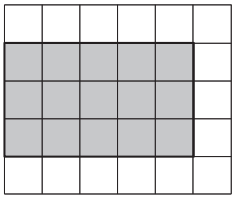
30. [Area]

Skill 30.1 Finding the area of a rectangle or a triangle on a square grid.

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

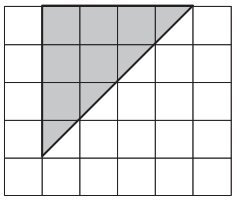
Q. Find the area of the shaded rectangle.



A. ***15 sq. units***

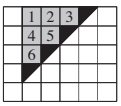
Count the number of shaded squares.
OR
You will notice that there are 5 shaded squares across the length (l) and 3 rows of shaded squares along the width (w).
$5 \times 3 = 15$
Area of a rectangle = length × width

Q. Find the area of the shaded triangle.

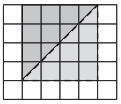


A. ***8 sq. units***

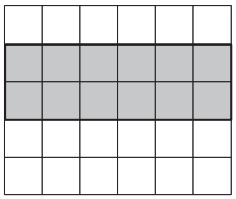
First count the number of fully shaded squares.
There are 6 fully shaded squares.
Then include the 4 half shaded squares, making 2 more fully shaded squares.
$6 + 2 = 8$



OR
Consider the triangle doubled to form a square of 16 shaded square units.
The area of the triangle would account for half that of the square.

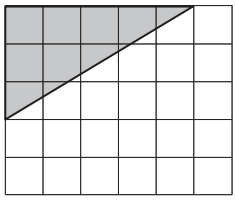


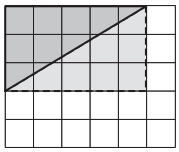
a) Find the area of the shaded rectangle.



12 sq. units

b) Find the area of the shaded triangle.

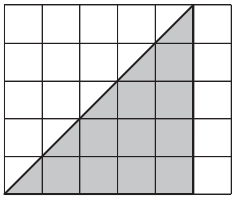




Area rectangle = 5 × 3 = 15
Area triangle = 15 ÷ 2 = 7.5

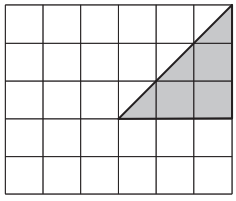
..... sq. units

c) Find the area of the shaded triangle.



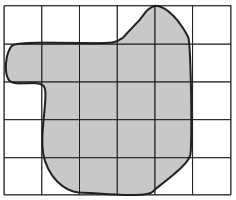
..... sq. units

d) Find the area of the shaded triangle.



..... sq. units

Q. Find the area of this irregular shape.
[Round off to the nearest whole number.]

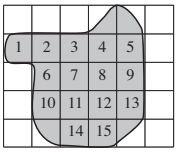


A. *17 sq. units*

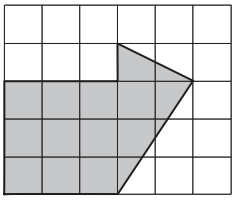
First count the number of squares that are approximately fully shaded.
There are 15 fully shaded squares.

There are 4 approximately half shaded squares, so add 2 more fully shaded squares to the total.

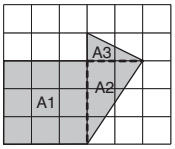
15 + 2 = 17 sq. units



Q. Find the area of this irregular shape.
[Round off to the nearest whole number.]

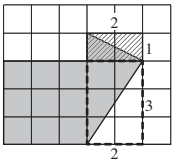


A. *13 sq. units*



Divide the shaded area into a square and two right-angled triangles. Calculate the area of each shape.

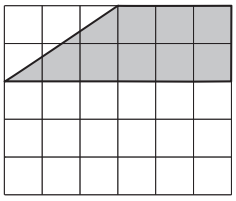
Count the squares in A1:
A1 = 9 sq. units
The area of the triangle A2 is half of the dashed rectangle of 6 sq. units:
A2 = 3 sq. units

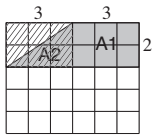


The area of the triangle A3 is half of the striped rectangle of 2 sq. units:
A3 = 1 sq. unit

Total area of shape $= A1 + A2 + A3$
$= 9 + 3 + 1$
$= 13$ *sq. units*

a) Find the area of this irregular shape.

