

23. [Perimeter / Area]

Skill 23.1 Calculating the perimeter of polygons (1).

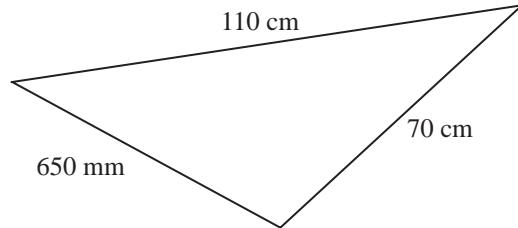
MM5.2 1 1 2 2 3 3 4 4
MM6.1 1 1 2 2 3 3 4 4

- 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 centimetres.

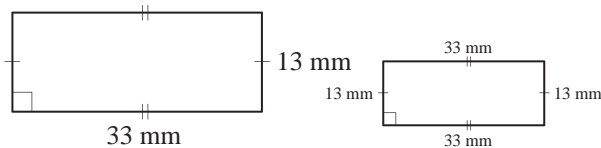


A. $650 \text{ mm} = 650 \div 10 \text{ cm} = 65 \text{ cm}$ *Convert mm to cm*

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

$P = 245 \text{ cm}$

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

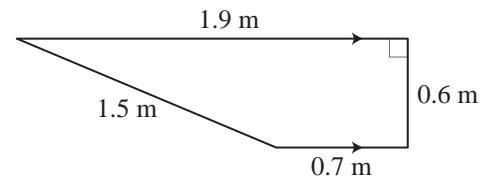


$P = 33 + 33 + 13 + 13$

$= 66 + 26$

$=$

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

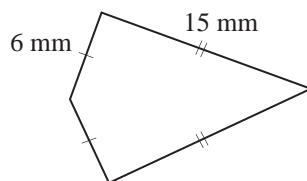


$P = 1.5 +$

$=$

$=$

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

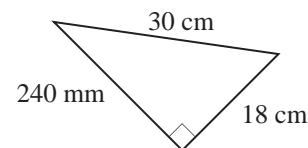


$P =$

$=$

$=$

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



$P =$

$=$

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

$P =$

$=$

$=$

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

$P =$

$=$

Skill 23.1 Calculating the perimeter of polygons (2).

MM5.2 1 1 2 2 3 3 4 4
MM6.1 1 1 2 2 3 3 4 4

- g)** What is the perimeter in centimetres of an isosceles triangle with congruent sides of 15 m and the other side measuring 1.5 m?

$P =$
 $=$ =

- h)** Find the perimeter in centimetres of a parallelogram with side lengths measuring 202 cm and 100 mm.

$P =$
 $=$ =

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

$P =$
 $=$ =

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

$P =$
 $=$ =

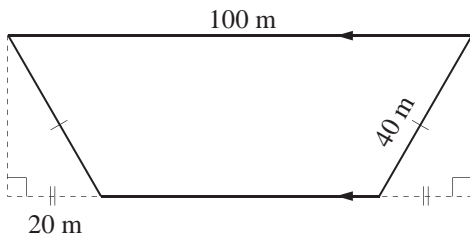
- k)** Lisa's backyard is a rectangle measuring 28 m in length and 12 m in width. What will the perimeter of the backyard be?

$P =$
 $=$ = m

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

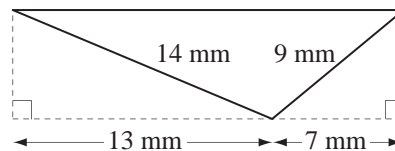
$P =$
 $=$ =

- m)** Find the perimeter of the trapezium.



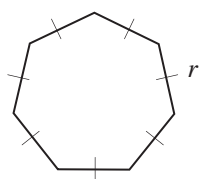
$P =$
 $=$ = m

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



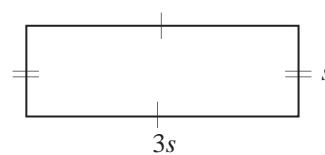
$P =$
 $=$ = mm

- o)** Write an algebraic expression for the perimeter P of the heptagon. [Express the answer in terms of r .]



$P =$
 $=$ =

- p)** Write an algebraic expression for the perimeter P of the rectangle. [Express the answer in terms of s .]



$P =$
 $=$ =

Skill 23.2 Calculating the perimeter of composite shapes.

MM5.2 1 1 22 3 3 4 4
MM6.1 1 1 22 3 3 4 4

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

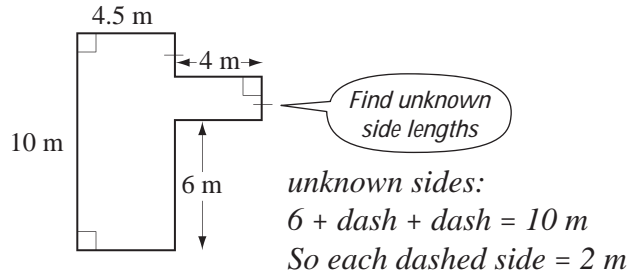
Hints: Sides marked with a dash (|) are of equal length.

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.

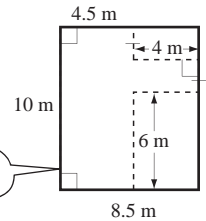


$$\begin{aligned} \text{A. } P &= 10 + 4.5 + 2 + 4 + 2 + 4 + 6 + 4.5 \\ &= 14.5 + 8 + 10 + 4.5 \\ &= 37 \text{ m} \end{aligned}$$

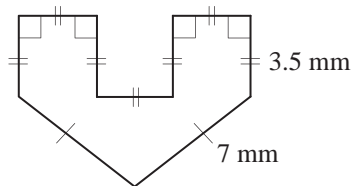
OR

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

shape becomes a rectangle



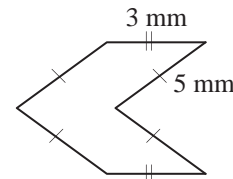
a) Find the perimeter of the shape.



