

26. [Perimeter / Area]

continues on page 269

Skill 26.1 Calculating the perimeter of polygons (1).

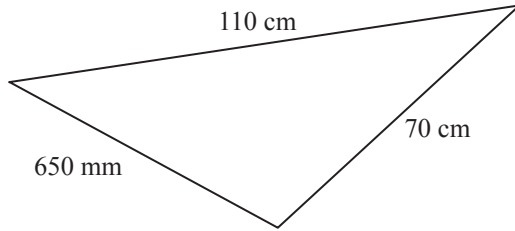
MM9 1 2 3 4 4
MM10 1 2 3 3 4 4

- 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.

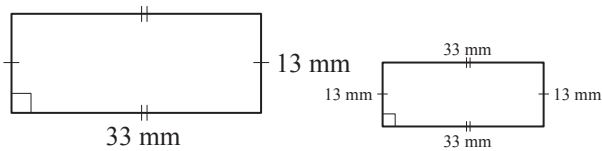


- A.** $650 \text{ mm} = 650 \div 10 \text{ cm} = 65 \text{ cm}$ Convert mm to cm

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

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

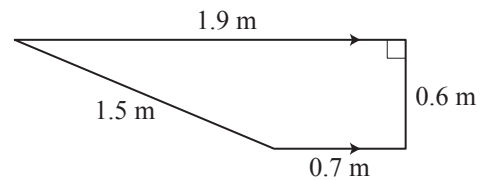
- a)** Find the perimeter of the rectangle.



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

$$= 66 + 26 = \boxed{92 \text{ mm}}$$

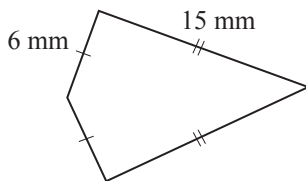
- b)** Find the perimeter of the trapezium.



$$P = 1.5 +$$

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

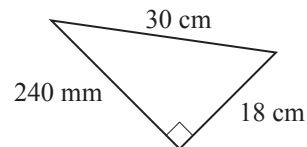
- c)** Find the perimeter of the kite.



$$P =$$

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

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



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

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

$$P =$$

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

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

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

Skill 26.1 Calculating the perimeter of polygons (2).

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

.....
 $P =$ = m

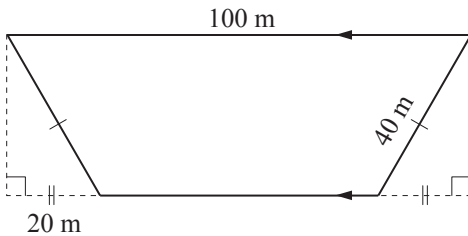
- i)** The smallest ever postage stamp came from Columbia. Rectangular, it measured 7.85 mm by 9.4 mm. What was its perimeter in cm?

.....
 $P =$
 = = cm

- 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?

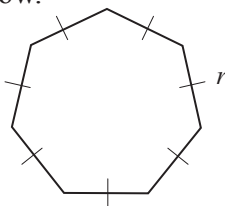
.....
 $P =$
 = = m

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



.....
 $P =$
 = = m

- o)** Write a formula for the perimeter P of the heptagon below.



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

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

.....
 $P =$ = cm

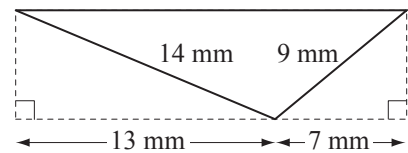
- j)** An Australian \$20 note measures 14.4 cm by 6.5 cm. What is its perimeter in millimetres?

.....
 $P =$
 = = mm

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

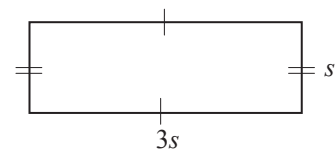
.....
 $P =$ = cm

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



.....
 $P =$
 = = mm

- p)** Write a formula for the perimeter P of the rectangle below.



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

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

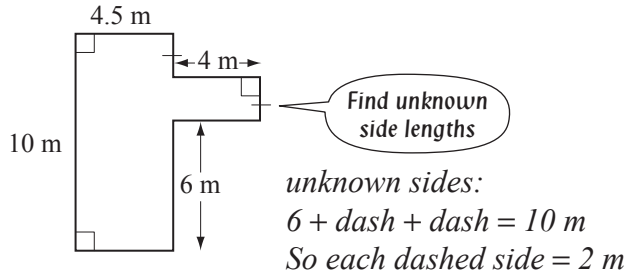
Hints: Sides marked with a dash (|) are of equal length.

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.

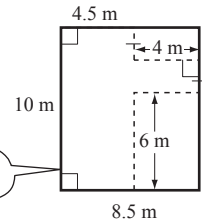


A. $P = 10 + 4.5 + 2 + 4 + 2 + 4 + 6 + 4.5$
 $= 14.5 + 8 + 10 + 4.5$
 $= 37 \text{ m}$

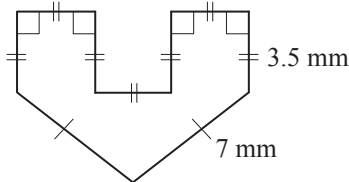
OR

$P = 10 + 10 + 8.5 + 8.5$
 $= 20 + 17$
 $= 37 \text{ m}$

shape becomes a rectangle

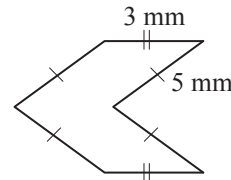


a) Find the perimeter of the shape.



