

24. [Perimeter]

continues on page 282

Skill 24.1 Calculating the perimeter of polygons (1).

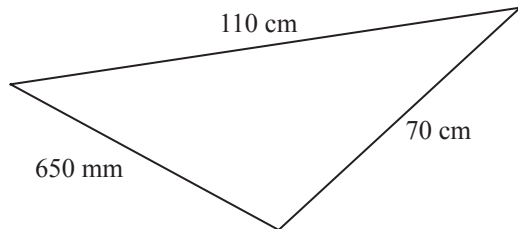
MMMaive 11 2 2 3 3 4 4
MMLime 11 2 2 3 3 4 4

- Convert all measurements to the same unit.
- Find and label the length of all sides.
- Add together all side lengths.

Hints: Sides marked with a dash (|) are of equal length.

Sides marked with two dashes (||) are of equal length etc.

- Q.** Find the perimeter of the scalene triangle in centimeters.

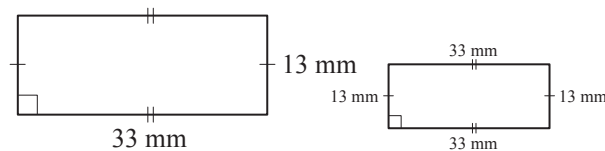


A. $650 \text{ mm} = 650 \div 10 \text{ cm} = 65 \text{ cm}$ Convert mm to cm

$$P = 65 \text{ cm} + 110 \text{ cm} + 70 \text{ cm}$$

$$P = 245 \text{ cm}$$

- a)** Find the perimeter of the rectangle.

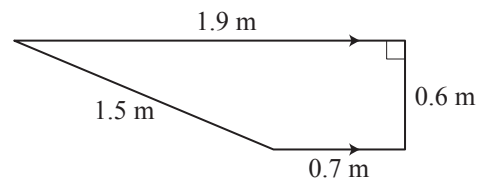


$$P = 33 + 33 + 13 + 13$$

$$= 66 + 26$$

$$= \boxed{92 \text{ mm}}$$

- b)** Find the perimeter of the trapezoid.



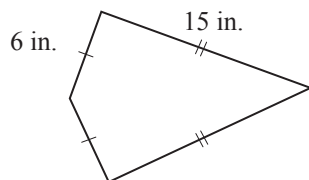
$$P = 1.5 +$$

$$=$$

$$=$$

$$\boxed{\text{m}}$$

- c)** Find the perimeter of the kite.



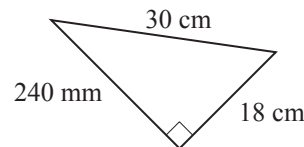
$$P =$$

$$=$$

$$=$$

$$\boxed{\text{in.}}$$

- d)** Find the perimeter of the right triangle in millimeters.



$$=$$

$$P =$$

$$=$$

- e)** What is the perimeter of a regular heptagon with sides measuring 14 ft?

$$P =$$

$$=$$

$$=$$

$$\boxed{\text{ft}}$$

- f)** What is the perimeter in centimeters of a rhombus with a side length measuring 125 mm?

$$P =$$

$$=$$

Skill 24.1 Calculating the perimeter of polygons (2).

MMMaive 11 2 3 3 4 4
MMLime 11 2 2 3 3 4 4

- g)** What is the perimeter in feet and inches of an isosceles triangle with congruent sides measuring 11 in. and the other side measuring 8 in.?

.....
 $P =$ =

- h)** Find the perimeter in feet of a parallelogram with side lengths measuring 15 ft and 14 yd.

.....
 $P =$ =

- i)** Find the perimeter in inches of a square with side length measuring 3.5 inches.

.....
 $P =$ =

- j)** Find the perimeter in centimeters of an equilateral triangle with side length measuring 180 mm.

.....
 $P =$ =

- k)** The smallest ever postage stamp came from Columbia. Rectangular, it measured 7.85 mm by 9.4 mm. What was its perimeter in cm?

.....
 $P =$
 = =

- l)** An Australian \$20 note measures 14.4 cm by 6.5 cm. What is its perimeter in millimeters?

.....
 $P =$
 = =

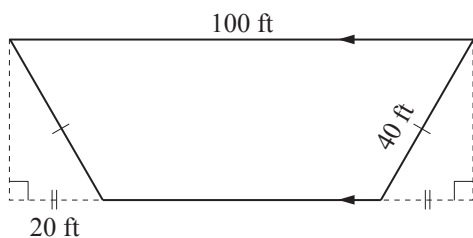
- m)** Lisa's backyard is a rectangle measuring 28 yd in length and 12 yd in width. What is the perimeter of the backyard?

