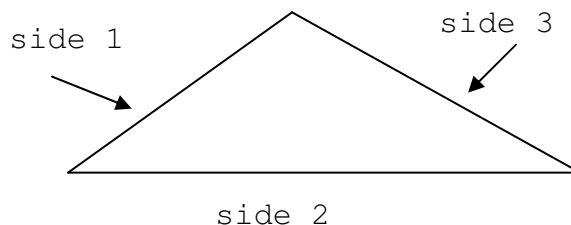# Perimeter of Basic Geometric Figures

The <u>perimeter of a plane figure</u> is the distance around it. Perimeter is measured in <u>linear</u> units because we are finding the total of the lengths of the sides of the figures.

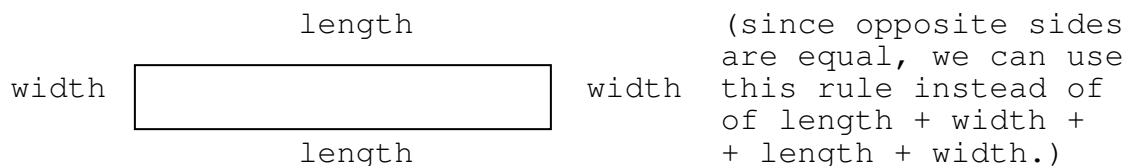Some commonly used units used to measure line segments are:

in.	– inch	m.	– meter
ft.	– foot	cm.	– centimeter
yd.	– yard	mm.	– millimeter
mi.	– mile	km.	– kilometer

To find the perimeter of a plane figure you can measure each side and add. There are formulas for special figures. <u>You should memorize these</u>.

<u>Triangle</u>: Perimeter = side 1 + side 2 + side 3

<u>Rectangle:</u>   Perimeter = 2 × (length) + 2 × (width)

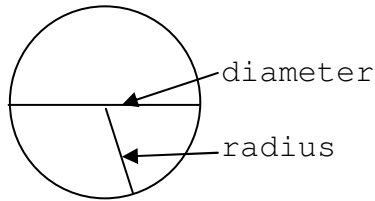(since opposite sides are equal, we can use this rule instead of of length + width + + length + width.)

You will often use P = 2 × L + 2 × W to find the perimeter of a rectangle. (P is the perimeter, L is the length and W is the width.)

<u>Square:</u>   Perimeter = side + side + side + side

Since all sides have the same length in a square, we say:

Perimeter = 4 ×(side)   or <u>P = 4 × S</u>, where P is the perimeter and S is the side.

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CIRCLE:

The distance around a circle is called its circumference. The circumference of any circle is a little more than three times that circle's diameter.

We use <u>Circumference = π × diameter</u>

When π (pi) is approximately 3.14

Since the diameter is 2 × radius, we can also find a circle's circumference using: C = 2 × π × r: we get this from replacing (2 × r) for d in
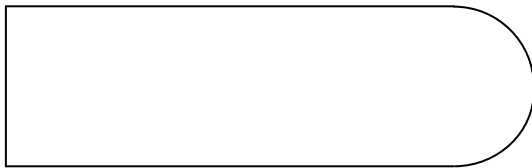
$$C = \pi \times d$$

$$C = \pi \times (2 \times r)$$

Then change the grouping
and the order

$$C = 2 \times \pi \times r$$

Composite Geometric Figures are made from two or more geometric figures.

This composite figure was made by placing half a circle at one end of a rectangle. The diameter of the circle is the same size as the width of the rectangle.

We can figure the perimeter of this figure by adding **half** the circumference of the circle to 2 × length + one width of the rectangle. (The dotted line is <u>inside</u> the composite figure and is <u>not</u> included in the perimeter.)

When you are asked to find the perimeter of a composite figure, use what you know about the figures that make up the composite figures. REMEMBER you are just finding the distance around the <u>outer</u> border!

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APPLICATIONS:

There are many uses for perimeter. When you fence in a dog pen, frame a picture, or bind a rug you are working with perimeter. Drawing the figures will help you. You must know the characteristics of the special plane figures.

PROBLEMS:

DIRECTIONS:

1. Draw the figure.
2. Write the measurements you know.
3. Write the perimeter formula for the figure.
4. Replace the parts of the formula with their given values.
5. Use the Order of Operations Agreement to find the perimeter.
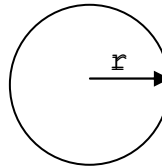6. Name the unit of measure for your answer.

EXAMPLES:

1. A circle has a radius of 20 ft.
   Find the circumference. Use π = 3.14

   C = 2 × π × r
   C = 2 × 3.14 × 20   (r= 20 ft)
   C = 125.60 feet

Give the correct unit of measurement
in the answer.