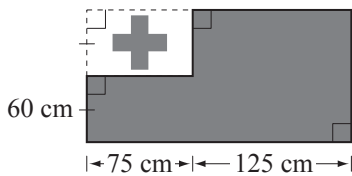
$P = 3.5 + 7 + 7 + 3.5 + 3.5 + 3.5 + 3.5 + 3.5 + 3.5$
 $= 14 + 24.5 = 38.5 \text{ mm}$

b) Find the perimeter of the shape.



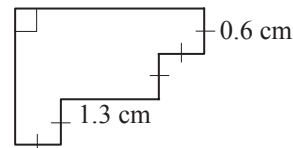
$P =$
 $=$ mm

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



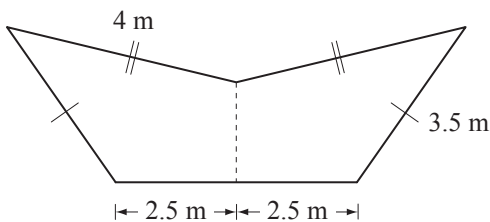
$P =$
 $=$ cm

d) Find the perimeter of the shape.



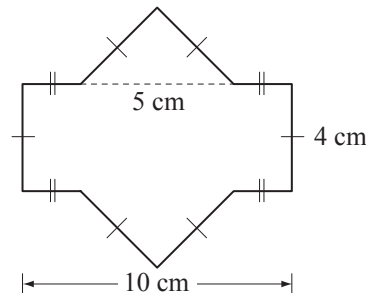
$P =$
 $=$ cm

e) Find the perimeter of the shape.



$P =$
 $=$ m

f) Find the perimeter of the shape.



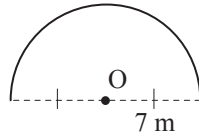
$P =$
 $=$ cm

Skill 26.3 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.

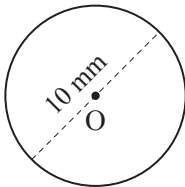
Circumference = $2 \times \pi \times \text{radius}$
 $C = 2\pi r$
 OR $C = \pi \times \text{diameter}$
 $C = \pi d$
 where $\pi \approx 3.14\dots$ or $\frac{22}{7}$

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



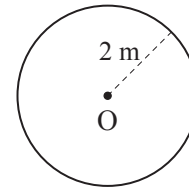
A. $C = 2\pi r$
 $= 2 \times \frac{22}{7} \times 7$ *Simplify: $\div 7$*
 $= 44$
 $\frac{1}{2} C = \frac{1}{2} \times 44 = 22 \text{ m}$

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



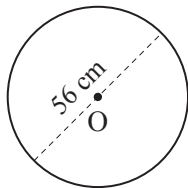
$C = \pi d$ where $d = 10$
 $= 10 \times 3.14 = \boxed{} \text{ mm}$

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



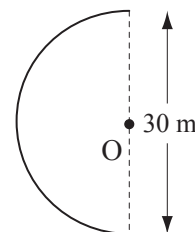
$C = 2\pi r$
 $= = \boxed{} \text{ m}$

- 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.

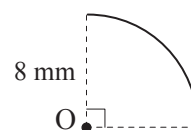


$C = $
 $\frac{1}{2} C = = \boxed{} \text{ m}$

- 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 26.4 Calculating the perimeter of composite circular shapes (1).

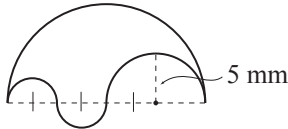
MM9 11 22 33 44
MM10 11 22 33 44

- 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.

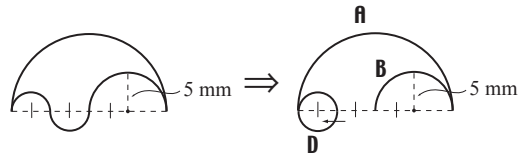
$$C = 2\pi r = \pi d$$

*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.



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

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

$$A = 62.8 \div 2 = 31.4$$

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

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

$$B = 31.4 \div 2 = 15.7$$

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

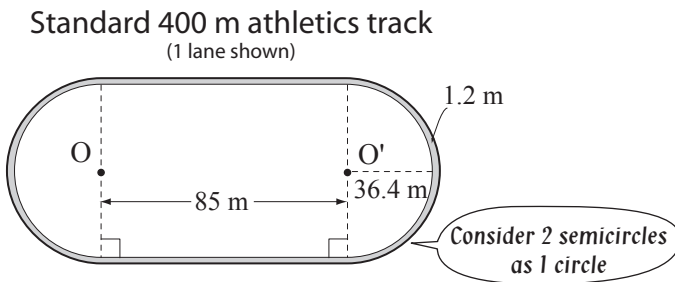
$$D = 3.14 \times 5 = 15.7$$

semicircle A
semicircle B
circle D

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

$$= 62.8 \text{ mm}$$

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.