.....
 $P =$
 = = yd

- n)** Find the perimeter in centimeters of a kite with side lengths measuring 180 cm and 750 mm.

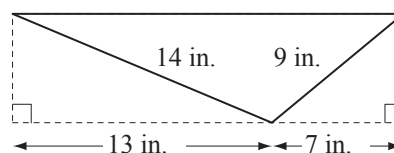
.....
 $P =$ =

- o)** Find the perimeter of the trapezoid.



.....
 $P =$
 = = ft

- p)** Find the perimeter of the triangle.



.....
 $P =$
 = = in.

Skill 24.2 Calculating the perimeter of composite shapes.

MMMaive 11 2 33 44
MMLime 11 2 33 44

- Find and label the length of all sides.
- Add together all side lengths.

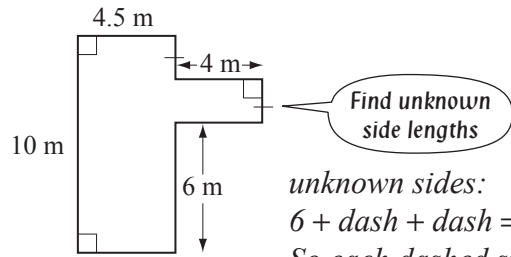
Hints: Sides marked with a dash (|) are of equal length.

Sides marked with two dashes (||) are of equal length etc.

OR

- Manipulate shapes to become rectangles by pushing out inverted corners.

Q. Find the perimeter of the shape.

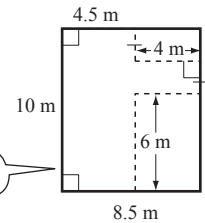


$$\begin{aligned} \text{A. } P &= 10 + 4.5 + 2 + 4 + 2 + 4 + 6 + 4.5 \\ &= 14.5 + 8 + 10 + 4.5 \\ &= 37 \text{ m} \end{aligned}$$

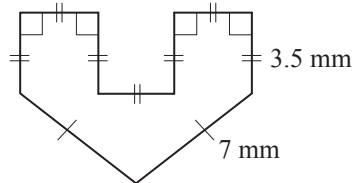
OR

$$\begin{aligned} P &= 10 + 10 + 8.5 + 8.5 \\ &= 20 + 17 \\ &= 37 \text{ m} \end{aligned}$$

shape becomes a rectangle



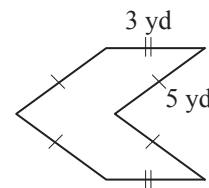
a) Find the perimeter of the shape.



$$P = 3.5 + 7 + 7 + 3.5 + 3.5 + 3.5 + 3.5 + 3.5 + 3.5$$

$$= 14 + 24.5 = \boxed{\text{mm}}$$

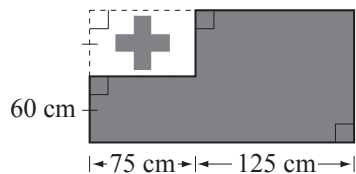
b) Find the perimeter of the shape.



$$P =$$

$$= \boxed{\text{yd}}$$

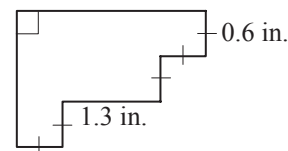
c) Find the perimeter around the colored background of this Tongan flag.



$$P =$$

$$= \boxed{\text{cm}}$$

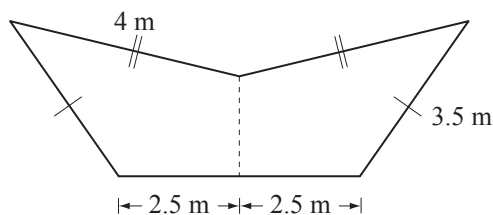
d) Find the perimeter of the shape.



$$P =$$

$$= \boxed{\text{in.}}$$

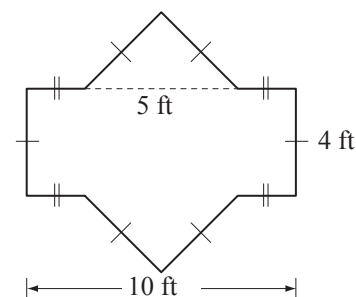
e) Find the perimeter of the shape.



$$P =$$

$$= \boxed{\text{m}}$$

f) Find the perimeter of the shape.



$$P =$$

$$= \boxed{\text{ft}}$$

Skill 24.3 Calculating the circumference of circles.