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

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

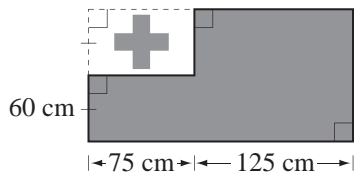
b) Find the perimeter of the shape.



$$P =$$

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

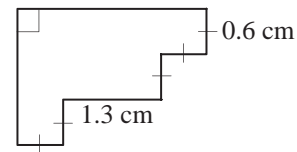
c) Find the perimeter in centimetres around the coloured background of this Tongan flag.



$$P =$$

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

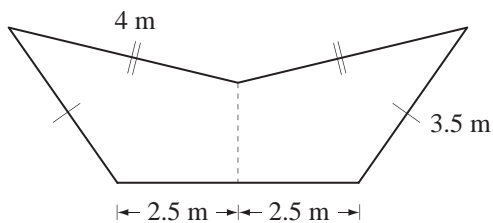
d) Find the perimeter of the shape.



$$P =$$

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

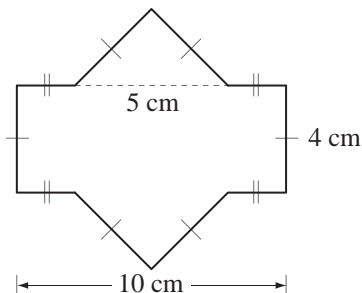
e) Find the perimeter of the shape.



$$P =$$

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

f) Find the perimeter of the shape.



$$P =$$

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

Skill 23.3 Calculating the circumference of circles.

MM5.2 1 1 2 2 3 3 4 4
MM6.1 1 1 2 2 3 3 4 4

- Substitute known values into the formula.

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

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

Circumference of a circle

$$C = 2 \times \pi \times \text{radius}$$

$$C = 2\pi r$$

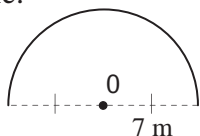
OR

$$C = \pi \times \text{diameter}$$

$$C = \pi d$$

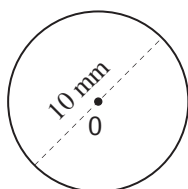
where $\pi \approx 3.14\dots$ or $\frac{22}{7}$

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



A. $C = 2\pi r$
 $= 2 \times \frac{22}{7} \times 7$ *Simplify: $\div 7$*
 $= 44$
 $\frac{1}{2} C = \frac{1}{2} \times 44 = 22 \text{ m}$

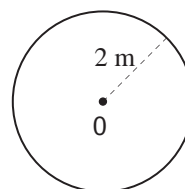
- a)** Using $C = 2\pi r$ where $\pi \approx 3.14$, find the circumference of the circle.



$$C = \pi d \text{ where } d = 10$$

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

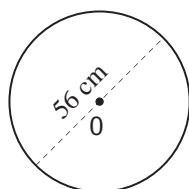
- b)** Using $C = 2\pi r$ where $\pi \approx 3.14$, find the circumference of the circle.



$$C = 2\pi r$$

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

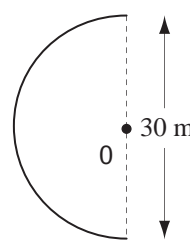
- c)** Using $C = 2\pi r$ where $\pi \approx \frac{22}{7}$, find the circumference of the circle.



$$C =$$

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

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



$$C =$$

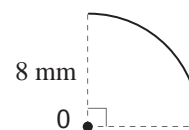
$$\frac{1}{2} C = = \boxed{} \text{ m}$$

- 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.



$$C =$$

$$\frac{1}{4} C = = \boxed{} \text{ mm}$$

Skill 23.4 Calculating the perimeter of composite circular shapes (1).

MM5.2 1 1 2 2 3 3 4 4
MM6.1 1 1 2 2 3 3 4 4

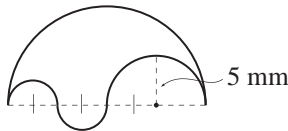
- Find and label the length of all sides.
- Break the shape into workable parts.
- For circular shapes substitute known values into the formula for the circumference:

Circumference of a circle
 $C = 2\pi r = \pi d$

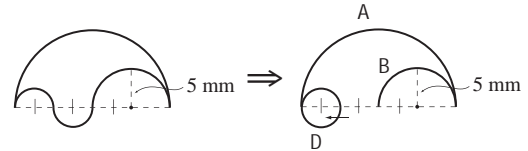
Hint: Consider 2 congruent semicircles equal 1 full circle.

- 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 shape.
(Use $\pi \approx 3.14$)



A.



$C = 2\pi r$ where $r = 10$
 $= 2 \times 3.14 \times 10 = 62.8$
 $A = 62.8 \div 2 = 31.4$

semicircle A

$C = 2\pi r$ where $r = 5$
 $= 2 \times 3.14 \times 5 = 31.4$
 $B = 31.4 \div 2 = 15.7$

semicircle B

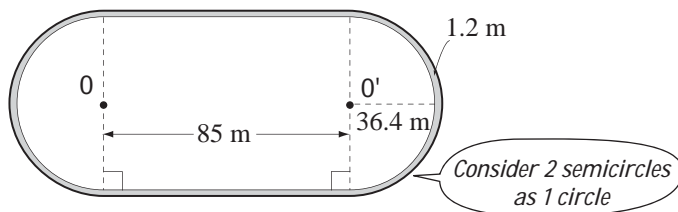
$C = \pi d$ where $d = 5$
 $D = 3.14 \times 5 = 15.7$

circle D

$shape = 31.4 + 15.7 + 15.7$
 $= 62.8 \text{ mm}$

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)



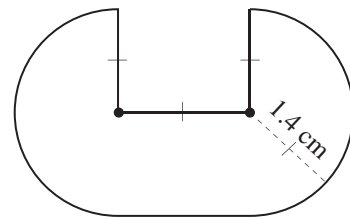
$C = 2\pi r$ where $r = 36.4 + 1.2 = 37.6$

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

$85 + 85 = 170$

$P = 236.128 + 170 = 406.128 \text{ m}$

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



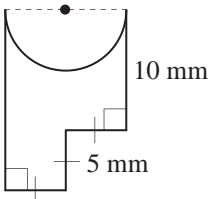
$C = 2\pi r$

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

Skill 23.4 Calculating the perimeter of composite circular shapes (2).

