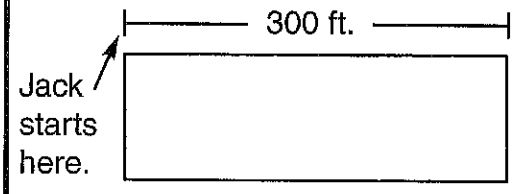
Finding the Perimeter of a Polygon

Perimeter means the total distance around the outside.

Jack walked all the way around a football field. How many feet did Jack walk?



Jack walks 300 ft. and turns. He walks 160 ft and turns. He walks 300 ft. and turns. He walks 160 ft. and is back where he started.

300 + 160 + 300 + 160 = 920

The perimeter of the football field is 920 ft.

The space between two dots represents 1 foot. Find the perimeter of each polygon.

1. 

perimeter = _____ ft.

2. 

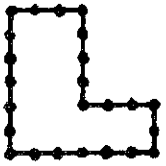
perimeter = _____ ft.

3. 

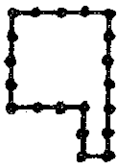
perimeter = _____ ft.

4. 

perimeter = _____ ft.

5. 

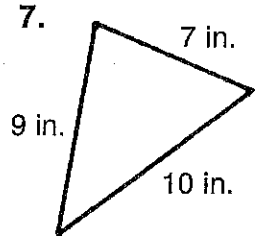
perimeter = _____ ft.

6. 

perimeter = _____ ft.

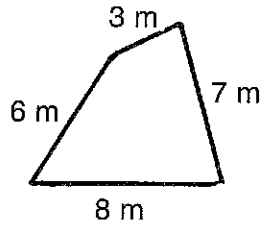
The measurements of each side of the polygons are given. Find the perimeter.

7.



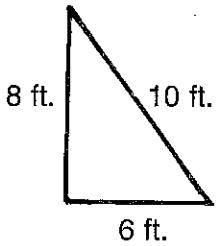
P = _____ in.

8.



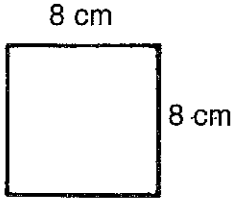
P = _____ m

9.



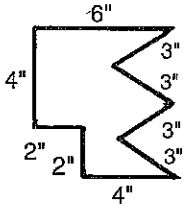
P = _____ ft.

10.



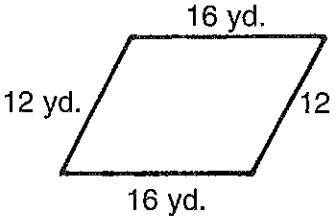
P = _____ cm

11.



P = _____ in.

12.

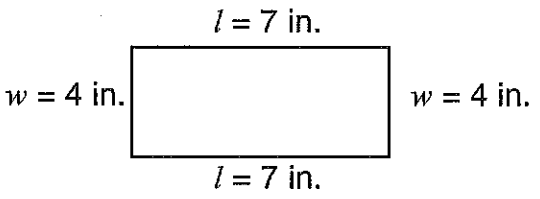


P = _____ yd.

Using a Formula to Find the Perimeter of a Rectangle

Follow four steps to find the perimeter of a rectangle with length of 7 inches and width of 4 inches.

1. Draw a sketch.



2. Find a formula from the sketch.
   P = (2 lengths) + (2 widths)
   $P = (2l) + (2w)$

3. Substitute values.
   $P = (2l) + (2w)$

   Take out l and put in 7.
   Take out w and put in 4.

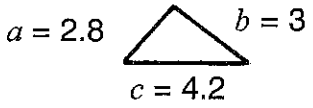
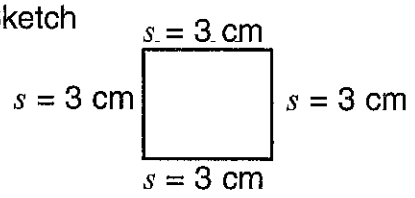
   $P = (2 \times 7) + (2 \times 4)$

4. Solve and label.
   $P = (2l) + (2w)$
   $= (2 \times 7) + (2 \times 4)$
   $= 14 + 8$
   $= 22$ inches

Follow four steps to find the perimeter of a rectangle with the given dimensions.