- Substitute known values into the formula.

Hints: The diameter of a circle is equal to twice the radius.

Pi (π) gets its value because the diameter of any circle fits approximately 3.14 times around the circumference.

Circumference = $2 \times \pi \times$ radius

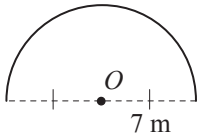
$C = 2\pi r$

OR $C = \pi \times$ diameter

$C = \pi d$

where $\pi \approx 3.14\dots$ or $\frac{22}{7}$

- Q.** Using $C = 2\pi r$ where $\pi \approx \frac{22}{7}$, find the length of the semicircle.



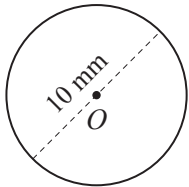
A. $C = 2\pi r$ where $r = 7$

$= 2 \times \frac{22}{7} \times 7$ Simplify: $\div 7$

$= 44$

$\frac{1}{2} C = \frac{1}{2} \times 44 = 22 \text{ m}$

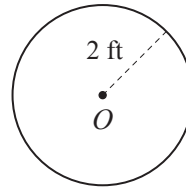
- a)** Using $C = 2\pi r$ where $\pi \approx 3.14$, find the circumference of the circle.



$C = \pi d$ where $d = 10$

$= 10 \times 3.14 = \boxed{} \text{ mm}$

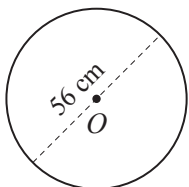
- b)** Using $C = 2\pi r$ where $\pi \approx 3.14$, find the circumference of the circle.



$C = 2\pi r$

$= = \boxed{} \text{ ft}$

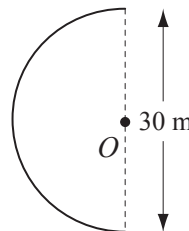
- c)** Using $C = 2\pi r$ where $\pi \approx \frac{22}{7}$, find the circumference of the circle.



$C = $

$= = \boxed{} \text{ cm}$

- d)** Using $\pi \approx 3.14$, find the length of the semicircle.



$C = $

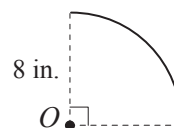
$\frac{1}{2} C = = \boxed{} \text{ m}$

- e)** The diameter of a circular discus is 2.5 m. Using $\pi \approx 3.14$ what is the circumference?

$C = $

$= = \boxed{} \text{ m}$

- f)** Using $\pi \approx 3.14$, find the length of the quarter circle.



$C = $

$\frac{1}{4} C = = \boxed{} \text{ in.}$

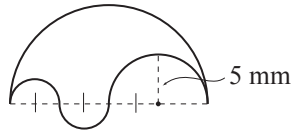
Skill 24.4 Calculating the perimeter of composite circular shapes (1).

- Find and label the length of all sides.
- Break the shape into workable parts.
- For circular shapes substitute known values into the formula for the circumference:
Hint: Consider 2 congruent semicircles equal 1 full circle.
- Add together all side lengths.

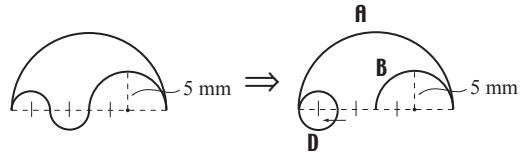
$$C = 2\pi r = \pi d$$

*Hints: Sides marked with a dash (|) are of equal length.
Sides marked with two dashes (||) are of equal length etc.*

Q. Find the perimeter of the shape below.
(Use $\pi \approx 3.14$)



A.



$$C = 2\pi r \text{ where } r = 10$$

$$= 2 \times 3.14 \times 10 = 62.8$$

$$\mathbf{A} = 62.8 \div 2 = 31.4$$

semicircle A

$$C = 2\pi r \text{ where } r = 5$$

$$= 2 \times 3.14 \times 5 = 31.4$$

$$\mathbf{B} = 31.4 \div 2 = 15.7$$

semicircle B

$$C = \pi d \text{ where } d = 5$$

$$\mathbf{D} = 3.14 \times 5 = 15.7$$

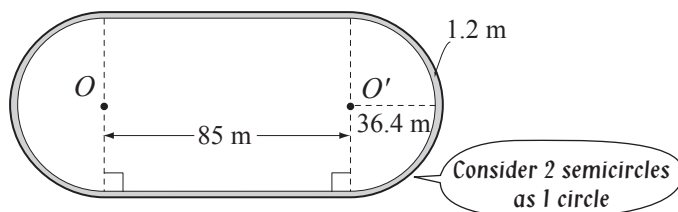
circle D

$$\text{shape} = 31.4 + 15.7 + 15.7$$

$$= \mathbf{62.8 \text{ mm}}$$

a) Using $C = 2\pi r$ where $\pi \approx 3.14$, find the perimeter around the outside of the first lane of an athletics track.