MM5.2 1 1 2 2 3 3 4 4
MM6.1 1 1 2 2 3 3 4 4

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



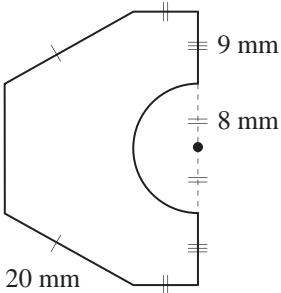
$C = 2\pi r$ where $r =$

$C =$

$P =$

$=$ $=$ mm

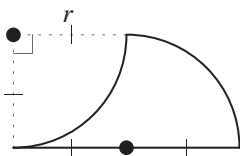
- e)** Using $C = 2\pi r$ where $\pi \approx 3.14$, find the perimeter of the shape.



$P =$

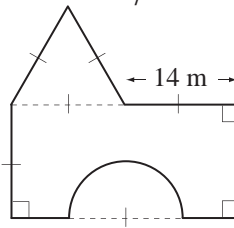
$=$ $=$ mm

- g)** Write an algebraic expression for the perimeter P of the shape. [Express the answer in terms of r and π .]



$P =$

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

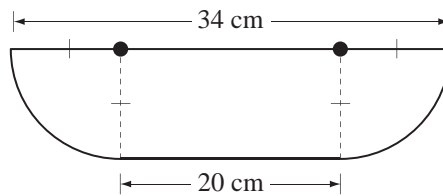


$C = 2\pi r$

$P =$

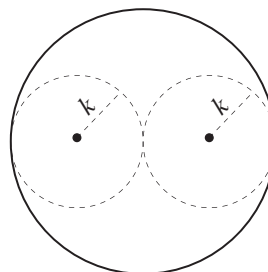
$=$ $=$ m

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



$=$ $=$ cm

- h)** Write an algebraic expression for the circumference P of the outer circle.
[Express the answer in terms of k and π .]



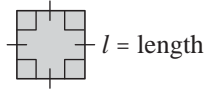
$P =$

Skill 23.5 Calculating the area of squares and rectangles.

MM5.2 1 2 2 3 3 4 4
MM6.1 1 1 2 2 3 3 4 4

- Substitute known values into the appropriate formula.

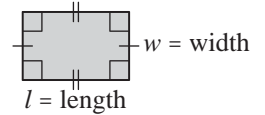
Area of a square



$$A = l \times l$$

$$= l^2$$

Area of a rectangle



$$A = l \times w$$

$$= lw$$

- Q.** A boxing ring is a square with side length 5.2 m. What is the area of the ring?

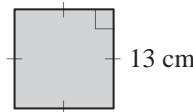
A. $A = l^2$
 $= 5.2 \times 5.2 \text{ m}$
 $= 27.04 \text{ m}^2$

- a)** What is the area of a rectangular billiard table with a length of 3.7 m and a width of 1.9 m?

$$A = l \times w$$

$$= 3.7 \times 1.9 = \boxed{\text{m}^2}$$

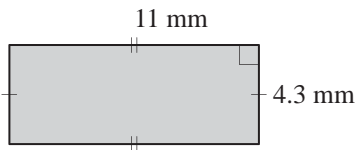
- b)** Find the area of the square.



$$A =$$

$$= \boxed{\text{cm}^2}$$

- c)** Find the area of the rectangle.



$$A =$$

$$= \boxed{\text{mm}^2}$$

- d)** A baseball diamond is a square of side length of approximately 27 m. What is its area?

$$A =$$

$$= \boxed{\text{m}^2}$$

- e)** The rectangular grounds of the Taj Mahal are 360 m long and 260 m wide. What is its area?

$$A = l \times w$$

$$= \boxed{\text{m}^2}$$

- f)** A rectangular badminton court measures approximately 13.5 m long and 6 m wide. What is its area?

$$A =$$

$$= \boxed{\text{m}^2}$$

- g)** What is the perimeter of a square with an area of 400 cm²?

$length =$

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

- h)** Paddy's rectangular iPod screen has an area of 720 mm². What is the perimeter of the screen, if the length measures 30 mm?

$width =$

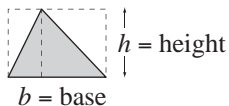
$$P = \boxed{\text{mm}}$$

Skill 23.6 Calculating the area of triangles.

MM5.2 1 1 2 2 3 3 4 4
MM6.1 1 1 2 2 3 3 4 4

- Substitute known values into the formula:

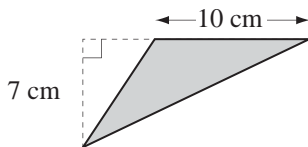
Area of a triangle



$$A = \frac{1}{2} \times b \times h$$

$$= \frac{1}{2} bh$$

- Q.** Find the area of the scalene triangle.



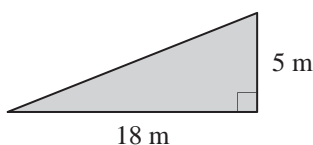
A. $A = \frac{1}{2}bh$

$$= \frac{1}{2} \times 10 \times 7$$

Simplify: $\div 2$

$$= 35 \text{ cm}^2$$

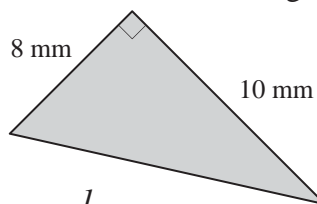
- a)** Find the area of the right-angled triangle.



$$A = \frac{1}{2}bh$$

$$= \frac{1}{2} \times 18 \times 5 = \boxed{\text{m}^2}$$

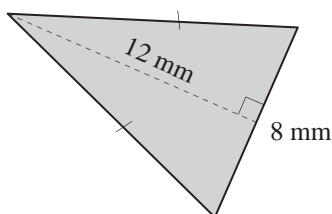
- b)** Find the area of the right-angled triangle.