1. length of 125 km, width of 90 km
2. length of 3.06 miles, width of 2 miles
3. length of .4 m, width of .3 m
4. length of $2\frac{1}{2}$ in., width of $1\frac{1}{4}$ in.
5. length of $3\frac{1}{5}$ km, width of $2\frac{3}{10}$ km
6. length of 8 yd., width of 2.5 yd.

Perimeter of a Triangle or Square with a Formula

Find the perimeter of a triangle with sides of 2.8 cm, 3 cm and 4.2 cm.		Find the perimeter of a square with sides of 3 cm.	
1. Sketch		1. Sketch	
2. Formula	$P = a + b + c$	2. Formula	$P = s + s + s + s$ or $P = 4s$
3. Substitute	$P = 2.8 + 3.0 + 4.2$	3. Substitute	$P = 4 \times 3$
4. Solve	$P = 10.0$ cm	4. Solve	$P = 12$ cm

Use the four steps to find the perimeter of a triangle with the given dimensions.

1. sides of 56 ft., 17 ft., and 67 ft.

2. sides of 0.53 m, 0.46 m and 0.85 m

3. sides of $2\frac{1}{4}$ in., 3 in., and $4\frac{1}{2}$ in.

Use the four steps to find the perimeter of a square with the given dimensions.

4. sides of 25 ft.

5. sides of 11 km

6. sides of 6.5 in.

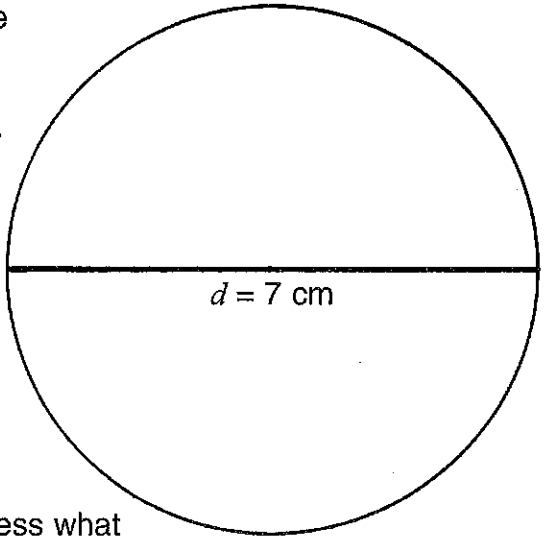
7. sides of $3\frac{3}{4}$ in.

8. sides of 3.68 km

9. sides of $\frac{1}{3}$ ft.

Circumference of a Circle

The distance around the outside of a circle is called its **circumference.**



1. Use a piece of string and a centimeter ruler to find the circumference of this circle to the nearest centimeter.
   circumference = _____ cm

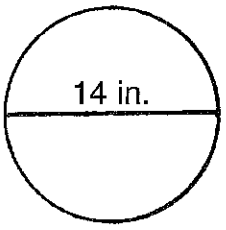
2. About how many times larger is the circumference than the diameter?
   _____

3. If the diameter of a circle is 14 cm, guess what its circumference might be. _____

4. The circumference of a circle is always equal to its diameter multiplied by $3\frac{1}{7}$ or 3.14. This constant value is called pi (π).
   Can you write a formula for the circumference of a circle (use C, π, d and =)?
   Formula: _____

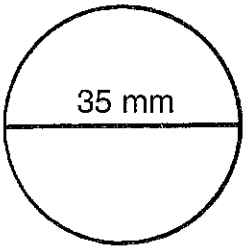
Find the circumference of each circle. Use $3\frac{1}{7}$ for π.

5.



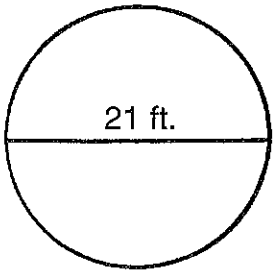
C = _____ in.

6.



C = _____ mm

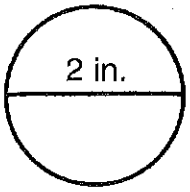
7.



C = _____ ft.