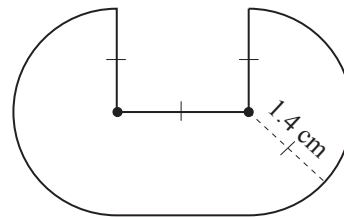
$$C = 2\pi r \text{ where } r = 36.4 + 1.2 = 37.6$$

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

$$85 + 85 = 170$$

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

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

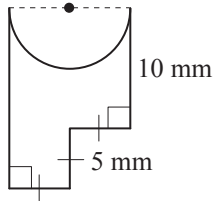


$$C = 2\pi r$$

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

Skill 26.4 Calculating the perimeter of composite circular shapes (2).

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



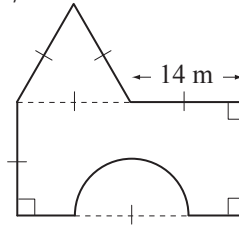
$C = 2\pi r$ where $r =$

$C =$

$P =$

$=$ $=$ mm

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



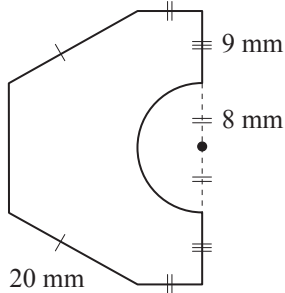
$C = 2\pi r$

$C =$

$P =$

$=$ $=$ m

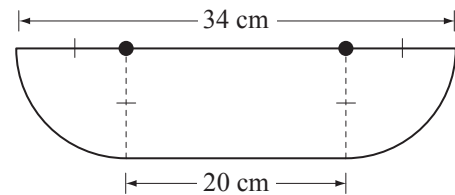
- e) Using $C = 2\pi r$ where $\pi \approx 3.14$, find the perimeter of this composite shape.



$P =$

$=$ $=$ mm

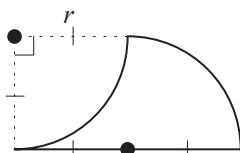
- f) Find the perimeter of the shape.
(Use $\pi \approx \frac{22}{7}$)



$P =$

$=$ $=$ cm

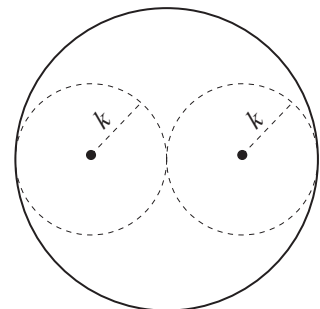
- g) Write a formula for the perimeter P of the shape.



$P =$

$P =$

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

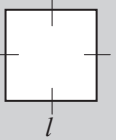


$P =$

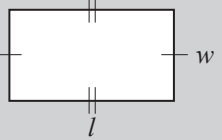
$P =$

- Substitute known values into the appropriate formula.

Area of a square = length \times length
 $A = l^2$



Area of a rectangle = length \times width
 $A = lw$



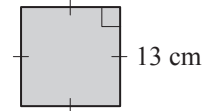
Q. A boxing ring is a square with side length 5.2 m. What is the area of the ring?

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?

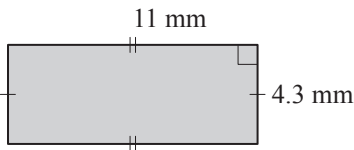
$A = l \times w$
 $= 3.7 \times 1.9 = 7.03 \text{ m}^2$

b) Find the area of the square.



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

c) Find the area of the rectangle.



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

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

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

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

$A = l \times w$
 $= = \text{m}^2$

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

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

g) The sport of fencing uses a rectangular space with an area of 28 m^2 . What is the perimeter of this space if the length measures 14 m?

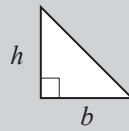
$w = A \div l = 28 \div 14 = 2 \text{ m}$
 $P = 14 + 14 + 2 + 2 = \text{m}$

h) Paddy's rectangular iPod screen has an area of 720 mm^2 . What is the perimeter of the screen, if the length measures 30 mm?

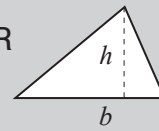
$w =$
 $P = = \text{mm}$

- Substitute known values into the formula.

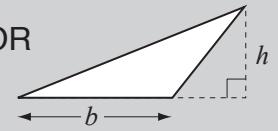
Area of a triangle = $\frac{1}{2} \times \text{base} \times \text{height}$
 $A = \frac{1}{2}bh$



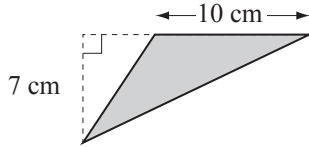
OR



OR

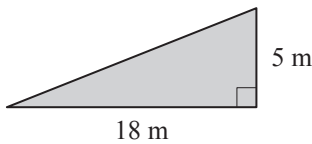


- Q.** Find the area of the scalene triangle.