$$A = \frac{1}{2}bh$$

$$= \quad = \boxed{\text{mm}^2}$$

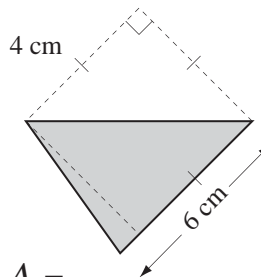
- c)** Find the area of the isosceles triangle.



$$A = \frac{1}{2}bh$$

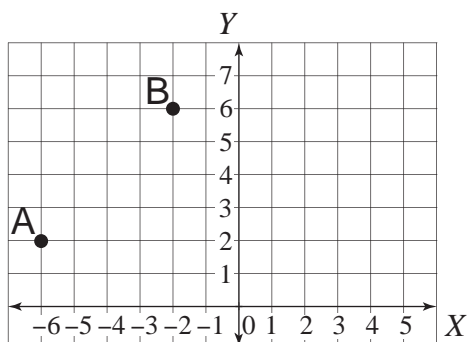
$$= \quad = \boxed{\text{mm}^2}$$

- d)** Find the area of the scalene triangle.

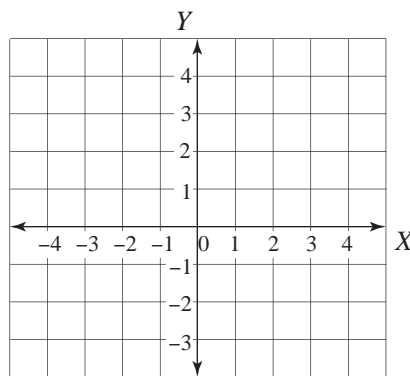


$$A = \quad = \quad = \boxed{\text{cm}^2}$$

- e)** Plot the points A(-6,2), B(-2,6) and C(5,2) and use them to find the area of ΔABC .



- f)** Plot the points A(-2,3), B(3,3) and C(-2,-3) and use them to find the area of ΔABC .

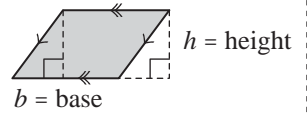


Skill 23.7 Calculating the area of parallelograms.

MM5.2 11 22 33 44
MM6.1 11 22 33 44

- Substitute known values into the formula.

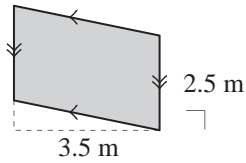
Area of a parallelogram



$$A = b \times h$$

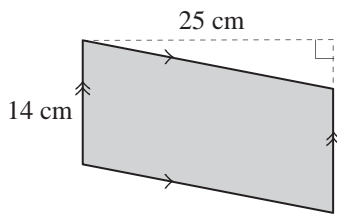
$$= bh$$

Q. Find the area of the parallelogram.



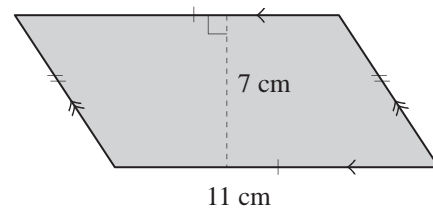
A. $A = bh$
 $= 2.5 \times 3.5 \text{ m}$
 $= 8.75 \text{ m}^2$

a) Find the area of the parallelogram.



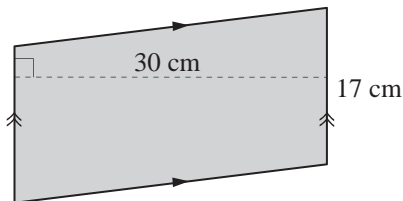
$A = bh$
 $= 14 \times 25 = \boxed{\text{cm}^2}$

b) Find the area of the parallelogram.



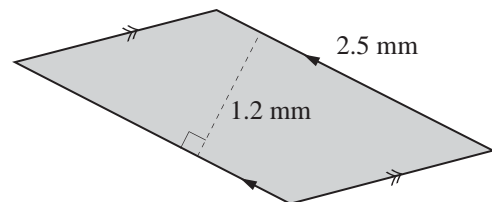
$A =$
 $= \boxed{\text{cm}^2}$

c) Find the area of the parallelogram.



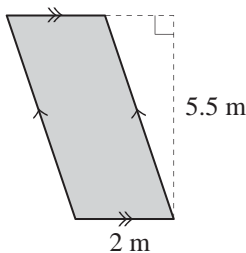
$A =$
 $= \boxed{\text{cm}^2}$

d) Find the area of the parallelogram.



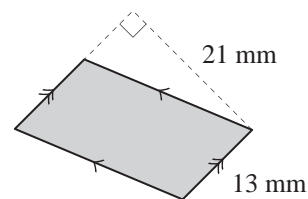
$A =$
 $= \boxed{\text{mm}^2}$

e) Find the area of the parallelogram.



$A =$
 $= \boxed{\text{m}^2}$

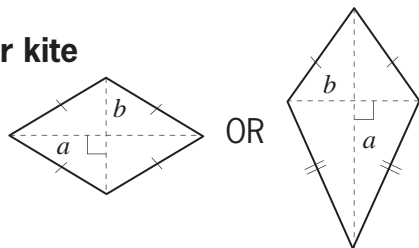
f) Find the area of the parallelogram.



$A =$
 $= \boxed{\text{mm}^2}$

- Substitute known values into the formula.