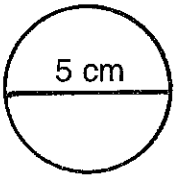
Find the circumference of each circle. Use 3.14 for π.

8.



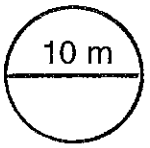
C = _____ in.

9.



C = _____ cm

10.

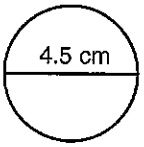


C = _____ m

Using a Formula to Find the Circumference of a Circle

Find the circumference of a circle with diameter of 4.5 cm.

1. Sketch



2. Formula $C = \pi d$

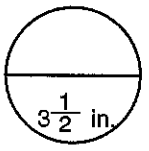
3. Substitute $= 3.14 \times 4.5$ cm

Use 3.14 for π because the diameter is a decimal.

4. Solve and label $= 14.13$ cm

Find the circumference of a circle with diameter of $3\frac{1}{2}$ in.

1. Sketch



2. Formula $C = \pi d$

3. Substitute $= 3\frac{1}{7} \times 3\frac{1}{2}$ in.

Use $3\frac{1}{7}$ for π because the diameter is a fraction.

4. Solve and label $= \frac{22}{7} \times \frac{7}{2}$
$= 11$ in.

Use the four steps to find the circumference of a circle with given diameter. Use $3\frac{1}{7}$ or 3.14 for π.

1. $d = 2$ in.

$C =$ _____ in.

2. $d = 18$ m

$C =$ _____ m

3. $d = 1.1$ ft.

$C =$ _____ ft.

4. $d = 2.5$ mm

$C =$ _____ mm

5. $d = 5.2$ dm

$C =$ _____ dm

6. $d = 4\frac{1}{2}$ in.

$C =$ _____ in.

7. $d = 14$ miles

$C =$ _____ miles

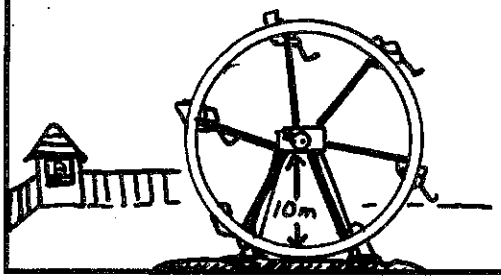
8. $d = 4\frac{2}{3}$ yd

$C =$ _____ yd.

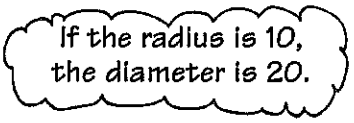
9. $d = 5\frac{1}{4}$ ft.

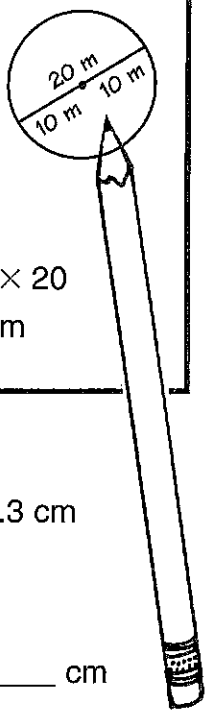
$C =$ _____ ft.

The axis of a Ferris Wheel is 10 meters from the base. How many meters will a person ride in one trip around?



1. Sketch





2. Formula $C = \pi d$
3. Substitute $= 3.14 \times 20$
4. Solve and label $= 62.8$ m

Use the four steps to find the circumference of each circle.

1. radius = 4 ft.

$C =$ _____ ft.

2. radius = $1\frac{1}{4}$ in.

$C =$ _____ in.

3. radius = 3.3 cm

$C =$ _____ cm

4. diameter = $14\frac{1}{2}$ in.

$C =$ _____ in.

5. radius = $3\frac{1}{2}$ cm

$C =$ _____ cm

6. diameter = 9.7 m

$C =$ _____ m

7. Write a formula to show the relationship between the diameter and radius of a circle.

_____

8. The diameter of a bicycle wheel is 24 in. How far does the wheel roll in one turn (one revolution)?

_____

9. A horse is tied to a rope 5 ft. 3 in. long. How much fencing is needed to enclose the part of the field where the horse can graze?