Standard 400 m athletics track
(1 lane shown)



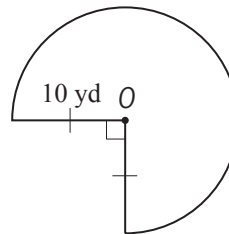
$$C = 2\pi r \text{ where } r = 36.4 + 1.2 = 37.6$$

$$C = 2 \times 3.14 \times 37.6 = 236.128$$

$$85 + 85 = 170$$

$$P = 236.128 + 170 = \boxed{} \text{ m}$$

b) Using $C = 2\pi r$ where $\pi \approx 3.14$, find the perimeter of the shape.

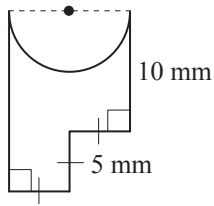


$$P = \boxed{} = \boxed{} \text{ yd}$$

Skill 24.4 Calculating the perimeter of composite circular shapes (2).

MMMaive 11 22 3 44
MMLime 11 22 3 44

- c)** Using $C = 2\pi r$ where $\pi \approx 3.14$, find the perimeter of the shape.



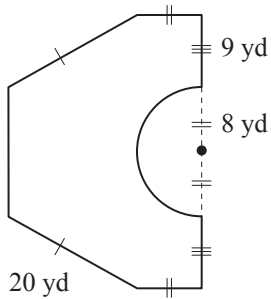
$C = 2\pi r$ where $r =$

$C =$

$P =$

$=$ = mm

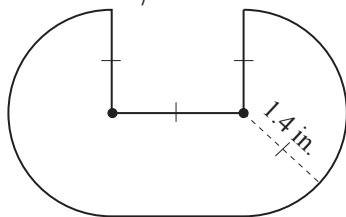
- e)** Using $C = 2\pi r$ where $\pi \approx 3.14$, find the perimeter of this composite shape.



$P =$

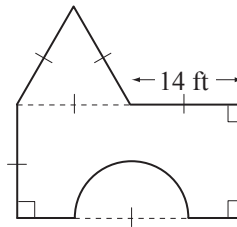
$=$ = yd

- g)** Find the perimeter of the shape.
(Use $\pi \approx \frac{22}{7}$)



$P =$ = in.

- d)** Find the perimeter of the shape.
(Use $\pi \approx \frac{22}{7}$)



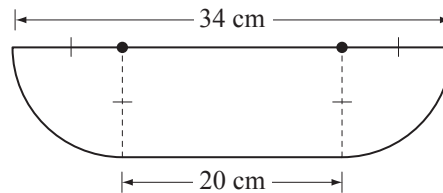
$C = 2\pi r$

$P =$

$P =$

$=$ = ft

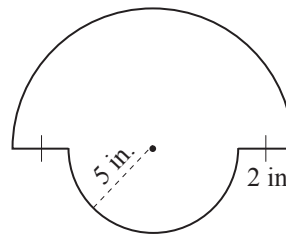
- f)** Find the perimeter of the shape.
(Use $\pi \approx \frac{22}{7}$)



$P =$

$=$ = cm

- h)** Find the perimeter of the shape.
(Use $\pi \approx 3.14$)

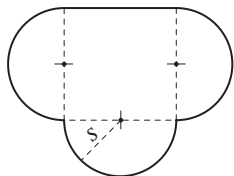


$P =$ = in.

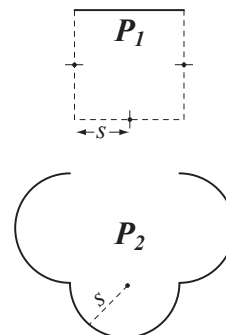
Skill 24.5 Expressing the perimeter of two-dimensional shapes in algebraic form.

- Find and label the length of all sides where appropriate.
- Break the shape up into workable parts.
- Write the formula for each part separately.
- Add the parts.

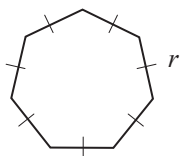
Q. Write a formula for the perimeter P of the shape.