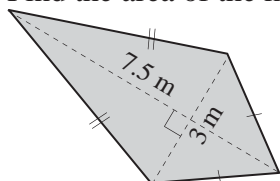
Area of a rhombus or kite



$$A = \frac{1}{2} \times a \times b \quad (\text{where } a \text{ is the long diagonal and } b \text{ is the short diagonal})$$

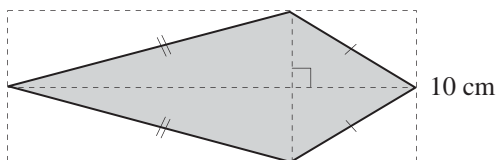
$$= \frac{1}{2} ab$$

Q. Find the area of the kite.



A. $A = \frac{1}{2} ab$
 $= \frac{1}{2} \times 7.5 \times 3$
 $= 11.25 \text{ m}^2$

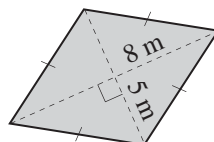
a) Find the area of the kite.



$$A = \frac{1}{2} ab$$

$$= \frac{1}{2} \times 27.5 \times 10 = \boxed{} \text{ cm}^2$$

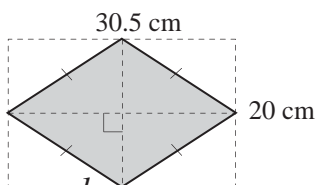
b) Find the area of the rhombus.



$$A = \frac{1}{2} ab$$

$$= = \boxed{} \text{ m}^2$$

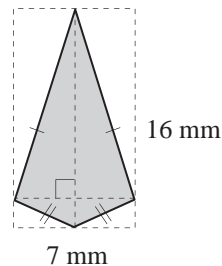
c) Find the area of the rhombus.



$$A = \frac{1}{2} ab$$

$$= = \boxed{} \text{ cm}^2$$

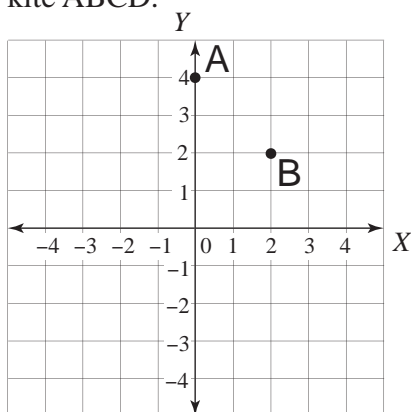
d) Find the area of the kite.



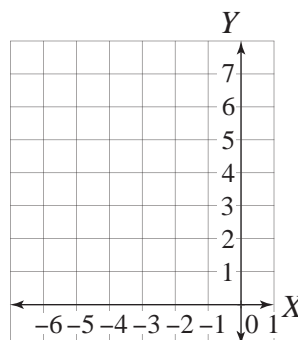
$$A = $$

$$= = \boxed{} \text{ mm}^2$$

e) Plot the points A(0,4), B(2,2), C(0,-3) and D(-2,2) and use them to find the area of the kite ABCD.

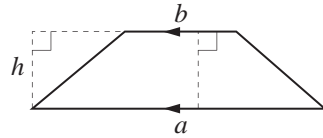


f) Plot the points A(-4,6), B(-2,3), C(-4,0) and D(-6,3) and use them to find the area of the rhombus ABCD.



- Substitute known values into the formula.

Area of a trapezium

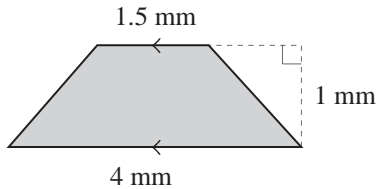


$$A = \frac{1}{2} \times (a + b) \times \text{height}$$

(where a and b are the parallel side lengths)

$$= \frac{1}{2} (a + b)h$$

Q. Find the area of the trapezium.



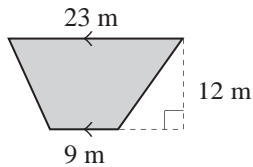
A. $A = \frac{1}{2}(a + b)h$

$$= \frac{1}{2} \times (4 + 1.5) \times 1$$

$$= \frac{1}{2} \times 5.5$$

$$= 2.75 \text{ mm}^2$$

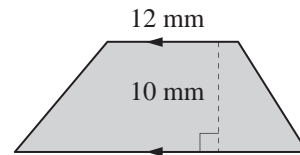
a) Find the area of the trapezium.



$$A = \frac{1}{2}(a + b)h = \frac{1}{2} \times (23 + 9) \times 12$$

$$= \frac{1}{2} \times 32 \times 12 = \boxed{\text{m}^2}$$

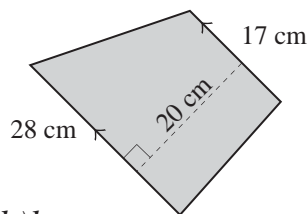
b) Find the area of the trapezium.



$$A = \frac{1}{2}(a + b)h =$$

$$= \boxed{\text{mm}^2}$$

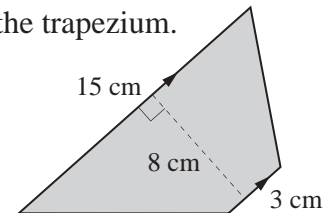
c) Find the area of the trapezium.



$$A = \frac{1}{2}(a + b)h =$$

$$= \boxed{\text{cm}^2}$$

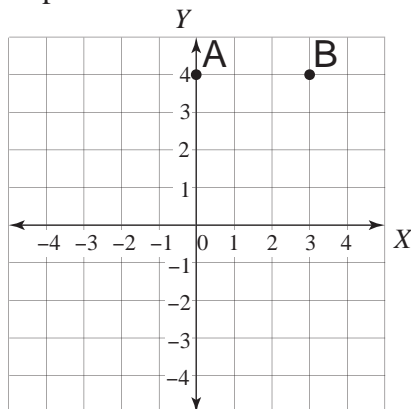
d) Find the area of the trapezium.



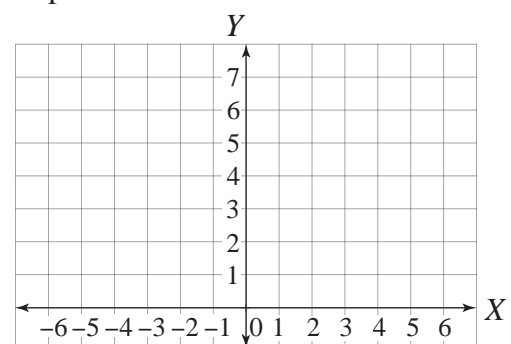
$$A =$$

$$= \boxed{\text{cm}^2}$$

e) Plot the points A(0,4), B(3,4), C(3,-2) and D(-4,-2) and use them to find the area of the trapezium ABCD.



f) Plot the points A(-4,5), B(4,6), C(4,1) and D(-4,4) and use them to find the area of the trapezium ABCD.