THINK: 2 × 3.14 = 6.28

```
      6.28
   ×    20
    125.60
```

The circumference is 125.60 feet.

2. This figure is drawn. It helps to see the diameter of the half-circle. Since the diameter is opposite the width of a rectangle, it is also 5 in.

   Plan: Perimeter = 2×length + width + 1/2 × circumference

         C = π × d
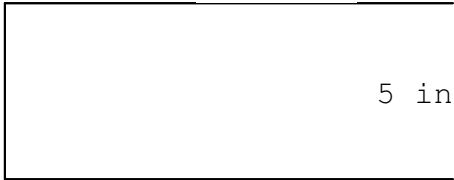   C = 3.14 × 5
         C = 15.70 in.

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Therefore, $1/2 \times C = 1/2 \times 15.70 = 7.85$ in.

P = 2 × length + width + 1/2C

p = 2 × 12   + 5 + 7.85

p =   24   + 5 + 7.85

p = 36.85 in.

```
          12 in.
 ┌─────────────────────────┐
 │                         │
 │                   5 in. │
 │                         │
 └─────────────────────────┘
          12 in.
```

(Be sure to include the correct units in your answer.)

EXERCISES: Write the formula. Draw and label the figure. You may use a calculator but you must write the problem first. Be sure to name the unit in the answer.

1. Find the perimeter of a rectangle which has a length of 14 ft. and a width of 8 ft.

2. Find the perimeter of a square with a side of 9 cm.

3. Find the perimeter of a triangle which has sides of $8\frac{1}{4}$ in., $9\frac{3}{8}$ in and $12\frac{1}{2}$ in.

4. Find the perimeter of a square which has a side of 0.06 meters.
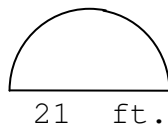
5. Find the perimeter of a rectangle which has a length of $4\frac{3}{4}$ in. and a width of $2\frac{1}{8}$ in.

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EXERCISES (continued):

6. Find the circumference of a circle which has a <u>diameter</u> of 30 mm. Use π = 3.14.

7. Find the circumference of a circle which has a <u>radius</u> of 0.25 m. Use π = 3.14.

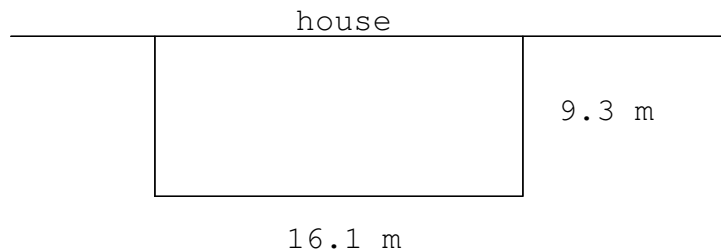8. Find the perimeter of the composite figure. Use π = 3.14.

6 ft.

2 ft
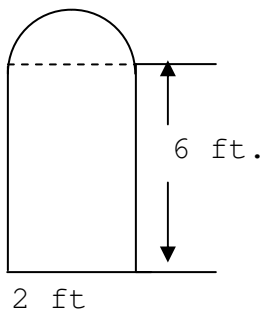
9. Find tne perimeter of the figure. Use π = $\frac{22}{7}$

21 ft.

Notice the diameter is part of the perimeter in #9, but it is not in #8.

10. A rectangular dog pen is going to be fenced on three sides. (The house will be on the fourth boundary.) If fencing costs $7.15 per meter, how much will this fence cost? Round to the nearest cent.

house

9.3 m

16.1 m

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11. A rain gutter is to be installed on the home shown here. At $2.05 per foot, find the cost of the rain gutter. Round to the nearest cent.

78 ft.

23 ft.

14 ft {

60 ft.
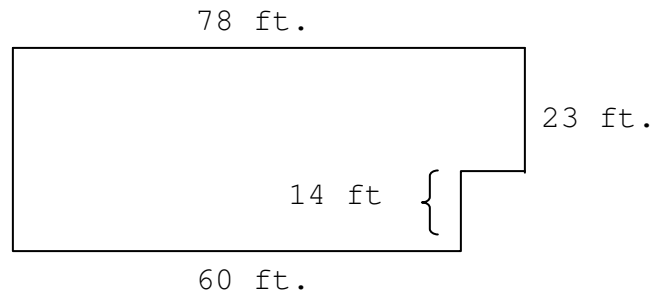
Be sure to put the gutter all around this house. You know enough the find the unmarked lengths.

ANSWER KEY:

1.   44 ft.

2.   36 cm.

3.   30 in.

4.   0.24 m.

5.   13 in.

6.   94.2 mm

7.   1.57m

8.   17.14 ft.

9.   54 ft.

10. 34.7 m × 7.15
     . $248.11

11. 230m × $2.05
     $471.50

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