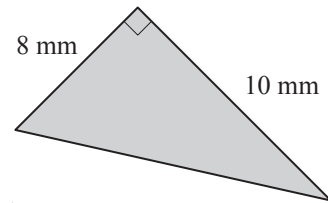
A. $A = \frac{1}{2}bh$
 $= \frac{1}{2} \times 10 \times 7$ *Simplify: $\div 2$*
 $= 35 \text{ cm}^2$

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



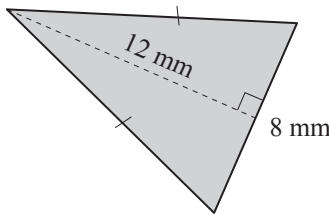
$A = \frac{1}{2}bh$
 $= \frac{1}{2} \times 18 \times 5 = \boxed{} \text{ m}^2$

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



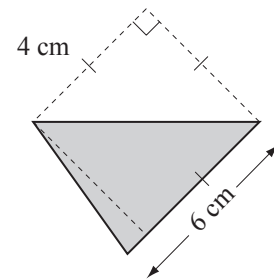
$A = \frac{1}{2}bh$
 $= = \boxed{} \text{ mm}^2$

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



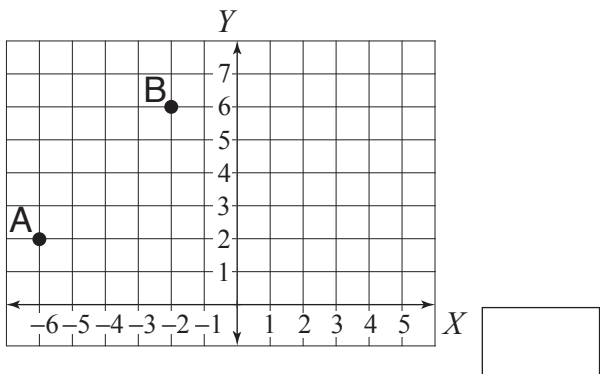
$A = \frac{1}{2}bh$
 $= = \boxed{} \text{ mm}^2$

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

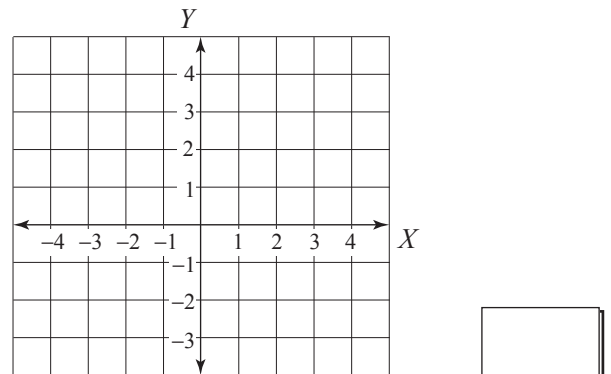


$A = $
 $= = \boxed{} \text{ cm}^2$

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



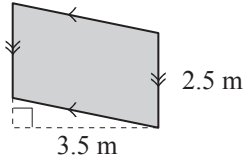
- f)** Plot the points A(-2,3), B(3,3) and C(-2,-3) and use them to find the area of ΔABC .



- Substitute known values into the formula.

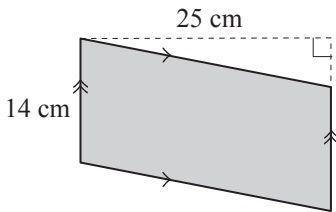
Area of a parallelogram = base \times height
 $A = bh$

Q. Find the area of the parallelogram.



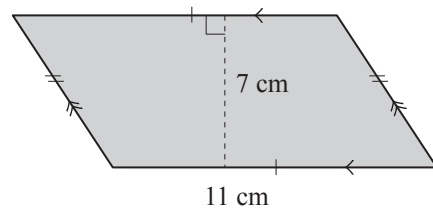
A. $A = bh$
 $= 2.5 \times 3.5 \text{ m}$
 $= 8.75 \text{ m}^2$

a) Find the area of the parallelogram.



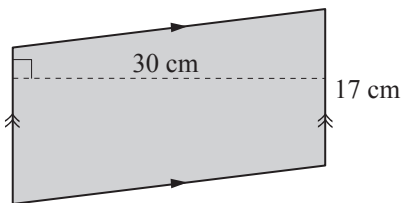
$A = bh$
 $= 14 \times 25 = \boxed{\text{cm}^2}$

b) Find the area of the parallelogram.



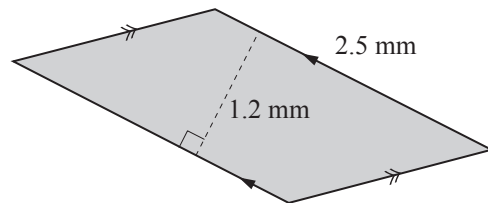
$A =$
 $= \quad = \boxed{\text{cm}^2}$

c) Find the area of the parallelogram.



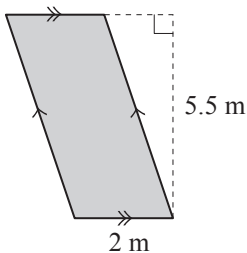
$A =$
 $= \quad = \boxed{\text{cm}^2}$

d) Find the area of the parallelogram.



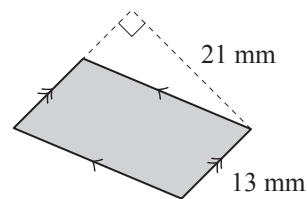
$A =$
 $= \quad = \boxed{\text{mm}^2}$

e) Find the area of the parallelogram.



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

f) Find the area of the parallelogram.