_____

10. A bicycle wheel has a radius of 14 inches. How far will the wheel turn in one revolution?

_____

11. Find the circumference of a pipe with a diameter of $10\frac{1}{2}$ inches.

_____

12. The diameter of a merry-go-round is 42 feet. If you stand on the outer edge, how far will you travel in one round?

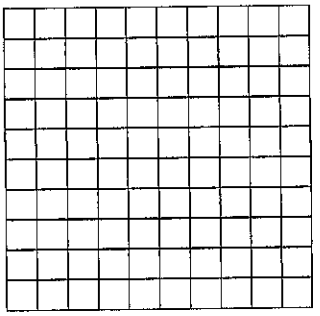
_____

Area

Area is the number of square units needed to cover a surface.

Tom is tiling a trivet with small squares of ceramic, 1 cm on a side. The trivet is 10 cm on each side. How many pieces of ceramic will he need?

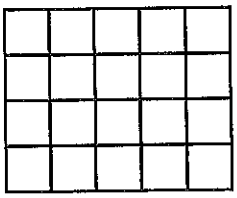
Each row will take 10 tiles. There are 10 rows.



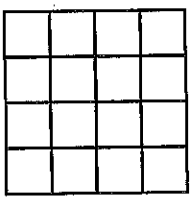
Tom will need (10 × 10) 100 tiles.
The area of the trivet is 100 sq. cm.

If ☐ = 1 sq. cm, find the area of each figure below.

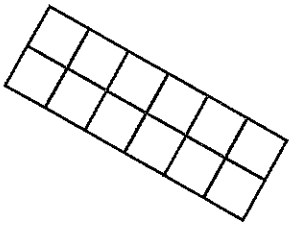
1. Area = _____ sq. cm



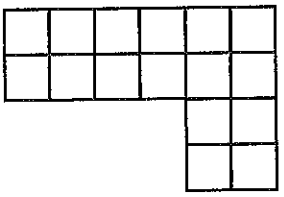
2. Area = _____ sq. cm



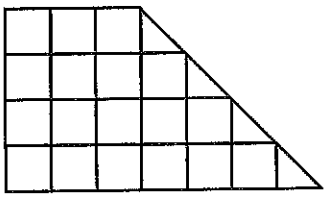
3. Area = _____ sq. cm



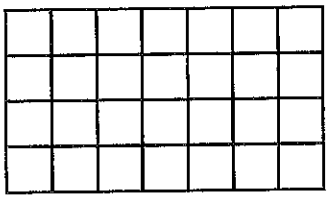
4. Area = _____ sq. cm



5. Area = _____ sq. cm



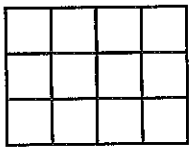
6. Area = _____ sq. cm



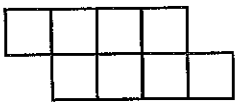
If ☐ = 1 sq. in., find the area of each figure below.

7. Area = _____ sq. in.

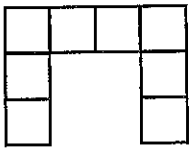
8. Area = _____ sq. in.



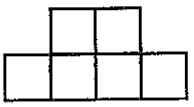
9. Area = _____ sq. in.



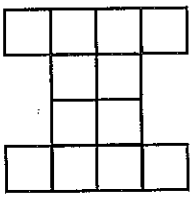
10. Area = _____ sq. in.



11. Area = _____ sq. in.

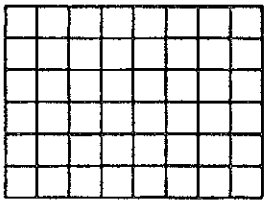


12. Area = _____ sq. in.



A Formula for the Area of a Rectangle

Juanita is tiling a bathroom floor with 1 foot squares of ceramic. The floor is 8 feet long and 6 feet wide. How many squares will she need?



There will be 6 rows...
Each row will have 8 1-ft squares...
6 x 8 or 48 squares will be used.