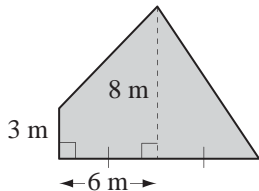


Skill 23.10 Calculating the area of composite shapes (1).

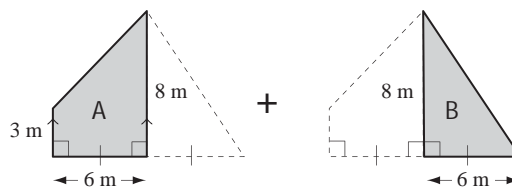
MM5.2 11 22 3 4 4
MM6.1 11 22 33 4

- Find and label the length of all sides.
- Break the shape into workable parts.
- Where possible substitute values into a known area formula.
(see skill 23.5, page 265 to skill 23.9, page 269)
- Add or subtract the area totals where necessary.

Q. Find the area of the polygon.



A.



$$\begin{aligned}
 A &= \frac{1}{2}(a + b)h \\
 &= \frac{1}{2} \times (3 + 8) \times 6 \\
 &= \frac{1}{2} \times 11 \times 6 = 33
 \end{aligned}$$

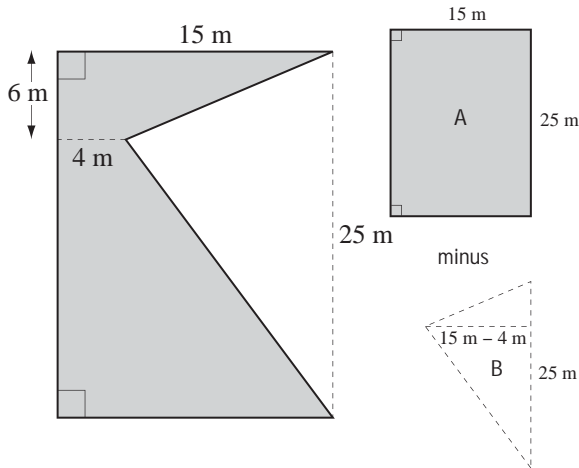
trapezium A

$$\begin{aligned}
 B &= \frac{1}{2}bh \\
 &= \frac{1}{2} \times 6 \times 8 \\
 &= \frac{1}{2} \times 48 = 24
 \end{aligned}$$

triangle B

$$\text{shape} = A + B = 33 + 24 = 57 \text{ m}^2$$

a) Find the area of the shape.



$$A = lw \quad (\text{a rectangle})$$

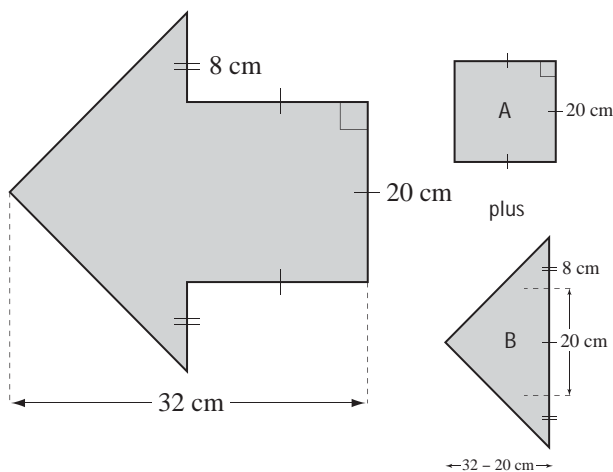
$$= 25 \times 15 = 375$$

$$B = \frac{1}{2}bh \quad (\text{a triangle})$$

$$= \frac{1}{2} \times 25 \times 11 = \frac{1}{2} \times 275 = 137.5$$

$$\text{shape} = 375 - 137.5 = \boxed{237.5 \text{ m}^2}$$

b) Find the area of the polygon.



$$A = l^2$$

$$=$$

$$B =$$

$$=$$

$$=$$

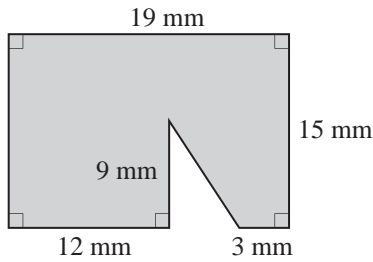
$$=$$

$$\text{shape} = \quad = \quad \boxed{\text{cm}^2}$$

Skill 23.10 Calculating the area of composite shapes (2).

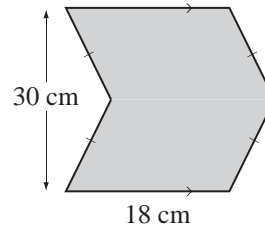
MM5.2 1 1 2 2 3 3 4 4
MM6.1 1 1 2 2 3 3 4 4

c) Find the area of the shape.



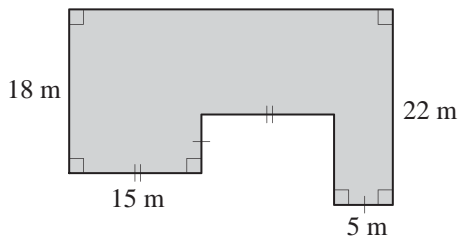
A =
.....
=
B =
.....
=
shape = =

d) Find the area of the polygon.



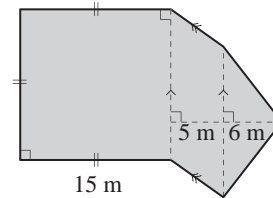
A =
.....
=
B =
.....
=
shape = =

e) Find the area of the shape.



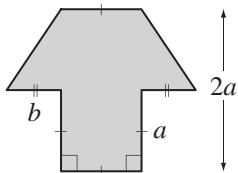
shape = =

f) Find the area of the polygon.