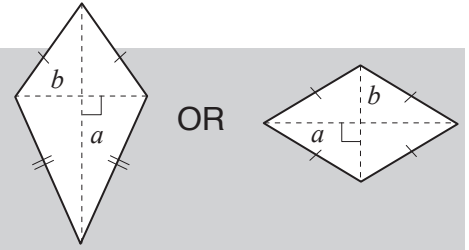


$A =$
 $= \quad = \boxed{\text{mm}^2}$

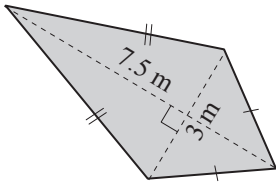
- Substitute known values into the formula.

Area of a kite or rhombus = $\frac{1}{2} \times a \times b$ (where a is the long diagonal and b is the short diagonal)

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

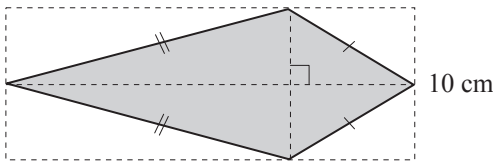


Q. Find the area of the kite.



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

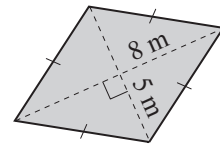
a) Find the area of the kite.



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

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

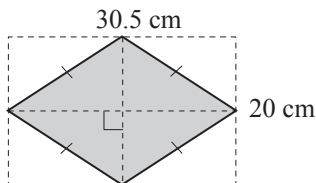
b) Find the area of the rhombus.



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

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

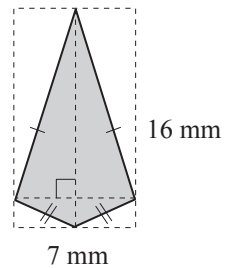
c) Find the area of the rhombus.



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

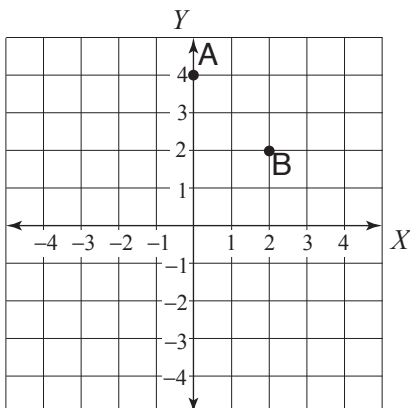
$$= \quad = \boxed{\text{cm}^2}$$

d) Find the area of the kite.

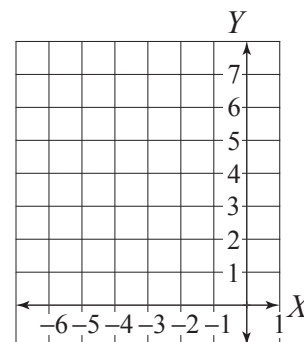


$$A = \quad = \quad = \boxed{\text{mm}^2}$$

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.



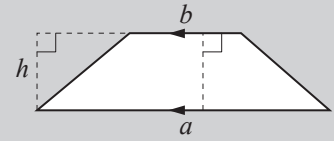
f) Plot the points A(-4,6), B(-2,3), C(-4,0) and D(-6,3) and use them to find the area of the rhombus ABCD.



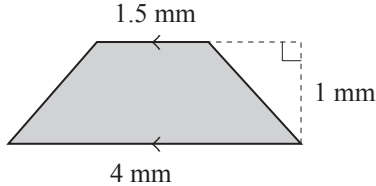
- Substitute known values into the formula.

Area of a trapezium = $\frac{1}{2} \times (a + b) \times \text{height}$ (where a and b are the parallel side lengths)

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

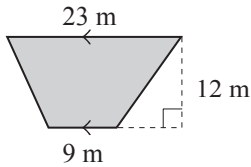


Q. Find the area of the trapezium.



A. $A = \frac{1}{2}(a + b)h$
 $= \frac{1}{2} \times (4 + 1.5) \times 1$
 $= \frac{1}{2} \times 5.5$
 $= 2.75 \text{ mm}^2$

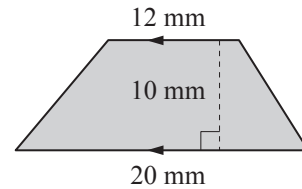
a) Find the area of the trapezium.



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

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

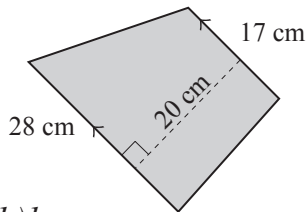
b) Find the area of the trapezium.



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

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

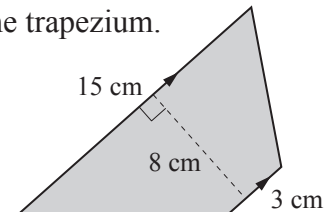
c) Find the area of the trapezium.



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

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

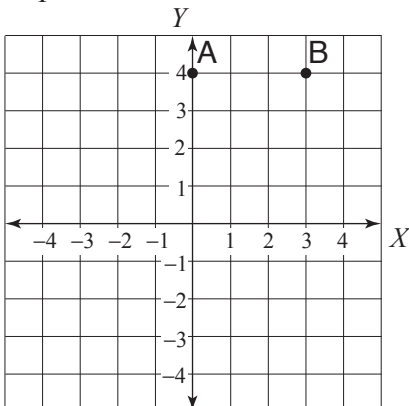
d) Find the area of the trapezium.



