

27. [Perimeter]

Skill 27.1 Finding the perimeter of polygons by measuring their side lengths.

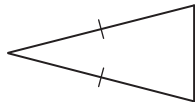
MMBlue 1 1 2 2 3 3 4 4
MMGreen 1 1 2 2 3 3 4 4

- Measure each side length of the shape.
- Add together the side lengths.

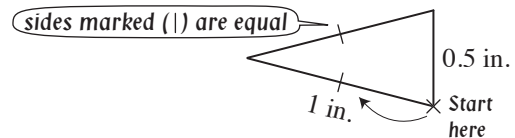
Hint: Sides marked with a dash (|) are of equal length.

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

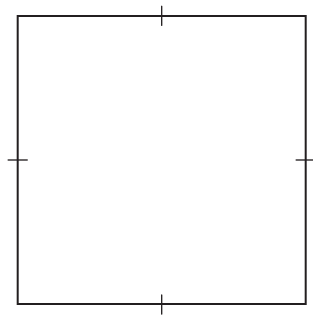
Q. Use a ruler to find the perimeter of the isosceles triangle in inches.



A. $1 \text{ in.} + 1 \text{ in.} + 0.5 \text{ in.}$ Measure the side lengths. Write down the lengths next to each side.
= **2.5 in.**

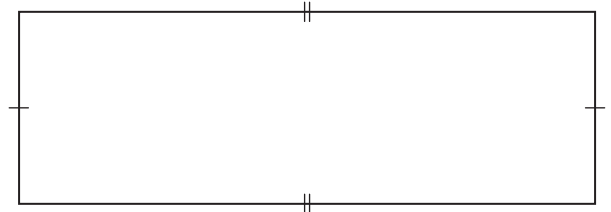


a) Use a ruler to find the perimeter of the square in inches.



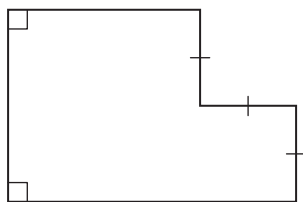
4×1.5 = in.

b) Use a ruler to find the perimeter of the rectangle in inches.



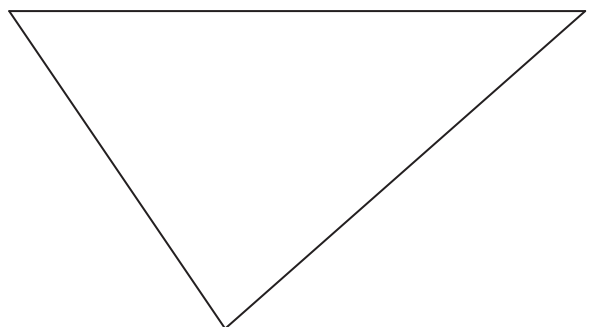
..... = in.

c) Use a ruler to find the perimeter of the polygon in inches.



..... = in.

d) Use a ruler to find the perimeter of the scalene triangle in inches.

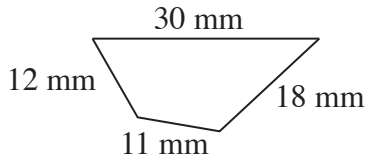


..... = in.

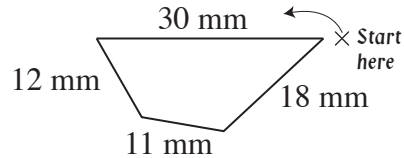
Skill 27.2 Calculating the perimeter of polygons when all side lengths are given.

- Add together the side lengths.

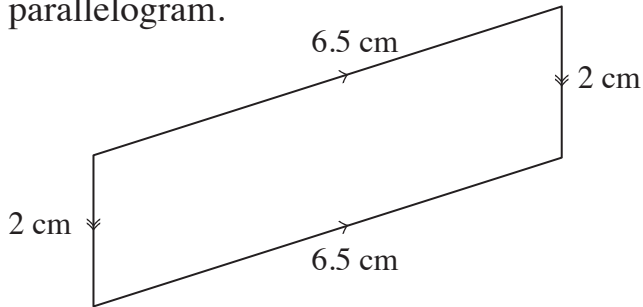
Q. Calculate the perimeter of the quadrilateral.



A. $30\text{ mm} + 12\text{ mm} + 11\text{ mm} + 18\text{ mm}$
 $= 71\text{ mm}$

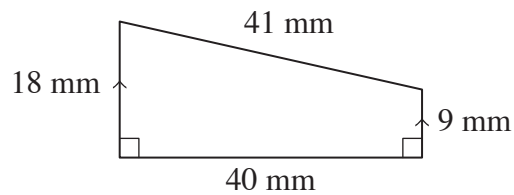


a) Calculate the perimeter of the parallelogram.



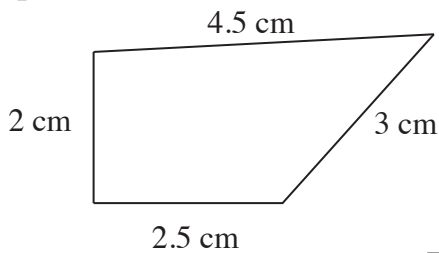
$6.5 + 2 + 6.5 + 2 =$

b) Calculate the perimeter of the trapezoid.