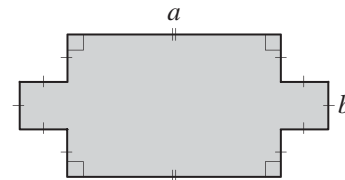
shape = =

g) Write an algebraic expression for the area *A* of the shape. [Express the answer in terms of *a* and *b*.]



A =

h) Write an algebraic expression for the area *A* of the shape. [Express the answer in terms of *a* and *b*.]



A =

Skill 23.11 Calculating the area of circles.

MM5.2 11 22 33 44
MM6.1 11 22 33 44

- Substitute known values into the formula:
*Hint: 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.*

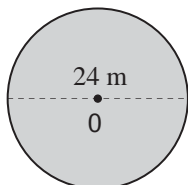
Area of a circle

$$A = \pi \times \text{radius} \times \text{radius}$$

$$A = \pi r^2$$

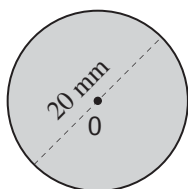
$$\text{where } \pi \approx 3.14\dots \text{ or } \frac{22}{7}$$

- Q.** Using $A = \pi r^2$ where $\pi \approx 3.14$, find the area of the circle.



- A.** $A = \pi r^2$ where $d = 24$, so $r = 12$
 $= 3.14 \times 12 \times 12$
 $= 3.14 \times 144$
 $= 452.16 \text{ m}^2$

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

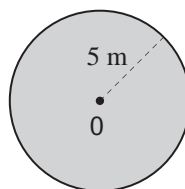


$$A = \pi r^2 \text{ where } d = 20 \text{ so } r = 10 \text{ mm}$$

$$= 3.14 \times 10 \times 10$$

$$= 3.14 \times 100 = \boxed{\text{mm}^2}$$

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

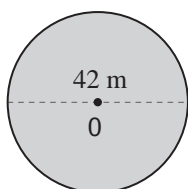


$$A = \pi r^2$$

$$=$$

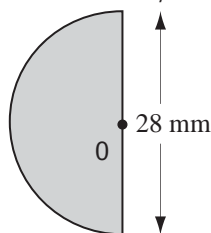
$$= \boxed{\text{m}^2}$$

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



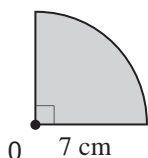
$$= \boxed{\text{m}^2}$$

- d)** Using $\pi \approx \frac{22}{7}$ find the area of the semicircle.



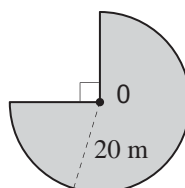
$$= \boxed{\text{mm}^2}$$

- e)** Using $\pi \approx \frac{22}{7}$ find the area of the quarter circle.



$$= \boxed{\text{cm}^2}$$

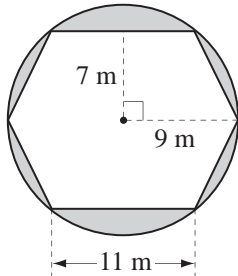
- f)** Using $\pi \approx 3.14$ find the area of the shape.



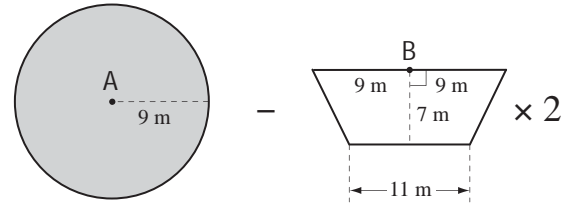
$$= \boxed{\text{m}^2}$$

- Find and label the length of all sides.
- Break the shape into workable parts.
- Where possible substitute values into a known area formula.
(see skills 23.5 to skill 23.9, pages 265 to 269 and skill 23.11, page 272)
- Add or subtract the area totals where necessary.

Q. Use $A = \pi r^2$ where $\pi \approx 3.14$, to find the area of the shaded shape.



A.



$$\begin{aligned}
 A &= \pi r^2 \text{ where } r = 9 \\
 &= 3.14 \times 9 \times 9 \\
 &= 3.14 \times 81 \\
 &= 254.34
 \end{aligned}$$

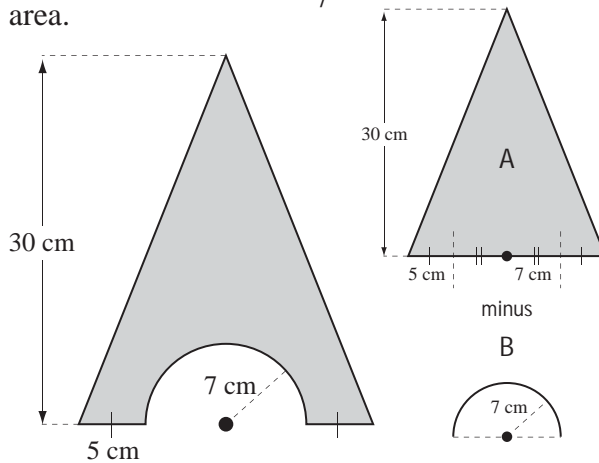
circle A

$$\begin{aligned}
 A &= \frac{1}{2}(a + b)h \\
 &= \frac{1}{2} \times (9 + 11) \times 7 = \frac{1}{2} \times 203 \\
 B &= \frac{1}{2} \times 203 \times 2 = 203
 \end{aligned}$$

trapezium $\times 2$ B

$$\text{shape} = A - B = 254.34 - 203 = 51.34 \text{ m}^2$$

a) Use $A = \pi r^2$ where $\pi \approx \frac{22}{7}$, to find the shaded area.