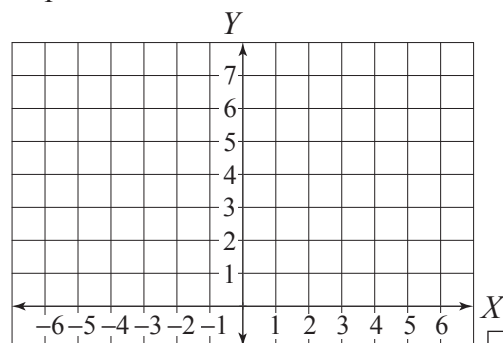
$$A = =$$

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

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.



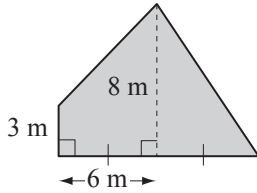
f) Plot the points A(-4,5), B(4,6), C(4,1) and D(-4,4) and use them to find the area of the trapezium ABCD.



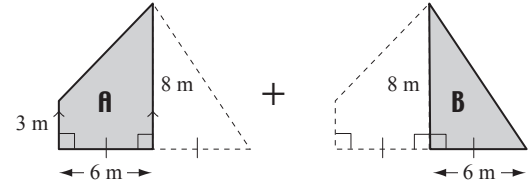
Skill 26.10 Calculating the area of composite shapes (1).

- 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 26.5, page 274 to skill 26.9, page 278)
- Add or subtract the area totals where necessary.

Q. Find the area of the plane figure.



A.



$$A_1 = \frac{1}{2}(a + b)h$$

$$= \frac{1}{2} \times (3 + 8) \times 6$$

$$\mathbf{A} = \frac{1}{2} \times 11 \times 6 = \mathbf{33}$$

trapezium A

$$A_2 = \frac{1}{2}bh$$

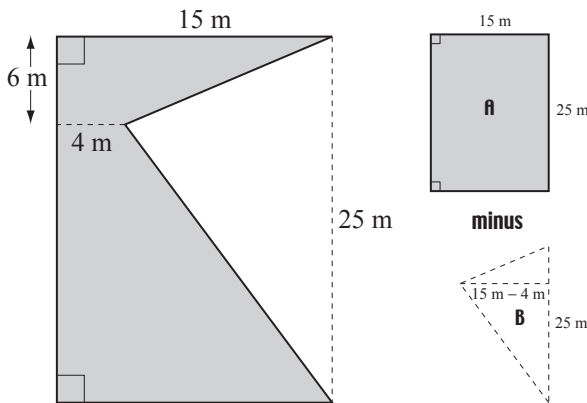
$$= \frac{1}{2} \times 6 \times 8$$

$$\mathbf{B} = \frac{1}{2} \times 48 = \mathbf{24}$$

triangle B

shape = 33 + 24 = **57 m²**

a) Find the area of the shape.



$A_1 = lw$ (for rectangular area **A**)

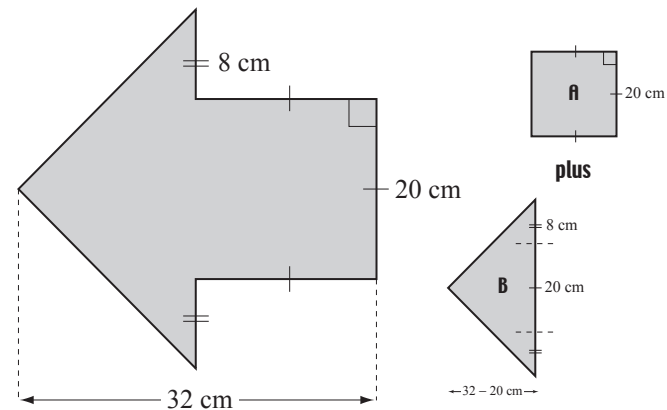
$= 25 \times 15 = \mathbf{375}$

$A_2 = \frac{1}{2}bh$ (for triangular area **B**)

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

shape = 375 - 137.5 = **237.5 m²**

b) Find the area of the plane figure.



$A_1 = l^2$ (for square area **A**)

=

$A_2 = \frac{1}{2}bh$ (for triangular area **B**)

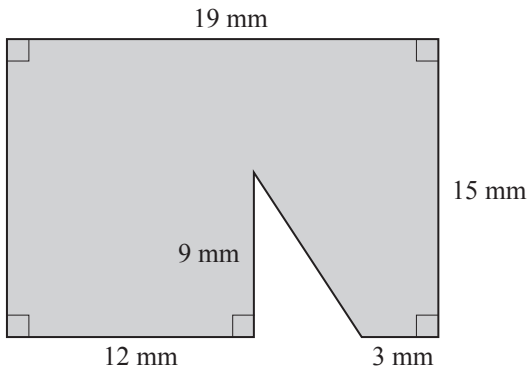
= = =

shape = = **cm²**

Skill 26.10 Calculating the area of composite shapes (2).

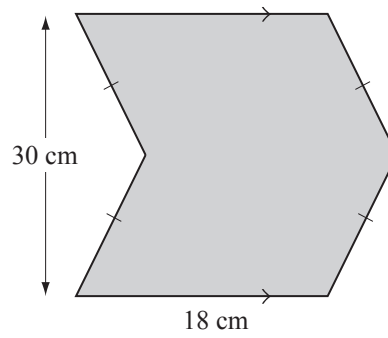
MM9 1 1 2 2 3 3 4 4
MM10 1 1 2 2 3 3 4 4

c) Find the area of the shaded shape.