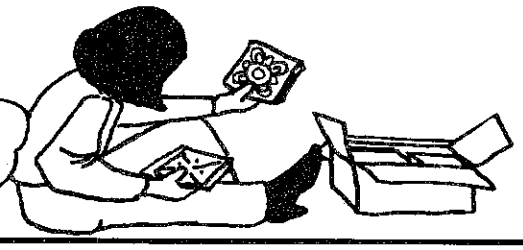
A **formula** is a pattern or rule that is always true. You can find the area of a rectangle by counting tiles in the picture or multiplying length times width.

Area = length times width

Formula: $A = lw$

$A = 8 \times 6$

$= 48$ square ft.



Use the four steps (sketch, formula, substitute and solve) to find the area of each rectangle. Be sure to label your answer with square units.

1. length = 15 in.
width = 4 in.

$A =$ _____ square in.

2. length = 5 cm
width = 3 cm

$A =$ _____ square cm

3. length = 12 ft.
width = 10 ft.

$A =$ _____ square ft.

4. $l = 3.4$ miles
$w = 2$ miles

$A =$ _____

5. $l = 7.8$ ft. $w = 2.1$ ft.

$A =$ _____

6. $l = 5$ m $w = 2.3$ m

$A =$ _____

7. $l = \frac{1}{2}$ in. $w = \frac{1}{4}$ in.

$A =$ _____

8. $l = 8$ ft. $w = \frac{1}{2}$ ft.

$A =$ _____

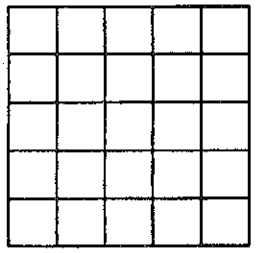
9. $l = 4\frac{1}{2}$ in. $w = 2$ in.

$A =$ _____

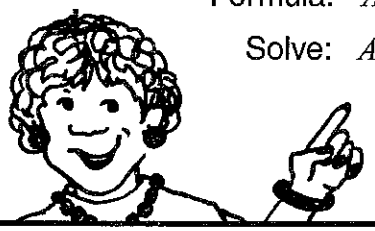
A Formula for the Area of a Square

A square is a special kind of rectangle in which all sides are equal. Instead of multiplying length times width to find the area, we think of multiplying side times side.

Find a formula for the area of a square. Use the formula to find the area of a square with 5 cm on each side.



side = 5 cm



Area = side times side

Formula: $A = s \times s$ or $A = s^2$

Solve: $A = 5^2$

$= 5 \times 5$

$= 25$ square cm

Use the four steps (sketch, formula, substitute and solve) to find the area of each square.

1. side = 3 in.

$A =$ _____ _____

2. side = 6 m

$A =$ _____ _____

3. side = 12 in.

$A =$ _____ _____

4. side = 0.5 km

$A =$ _____ _____

5. side = 4.5 yd.

$A =$ _____ _____

6. side = 5.4 cm

$A =$ _____ _____

7. $s = \frac{1}{4}$ in.

$A =$ _____ _____

8. $s = 2\frac{1}{2}$ ft.

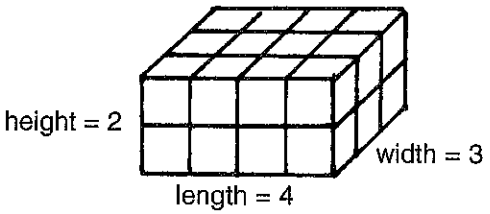
$A =$ _____ _____

9. $s = \frac{3}{4}$ ft.

$A =$ _____ _____

Volume of a Rectangular Solid with a Formula

This rectangular solid has 2 layers (height). Each layer is 4 units long (length) and 3 units wide (width).



How many cubic units?

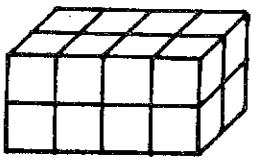
One layer will have (4x3) 12 cubic units.
There are 2 layers . . .
There are 24 cubic units in all.

Volume = length × width × height

Formula: $V = l\,w\,h$
$= 4 \times 3 \times 2$
$= 24$ cubic units

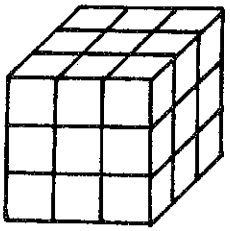
Write the formula, substitute and solve to find the volume of each solid.