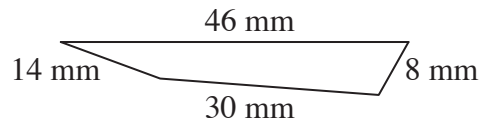
$\dots =$

c) Calculate the perimeter of the quadrilateral.



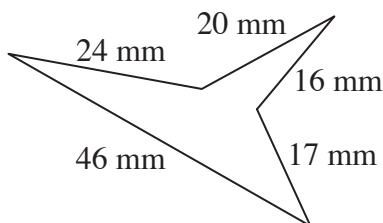
$\dots =$

d) Calculate the perimeter of the quadrilateral.



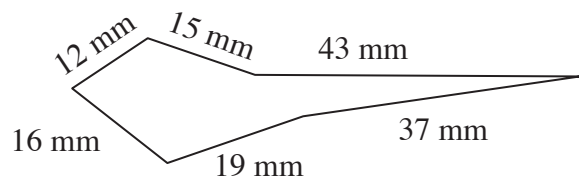
$\dots =$

e) Calculate the perimeter of the polygon.



$\dots =$

f) Calculate the perimeter of the polygon.

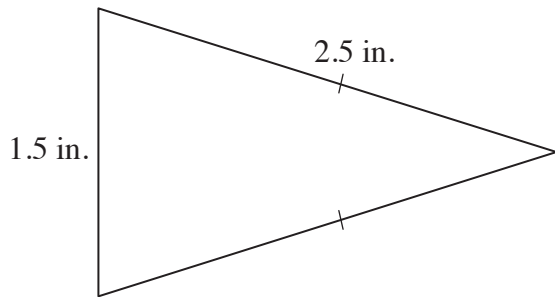


$\dots =$

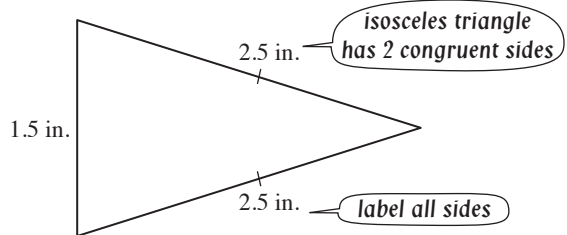
Skill 27.3 Calculating the perimeter of polygons by recognizing congruent sides.

- Determine and label all side lengths.
Hint: Sides marked with a dash (|) are of equal length. Sides marked with two dashes (||) are of equal length etc.
- Add together the side lengths.

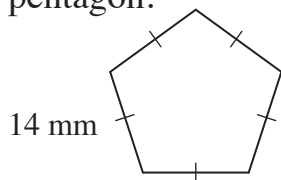
Q. Calculate the perimeter of the isosceles triangle.



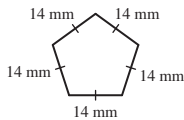
A. $1.5 \text{ in.} + 2.5 \text{ in.} + 2.5 \text{ in.}$
 $= 6.5 \text{ in.}$



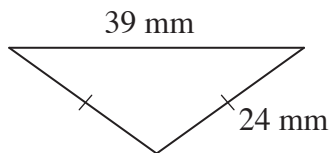
a) Calculate the perimeter of the regular pentagon.



5×14 pentagon - 5 sides = mm



b) Calculate the perimeter of the isosceles triangle.



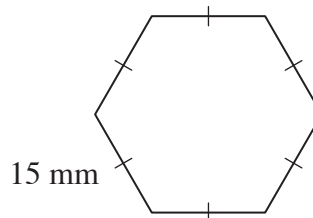
$39 \text{ mm} + 24 \text{ mm} + 24 \text{ mm} =$ mm

c) Calculate the perimeter of the regular octagonal gazebo with side length 4 ft.



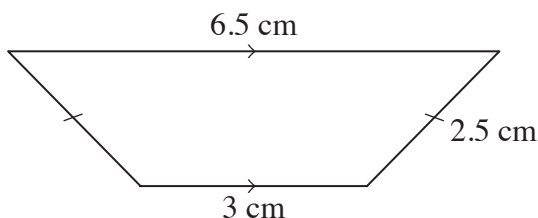
$8 \times 4 \text{ ft} =$ ft

d) Calculate the perimeter of the regular hexagon.



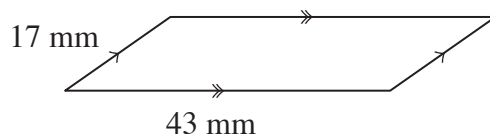
$6 \times 15 \text{ mm} =$ mm

e) Calculate the perimeter of the trapezoid.



$6.5 \text{ cm} + 3 \text{ cm} + 2.5 \text{ cm} + 2.5 \text{ cm} =$ cm

f) Calculate the perimeter of the parallelogram.