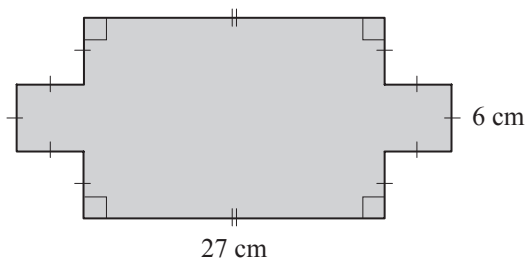
$A_1 =$
.....
=
 $A_2 =$
.....
=
shape = = mm^2

d) Find the area of the plane figure.



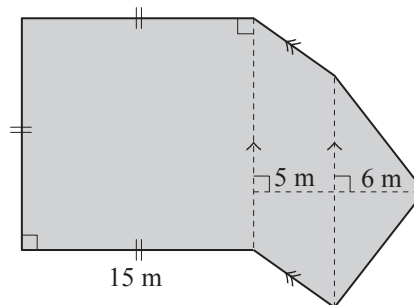
$A_1 =$
.....
=
=
shape = = cm^2

e) Find the area of the shape.



.....
.....
.....
shape = = cm^2

f) Find the area of the plane figure.

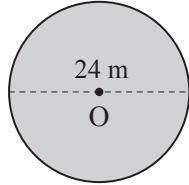


.....
.....
.....
shape = = m^2

- 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.

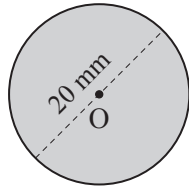
Area of a circle = $\pi \times \text{radius} \times \text{radius}$
 $A = \pi r^2$
 where $\pi \approx 3.14\dots$ or $\frac{22}{7}$

- 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.

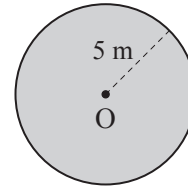


$A = \pi r^2$ where $d = 20$ so $r = 10 \text{ mm}$

$= 3.14 \times 10 \times 10$

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

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

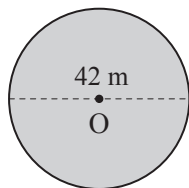


$A = \pi r^2$

$=$

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

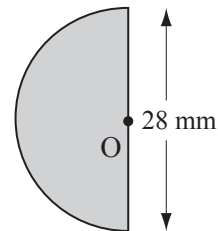
- c)** Using $A = \pi r^2$ where $\pi \approx \frac{22}{7}$, find the area of the circle.



$A = \pi r^2$

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

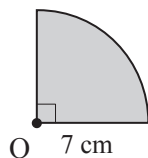
- d)** Using $\pi \approx \frac{22}{7}$, find the area of the semicircle.



$A = \pi r^2$

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

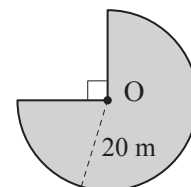
- e)** Using $\pi \approx \frac{22}{7}$, find the area of the quarter circle.



$A = \pi r^2$

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

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



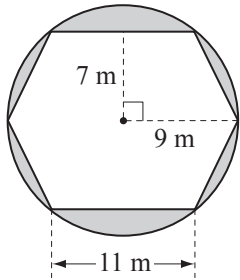
$A = \pi r^2$

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

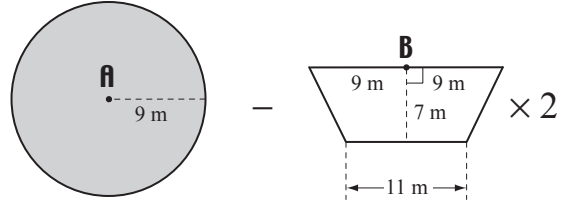
Skill 26.12 Calculating the area of composite circular shapes (1).

- 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 26.5, page 274 to skill 26.9, page 278 and 26.11, page 281)
- 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.



$$A_1 = \pi r^2 \text{ where } r = 9$$

$$= 3.14 \times 9 \times 9$$

$$= 3.14 \times 81$$

$$\mathbf{A} = 254.34$$

circle A

$$A_2 = \frac{1}{2}(a + b)h$$

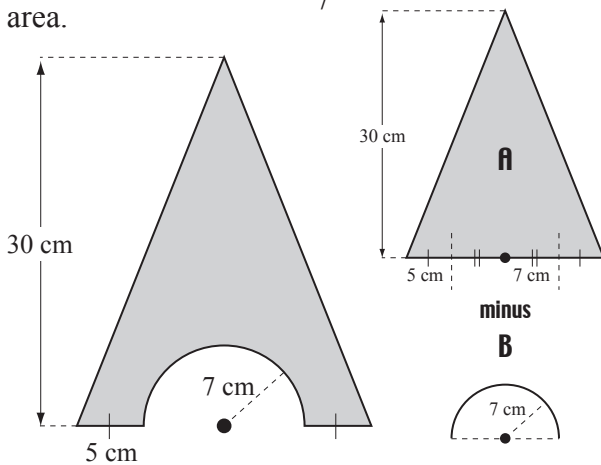
$$= \frac{1}{2} \times (18 + 11) \times 7 = \frac{1}{2} \times 203$$