A. $P_1 = s + s$
 $= 2s$
 $P_2 = \frac{3}{2} \cdot 2\pi r$ where $r = s$
 $= \frac{3}{2} \cdot 2\pi s$
 $= 3\pi s$
 $P = P_1 + P_2$
 $= 2s + 3\pi s$
 $= s(2 + 3\pi)$



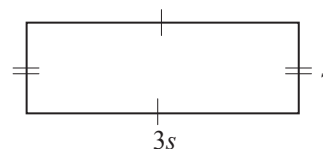
a) Write a formula for the perimeter P of the heptagon.



$P =$

 $=$ $P =$

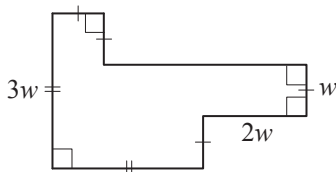
b) Write a formula for the perimeter P of the rectangle.



$P =$

 $=$ $P =$

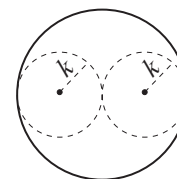
c) Write a formula for the perimeter P of the polygon.



$P =$

 $=$ $P =$

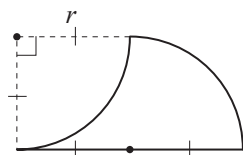
d) Write a formula for the circumference P of the outer circle.



$P =$

 $=$ $P =$

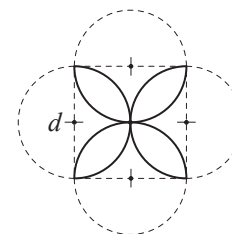
e) Write a formula for the perimeter P of the shape.



.....

 $P =$ $P =$

f) Write a formula for the perimeter P of the flower shape.



.....

 $P =$ $P =$

Skill 24.6 Finding an unknown side length when the perimeter of the shape is given.

- Draw a diagram if necessary and mark all the information given.
- OR
- Use the appropriate formula to deduce the unknown side length.

Q. A rectangular garden bed has a perimeter of 93 ft. If the length is 27 ft, what is the width?

A.

$$P = 2l + 2w \text{ where } P = 93 \text{ and } l = 27$$

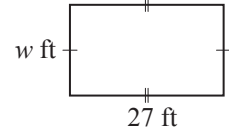
$$93 = 2 \cdot 27 + 2 \cdot w$$

$$93 - 54 = 54 - 54 + 2w$$

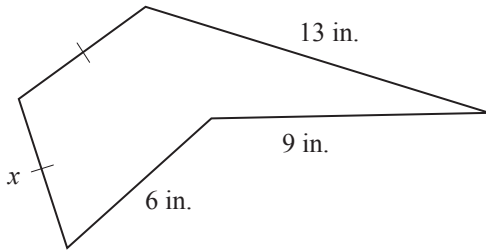
$$2w = 39$$

$$\cancel{2}w = \frac{39}{\cancel{2}}$$

$$w = \mathbf{19.5 \text{ ft}}$$



a) The perimeter of the pentagon is 39 inches. Find the unknown side length in inches.

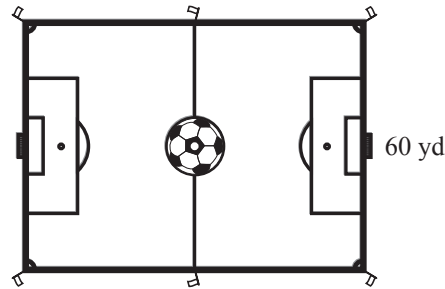


Find x

$$2x + 6 + 9 + 13 = 39$$

$$x = \frac{39 - 6 - 9 - 13}{2} = \frac{11}{2} = \boxed{}$$

b) A rectangular soccer field has a perimeter of 320 yards. Given the width is 60 yards, what is its length?



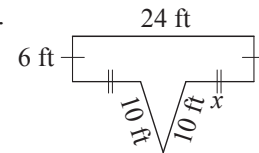
Use: $P = 2l + 2w$

$$P = \dots\dots\dots = \boxed{} \text{ yd}$$

c) The perimeter of a nonagon is 99 mm. What is the side length?

$$\dots\dots\dots = \boxed{} \text{ mm}$$

d) The perimeter of the shape is 74 feet. Find the unknown side length.



$$\dots\dots\dots = \boxed{} \text{ ft}$$

e) A rectangular cattle ranch has a perimeter of 80 miles. If the length measures 23 miles, how wide is the fence?

$$\dots\dots\dots = \boxed{} \text{ mi}$$

f) A rectangular park has a perimeter of 0.9 km. If the park measures 0.2 km in width, how long is the park?

$$\dots\dots\dots = \boxed{} \text{ km}$$