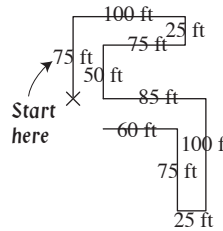
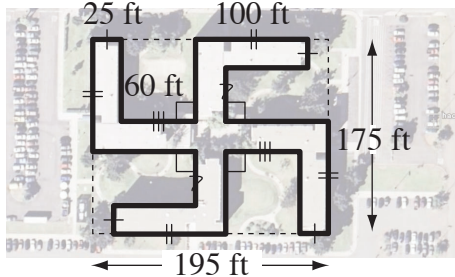


$17 \text{ mm} + 43 \text{ mm} + 17 \text{ mm} + 43 \text{ mm} =$ mm

Skill 27.4 Calculating the perimeter of polygons using real-life examples.

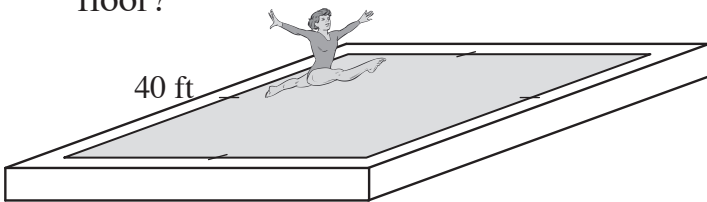
- Determine and label all side lengths.
Hint: Sides marked with a dash (|) are of equal length. Sides marked with two dashes (||) are of equal length etc.
- Add together the side lengths.

Q. What is the perimeter of this Navy building in California? **A.** $(75 + 100 + 25 + 75 + 50 + 85 + 100 + 25 + 75 + 60) \times 2$
 $= 670 \times 2$
 $= 1340 \text{ ft}$



Redraw half the shape.
Write the given side lengths.
Determine the remaining side lengths.
Double your answer.

a) What is the perimeter of the gymnastics floor?



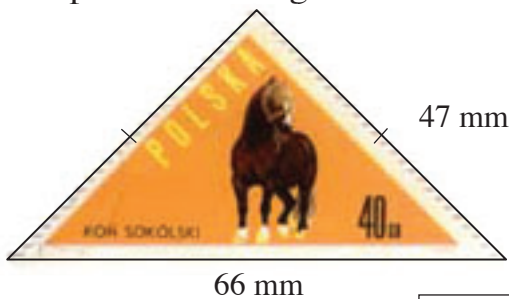
$4 \times 40 = \boxed{160 \text{ ft}}$

b) What is the perimeter of the rectangular Luxio TV screen?



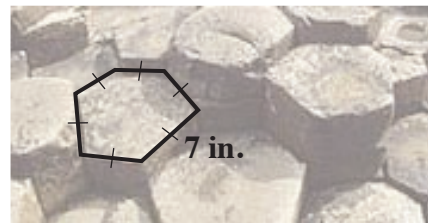
$255 + 455 + 255 + 455 = \boxed{\text{cm}}$

c) What is the perimeter of this Polish stamp valued at 40 groszy?



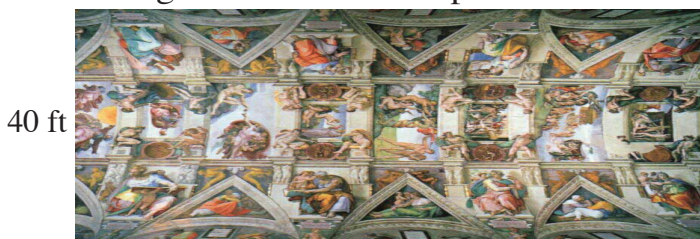
$66 + 47 + 66 + 47 = \boxed{\text{mm}}$

d) What is the perimeter of the upper surface of this regular hexagonal column of basalt seen at the Giant's Causeway in Ireland?



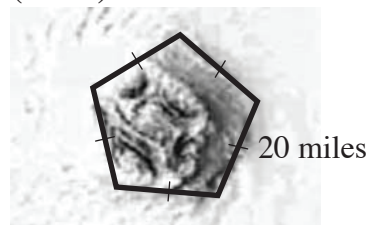
$6 \times 7 = \boxed{\text{in.}}$

e) What is the perimeter of the rectangular ceiling of the Sistine Chapel?



$40 + 130 + 40 + 130 = \boxed{\text{ft}}$

f) What is the perimeter of the eye of the pentagonal vortex of hurricane Isabel (2003)?

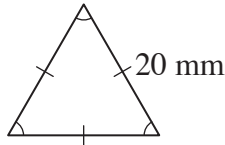


$5 \times 20 = \boxed{\text{mi}}$

Skill 27.5 Calculating the perimeter of polygons using unit conversions.

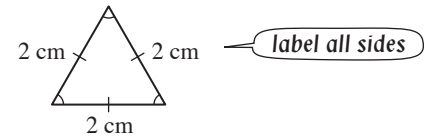
- Convert all measurements to the same unit. (see skill 26.1, page 245 and skill 26.2, page 246)
- Determine and label all side lengths.
*Hint: Sides marked with a dash (|) are of equal length.
Sides marked with two dashes (||) are of equal length etc.*
- Add together the side lengths.

