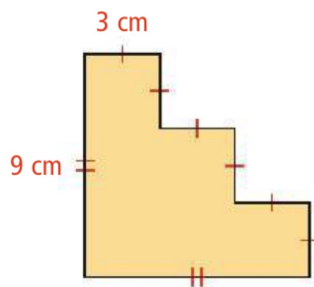
Ex 5a) What is the area of ⊙K in terms of pi?

16 m

K
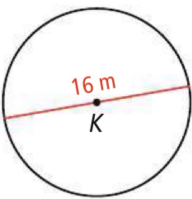
Ex 5b) The diameter of a circle is 14 feet. What is the approximate area of the circle?
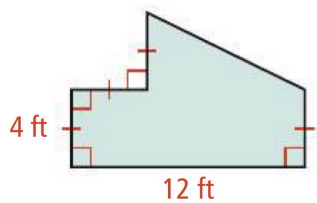
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take note

Postulate 1-10   Area Addition Postulate

The area of a region is the sum of the areas of its nonoverlapping parts.

Ex 6a) What is the area of the figure shown? All angles in the figure are right angles.

3 cm

9 cm

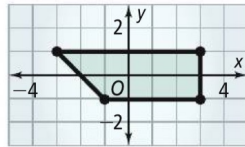**Ex 6b)** What is the area of the figure shown?

4 ft

12 ft

Lesson Check:

Lesson Check

Do you know HOW?

1. What is the perimeter and area of a rectangle with base 3 in. and height 7 in.?

2. What is the circumference and area of each circle to the nearest tenth?
   a. $r = 9$ in.
   b. $d = 7.3$ m

3. What is the perimeter and area of the figure at the right?

Do you UNDERSTAND? 🄲 MATHEMATICAL PRACTICES

🄲 4. **Writing** Describe a real-world situation in which you would need to find a perimeter. Then describe a situation in which you would need to find an area.

🄲 5. **Compare and Contrast** Your friend can't remember whether $2\pi r$ computes the circumference or the area of a circle. How would you help your friend? Explain.

🄲 6. **Error Analysis** A classmate finds the area of a circle with radius 30 in. to be 900 in.^{2}. What error did your classmate make?

Homework:
Textbook p. 64-66
#7-9, 12-13, 15-16, 18-20, 23-24, 31-37, 39, 41-42, 44-46, 48-49
(27 problems total)