1.



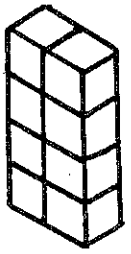
$V =$ _____ (formula)
$V =$ _____ (substitute)
$V =$ _____ cubic units

2.



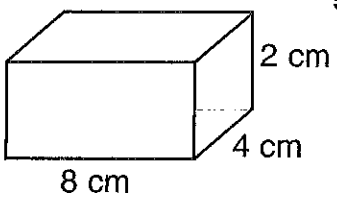
$V =$ _____
$V =$ _____
$V =$ _____ cubic units

3.



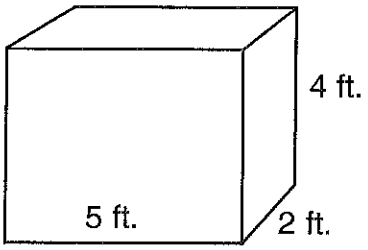
$V =$ _____
$V =$ _____
$V =$ _____ cubic units

4.



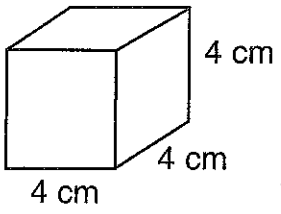
$V =$ _____
$V =$ _____ cubic cm

5.



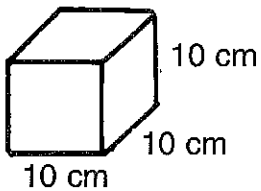
$V =$ _____
$V =$ _____ cubic ft.

6.



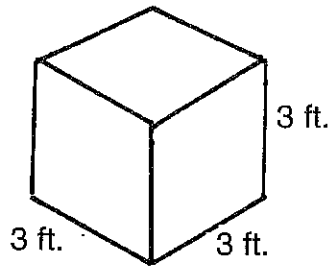
$V =$ _____
$V =$ _____ cubic cm

7.



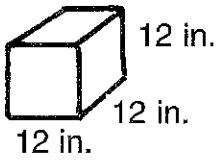
$V =$ _____
$V =$ _____ cubic cm

8.



$V =$ _____
$V =$ _____ cubic ft.

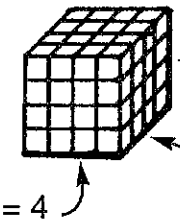
9.



$V =$ _____
$V =$ _____ cubic in.

Volume of a Cube with a Formula

A **cube** is a special kind of rectangular solid in which the length, width and height are the same. The length, width and height are called the **edges** (e) of the cube.



Instead of multiplying length x width x height, you can multiply edge x edge x edge.

Formula: $V = e \times e \times e$ or
$V = e^3$
$V = 4 \times 4 \times 4$
$= 64$ cubic units

1. $2^3 = 2 \times 2 \times 2 =$ _____

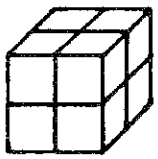
2. $5^3 =$ ___ $\times$ ___ $\times$ ___ $=$ _____

3. How are a rectangular solid and a cube alike? _____
_____

4. How are a rectangular solid and a cube different? _____
_____

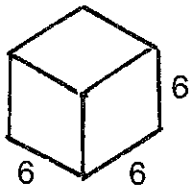
Write the formula, substitute and solve to find the volume of each solid.

5.



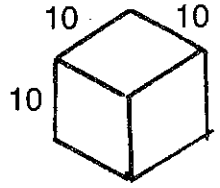
$V =$ _____ (formula)
$V =$ _____ cubic units

6.



$V =$ _____
$V =$ _____ cubic units

7.



$V =$ _____
$V =$ _____ cubic units

Sketch each solid. Find the volume.

8. $l = 2$ m
$w = 3$ m
$h = 4$ m

$V =$ _____ cubic m

9. $l = 5$ in.
$w = 2$ in.
$h = 3$ in.

$V =$ _____ cubic in.

10. $e = 3$ ft.

$V =$ _____ cubic ft.

11. $e = 10$ cm

$V =$ _____ cubic cm