Q. Calculate the perimeter of the equilateral triangle in centimeters.

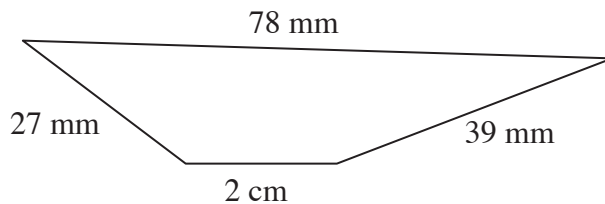


A. $20\text{ mm} = 20 \div 10\text{ cm} = 2\text{ cm}$ (mm to cm: $\div 10$)

$$P = 3 \times 2 = 6\text{ cm}$$

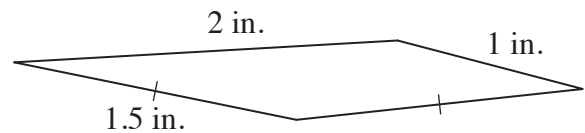


a) Calculate the perimeter of the trapezoid in millimeters.



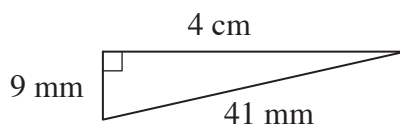
$P =$

b) Calculate the perimeter of the quadrilateral in feet.



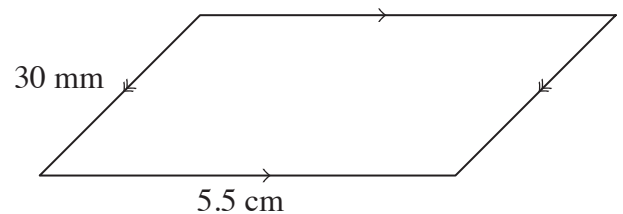
$P =$

c) Calculate the perimeter of the right triangle in millimeters.



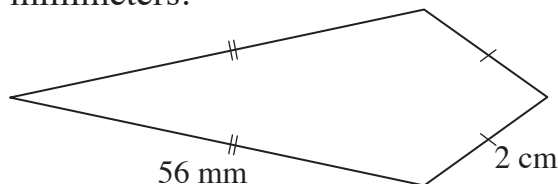
$P =$

d) Calculate the perimeter of the parallelogram in millimeters.



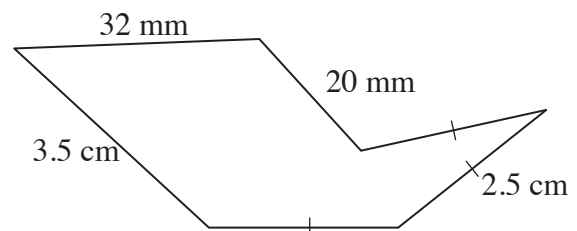
$P =$

e) Calculate the perimeter of the kite in millimeters.



$P =$

f) Calculate the perimeter of this polygon in centimeters.



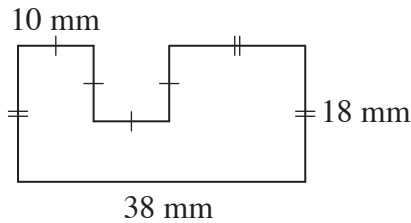
$P =$

Skill 27.6 Calculating the perimeter of composite shapes.

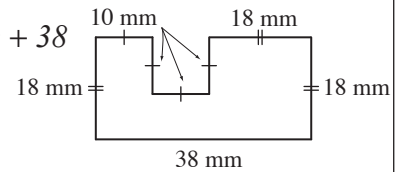
MMBlue 11 22 33 44
MMGreen 11 22 33 44

- Determine and label all side lengths.
Hint: Sides marked with a dash (|) are of equal length. Sides marked with two dashes (||) are of equal length etc.
- Add together the side lengths.

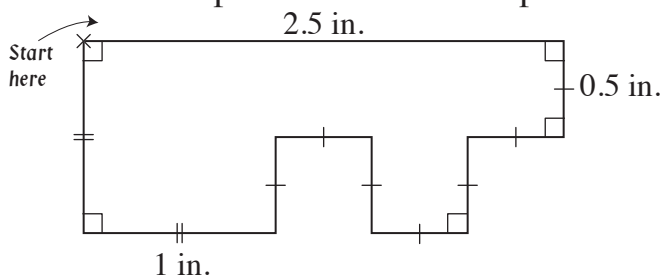
Q. Calculate the perimeter of this shape.



$$\begin{aligned} \mathbf{A.} \quad & 10 + 10 + 10 + 10 + 18 + 18 + 38 + 18 \\ & = 40 + 54 + 38 \\ & = \mathbf{132 \text{ mm}} \\ \text{OR} \quad & (10 \times 4) + (18 \times 3) + 38 \\ & = 40 + 54 + 38 \\ & = \mathbf{132 \text{ mm}} \end{aligned}$$



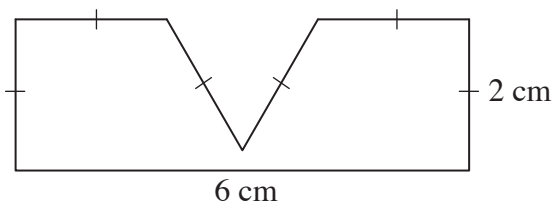
a) Calculate the perimeter of this shape.