$$\mathbf{B} = \frac{1}{2} \times 203 \times 2 = 203$$

trapezium $\times 2$ B

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

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



$$A_1 = \frac{1}{2}bh \quad (\text{for triangular area } \mathbf{A})$$

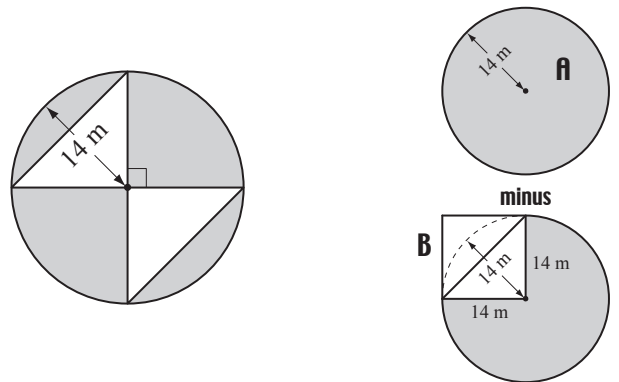
$$= \frac{1}{2} \times (5 + 7 + 7 + 5) \times 30 = 360$$

$$A_2 = \frac{1}{2}\pi r^2, r = 7 \text{ (for semicircular area } \mathbf{B})$$

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

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

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



$$A_1 = \pi r^2, r = 14 \text{ (for circular area } \mathbf{A})$$

$$= \quad =$$

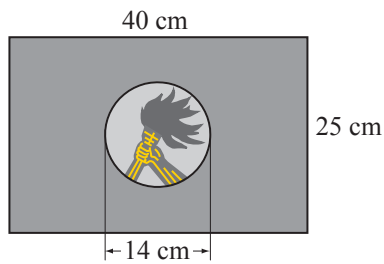
$$A_2 = l^2 \quad (\text{for square area } \mathbf{B})$$

$$= \quad =$$

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

Skill 26.12 Calculating the area of composite circular shapes (2).

- 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.



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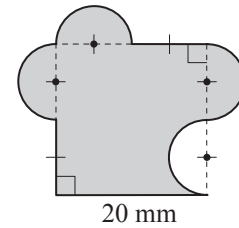
.....

shape =

.....

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



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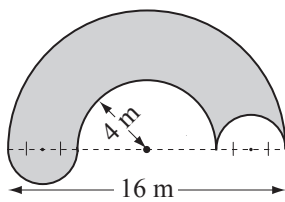
.....

shape =

.....

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



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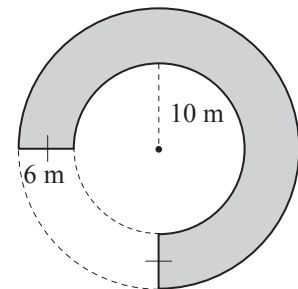
.....

shape =

.....

=

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



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.....

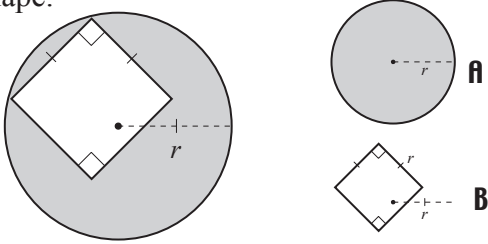
shape =

.....

=

Skill 26.12 Calculating the area of composite circular shapes (3).

g) Write a formula for the area A of the shaded shape.



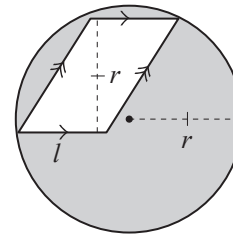
$A_1 = \pi r^2$ (for circular area **A**)

$A_2 = l^2$ (for square area **B**)

$= r^2$

shape = **A - B** $A = \pi r^2 - l^2$
OR $r^2(\pi - 1)$

h) Write a formula for the area A of the shaded shape.



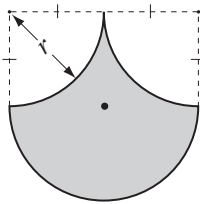
$A_1 = \pi r^2$ (for circular area)

$A_2 =$

$=$

shape = $A =$

i) Write a formula for the area A of the shaded shape.



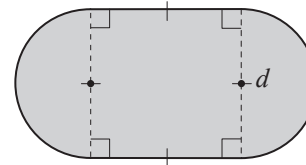
$=$

$=$

$=$

shape = $A =$

j) Write a formula for the area A of the shaded shape.



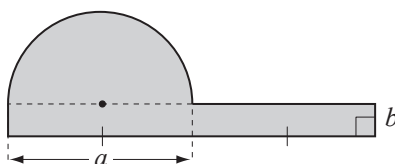
$=$

$=$

$=$

shape = $A =$

k) Write a formula for the area A of the shaded shape.



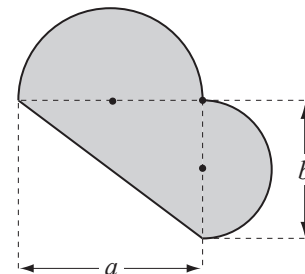
$A_{rectangle} =$

$A_{semicircle} =$

$=$

shape = $A =$

l) Write a formula for the area A of the shaded shape.



$A_{triangle} =$

$A_{semicircle 1} =$

$A_{semicircle 2} =$

shape = $A =$