$$A = \frac{1}{2}bh \quad (\text{a triangle})$$

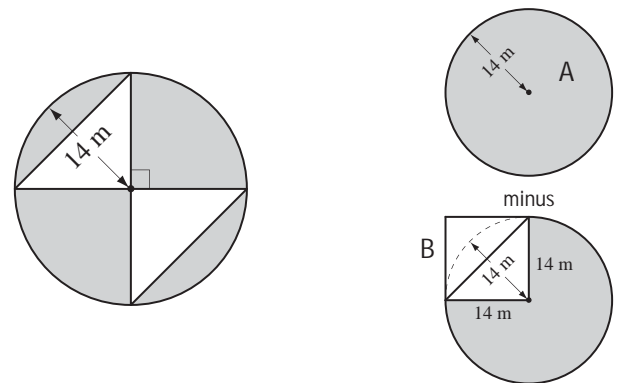
$$= \frac{1}{2} \times (5 + 7 + 7 + 5) \times 30 = 360$$

$$B = \frac{1}{2}\pi r^2, r = 7 \quad (\text{a semicircle})$$

$$= \frac{1}{2} \times \frac{22}{7} \times 7 \times 7 = 11 \times 7 = 77$$

$$\text{shape} = 360 - 77 = \boxed{} \text{ cm}^2$$

b) Use $A = \pi r^2$ where $\pi \approx \frac{22}{7}$, to find the shaded area.



$$A = \pi r^2, r = 14 \quad (\text{a circle})$$

$$= = $$

$$B = l^2 \quad (\text{a square})$$

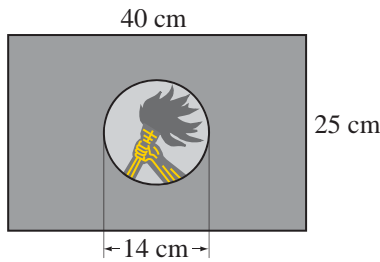
$$= = $$

$$\text{shape} = = \boxed{} \text{ m}^2$$

Skill 23.12 Calculating the area of composite circular shapes (2).

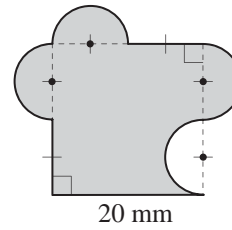
MM5.2 1 1 2 2 3 3 4
MM6.1 1 1 2 2 3 4

- c)** Use $A = \pi r^2$ where $\pi \approx \frac{22}{7}$, to find the area of the background colour of the flag of Zaire, without the central circle.



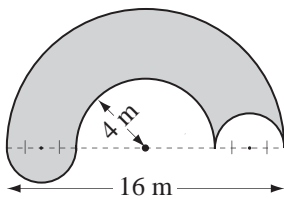
=
.....
=
.....
=
.....
=
.....
shape = =

- d)** Use $A = \pi r^2$ where $\pi \approx 3.14$, to find the area of the shaded shape.



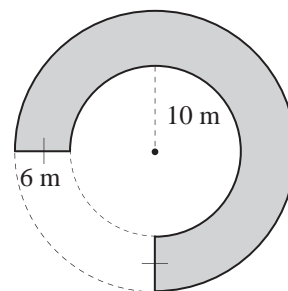
=
.....
=
.....
=
.....
=
.....
shape = =

- e)** Use $A = \pi r^2$ where $\pi \approx 3.14$, to find the area of the shaded shape.



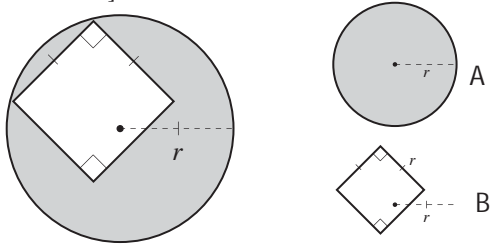
=
.....
=
.....
=
.....
=
.....
shape = =

- f)** Use $A = \pi r^2$ where $\pi \approx 3.14$, to find the area of the shaded shape.



=
.....
=
.....
=
.....
=
.....
shape = =

g) Write an algebraic expression for the area A of the shaded shape. [Express the answer in terms of r and π .]



$A = \pi r^2$ (a circle)

$B = l^2$ (a square)

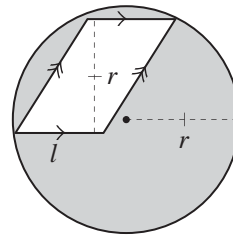
$= r^2$

OR $r^2(\pi - 1)$

shape = $A - B$

$A = \pi r^2 - r^2$

h) Write an algebraic expression for the area A of the shaded shape. [Express the answer in terms of r , l and π .]



$A = \pi r^2$

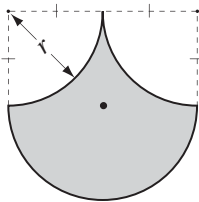
$B =$

$=$

shape =

$A =$

i) Write an algebraic expression for the area A of the shaded shape. [Express the answer in terms of r and π .]



$=$

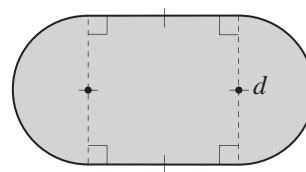
$=$

$=$

shape =

$A =$

j) Write an algebraic expression for the area A of the shaded shape. [Express the answer in terms of d and π .]



$=$

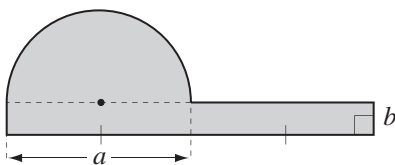
$=$

$=$

shape =

$A =$

k) Write an algebraic expression for the area A of the shaded shape. [Express the answer in terms of a , b and π .]



$A_{\text{rectangle}} =$

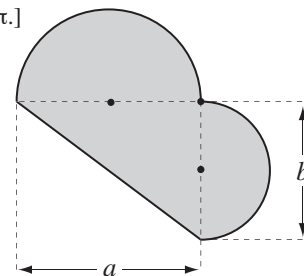
$A_{\text{semicircle}} =$

$=$

shape =

$A =$

l) Write an algebraic expression for the area A of the shaded shape. [Express the answer in terms of a , b and π .]



$A_{\text{triangle}} =$

$A_{\text{semicircle 1}} =$

$A_{\text{semicircle 2}} =$

shape =

$A =$