$$2.5 + (0.5 \times 7) + (1 \times 2)$$

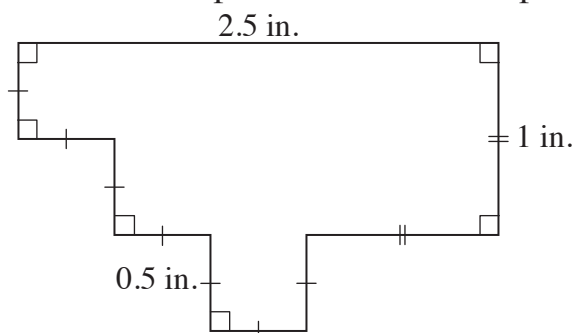
$$= 2.5 + 3.5 + 2 = \boxed{\text{in.}}$$

b) Calculate the perimeter of this shape.



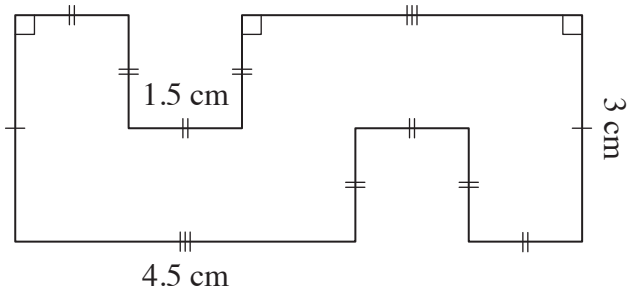
$$= \boxed{\text{cm}}$$

c) Calculate the perimeter of this shape.



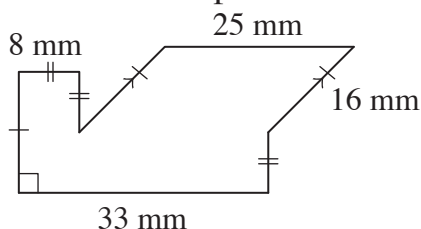
$$= \boxed{\text{in.}}$$

d) Calculate the perimeter of this shape.



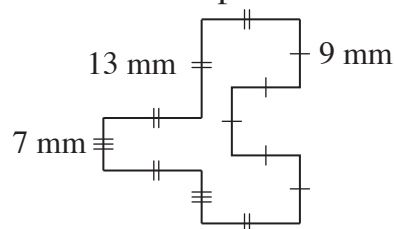
$$= \boxed{\text{cm}}$$

e) Calculate the perimeter of this shape.



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

f) Calculate the perimeter of this shape.

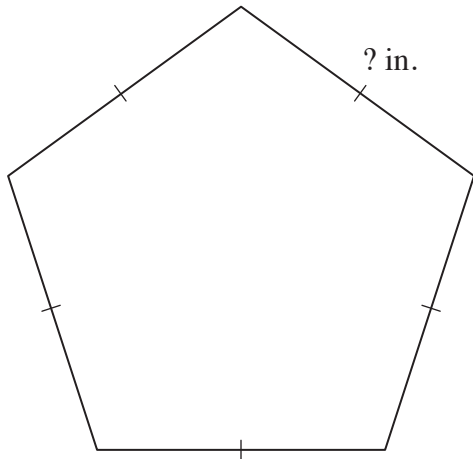


$$= \boxed{\text{mm}}$$

Skill 27.7 Calculating an unknown side length when the perimeter of a polygon is given.

- Add together all the given side lengths.
 - Subtract the total from the perimeter to find the unknown side length.
- OR
- Use algebra.

Q. The perimeter of this regular pentagon is 7.5 in. What is the length of a side?



A. If ? represents the length of a side:

$$P = 7.5 \text{ in.}$$

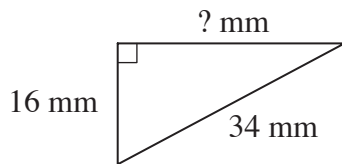
$$P = 5 \times ?$$

$$7.5 = 5 \times ?$$

$$? = \mathbf{1.5 \text{ in.}}$$

Guess ? = 1.5

a) The perimeter of this right triangle is 80 mm. Find the missing side length.

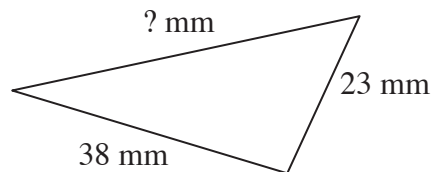


$$P = 16 + 34 + ?$$

Guess ? = 30

$$80 = 50 + ? \quad \text{so } ? = \boxed{\text{mm}}$$

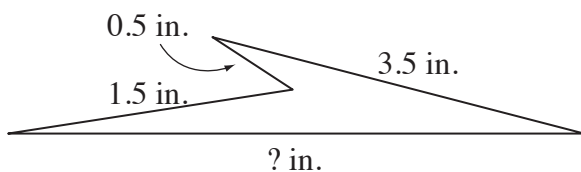
b) The perimeter of this scalene triangle is 108 mm. Find the missing side length.



$$P =$$

$$= \quad \text{so } ? = \boxed{\text{mm}}$$

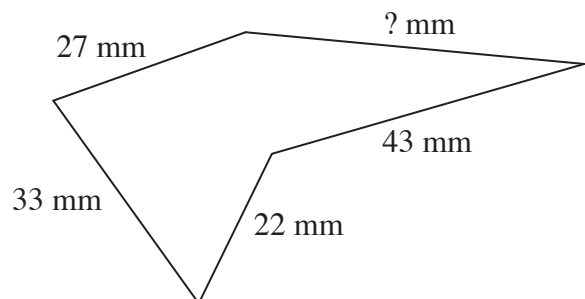
c) The perimeter of this quadrilateral is 7.5 in. Find the missing side length.



$$P =$$

$$= \quad \text{so } ? = \boxed{\text{in.}}$$

d) The perimeter of this polygon is 170 mm. Find the missing side length.



$$P =$$

$$= \quad \text{so } ? = \boxed{\text{mm}}$$

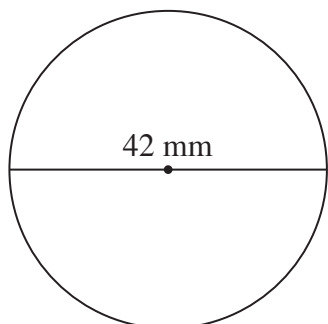
Skill 27.8 Calculating the circumference of circles (1).

MMBlue 11 22 33 44
MMGreen 11 22 33 44

- Substitute the known values into the formula for the circumference.

Hint: You need the radius which is half the diameter.

Q. Using $C = 2\pi r$ where $\pi \approx \frac{22}{7}$, calculate the circumference of the circle.



A. $C = 2\pi r$ where $d = 42$ and $r = 21$ $r = \frac{d}{2}$

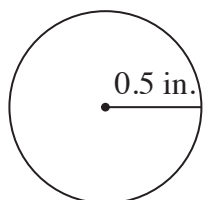
$$= 2 \times \frac{22}{7} \times 21$$

Simplify: $\div 7$

$$= 44 \times 3$$

$$= 132 \text{ mm}$$

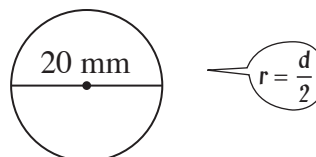
a) Using $C = 2\pi r$ where $\pi \approx 3.14$, calculate the circumference of the circle.



$$C = 2\pi r = 2 \times 3.14 \times 0.5$$

$$= 1 \times 3.14 = \boxed{\text{in.}}$$

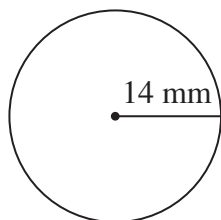
b) Using $C = 2\pi r$ where $\pi \approx 3.14$, calculate the circumference of the circle.



$$C =$$

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

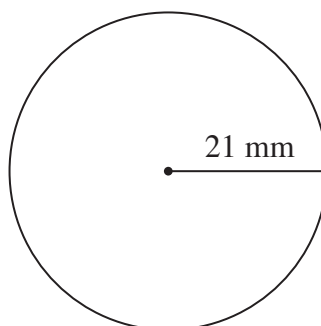
c) Using $C = 2\pi r$ where $\pi \approx \frac{22}{7}$, calculate the circumference of the circle.



$$C =$$

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

d) Using $C = 2\pi r$ where $\pi \approx \frac{22}{7}$, calculate the circumference of the circle.



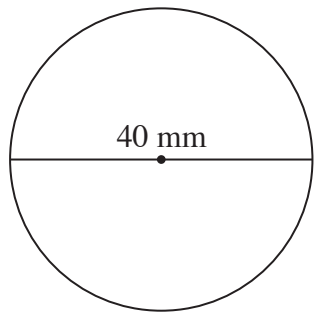
$$C =$$

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

Skill 27.8 Calculating the circumference of circles (2).

MMBlue 11 22 33 44
MMGreen 11 22 33 44

- e) Using $C = 2\pi r$ where $\pi \approx 3.14$, calculate the circumference of the circle.

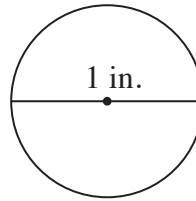


$$r = \frac{d}{2}$$

$$C = 2 \times 3.14 \times 20 \text{ where } d = 40 \text{ and } r = 20$$

$$= 40 \times 3.14 = \boxed{125.6 \text{ mm}}$$

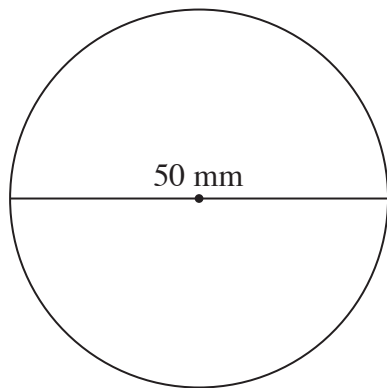
- f) Using $C = 2\pi r$ where $\pi \approx 3.14$, calculate the circumference of the circle.



$$C =$$

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

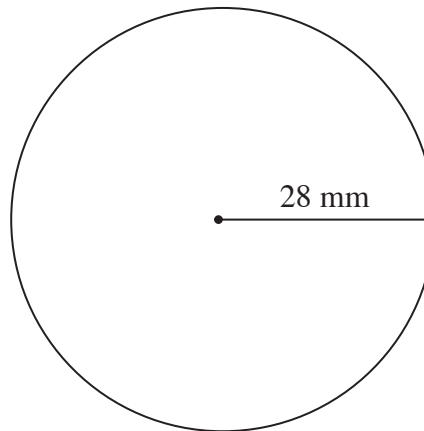
- g) Using $C = 2\pi r$ where $\pi \approx 3.14$, calculate the circumference of the circle.



$$C =$$

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

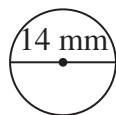
- h) Using $C = 2\pi r$ where $\pi \approx \frac{22}{7}$, calculate the circumference of the circle.



$$C =$$

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

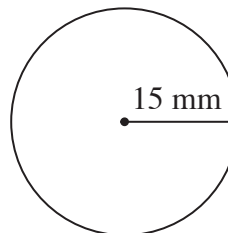
- i) Using $C = 2\pi r$ where $\pi \approx \frac{22}{7}$, calculate the circumference of the circle.



$$C =$$

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

- j) Using $C = 2\pi r$ where $\pi \approx 3.14$, calculate the circumference of the circle.



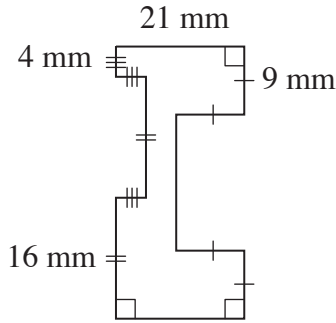
$$C =$$

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

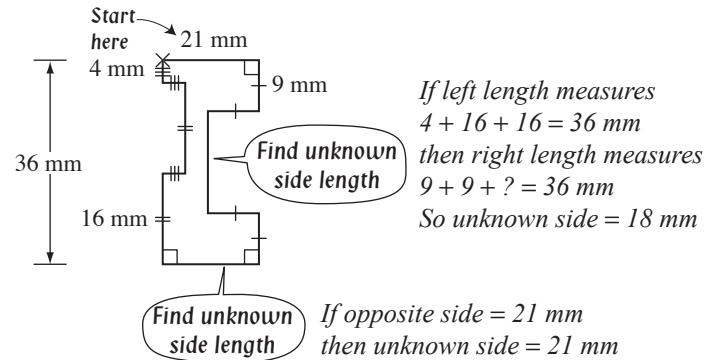
Skill 27.9 Calculating the perimeter of composite shapes by first finding missing side lengths.

- Determine the missing sides by adding or subtracting known sides.
- Label all side lengths.
Hint: Sides marked with a dash (|) are of equal length. Sides marked with two dashes (||) are of equal length etc.
- Add together the side lengths.

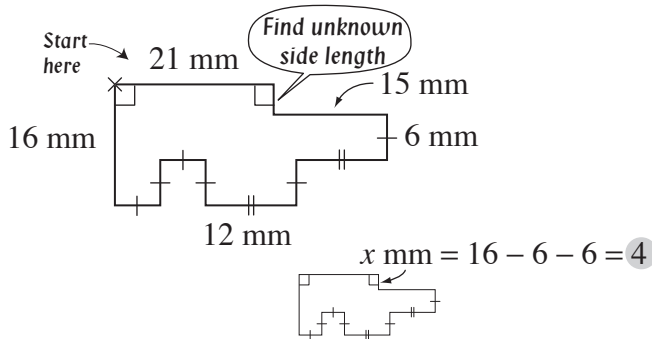
Q. Calculate the perimeter of this shape.



A. $21 + 9 + 9 + 18 + 9 + 9 + 21 + 16 + 4 + 16 + 4 + 4$
 $= 30 + 36 + 30 + 44$
 $= 140 \text{ mm}$



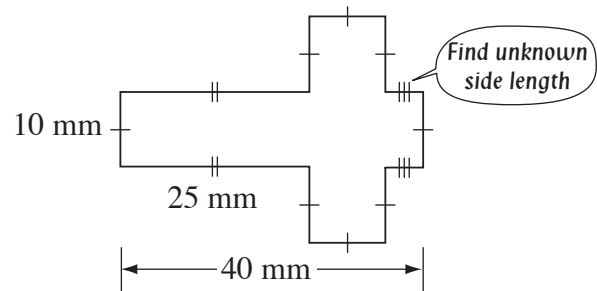
a) Calculate the perimeter of this shape.



$21 + 4 + 15 + 6 + 12 + 6 + 12 + 6 + 6 + 6 + 6 + 16$

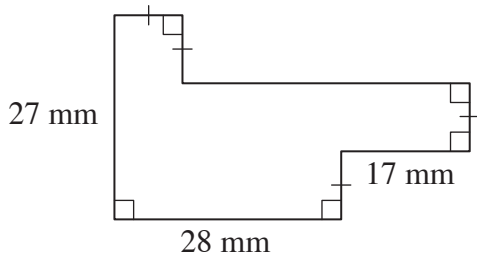
$= 40 + 36 + 40 = \boxed{\text{mm}}$

b) Calculate the perimeter of this shape.



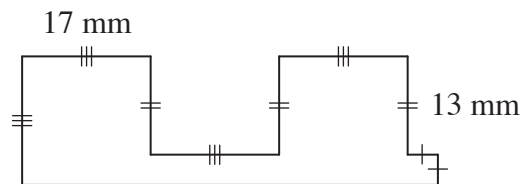
$= \dots = \boxed{\text{mm}}$

c) Calculate the perimeter of this shape.



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

d) Calculate the perimeter of this shape.

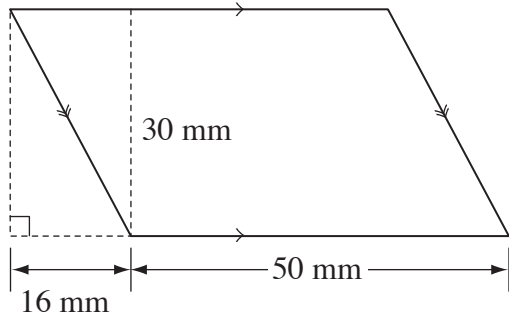


$= \dots = \boxed{\text{mm}}$

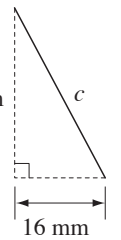
Skill 27.10 Calculating the perimeter of polygons by using Pythagorean theorem.

- Mark all the information given.
- Use Pythagorean formula to deduce any unknown side length.
- Add together the side lengths.

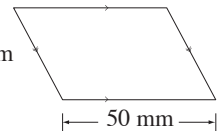
Q. Calculate the perimeter of this parallelogram. [Hint: Pythagorean theorem will help.]



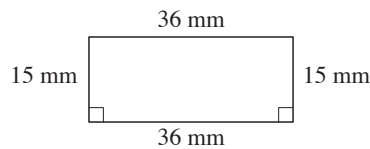
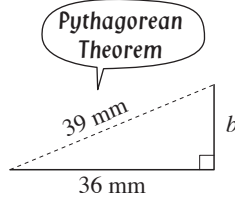
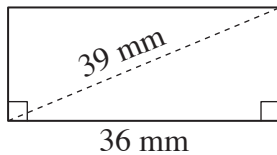
A. $c^2 = a^2 + b^2$ where $a = 16$ and $b = 30$
 $c^2 = 16^2 + 30^2$
 $c^2 = 256 + 900$
 $c^2 = 1156$
 $c = \sqrt{1156}$ (1156 = 34 × 34)
 $c = 34$



$P = 34 + 50 + 34 + 50$
 $= 168 \text{ mm}$



a) Calculate the perimeter of the rectangle. [Hint: Pythagorean theorem will help.]

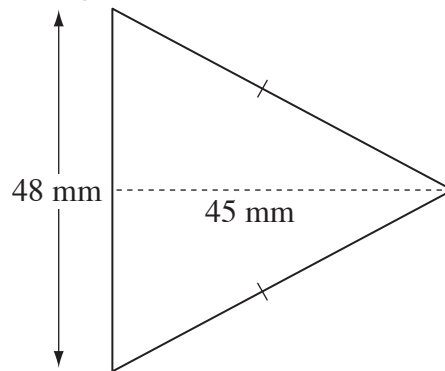


$39^2 = 36^2 + b^2 \Rightarrow b^2 = 1521 - 1296$

$b^2 = 225 \Rightarrow b = \sqrt{225} = 15$

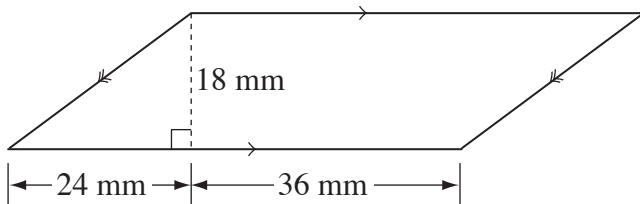
$P = 36 + 15 + 36 + 15 =$ mm

b) Calculate the perimeter of this isosceles triangle. [Hint: Pythagorean theorem will help.]



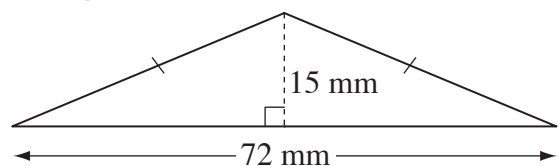
$P =$ mm

c) Calculate the perimeter of this parallelogram. [Hint: Pythagorean theorem will help.]



$P =$ mm

d) Calculate the perimeter of this isosceles triangle. [Hint: Pythagorean theorem will help.]



$P =$ mm