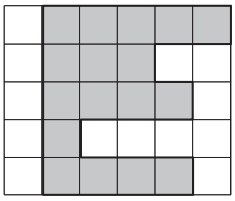




$A1 = 6$
$A2 = \frac{1}{2} \times 6 = 3$
$A1 + A2 = 6 + 3 = 9$

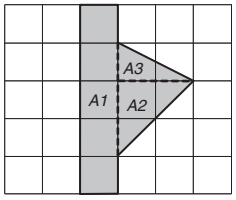
9 sq. units

b) Find the area of this irregular shape.



..... sq. units

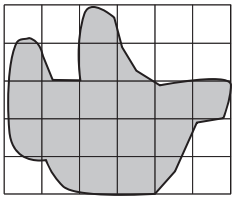
c) Find the area of this irregular shape.
[Round off to the nearest whole number.]



$A1 =$
$A2 =$
$A3 =$
$A1 + A2 + A3 =$

..... sq. units

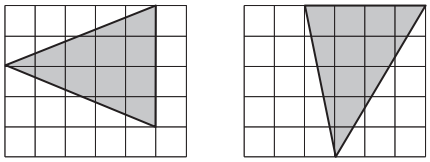
d) Find the area of this irregular shape.
[Round off to the nearest whole number.]



..... sq. units

Skill 30.3 Comparing the area of shapes on a square grid.

Q. Do these triangles have the same area?



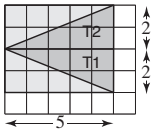
A. *Yes*

Divide the first triangle into two right triangles.
Calculate the area of each triangle by halving the area of the rectangle enclosing it and adding them together.

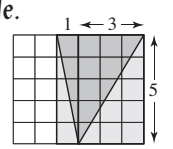
Area of T1 $= \frac{1}{2}(5 \times 2) = 5$

Area of T2 $= \frac{1}{2}(5 \times 2) = 5$

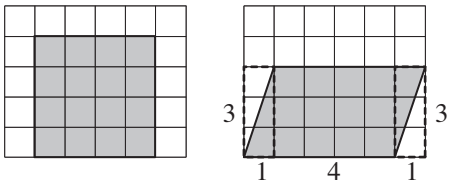
Area of first triangle $= 5 + 5 = 10$ *sq. units*



Repeat this method for the second triangle.
The area of the second triangle is
2.5 + 7.5 = 10 sq. units
Compare your results.
The triangles have the same area.



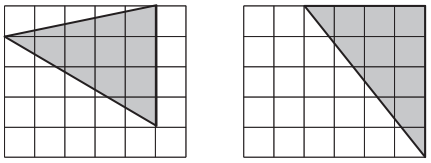
a) Do the square and the parallelogram have the same area? No



Area A = 16

Area B = 1.5 + 12 + 1.5 = 15

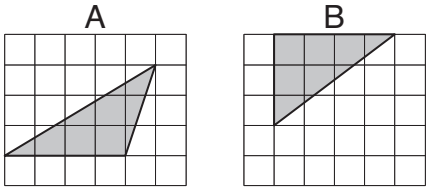
b) Do these triangles have the same area?



Area A = ...

Area B = ...

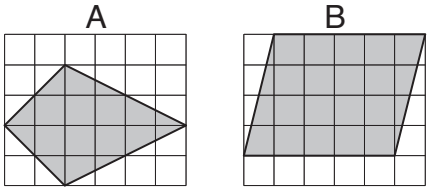
c) Do these triangles have the same area?



Area A = ...

Area B = ...

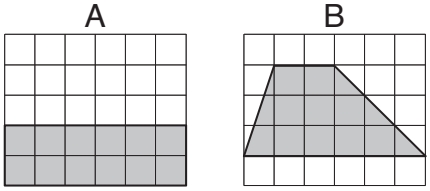
d) Do the kite and the parallelogram have the same area?



Area A = ...

Area B = ...

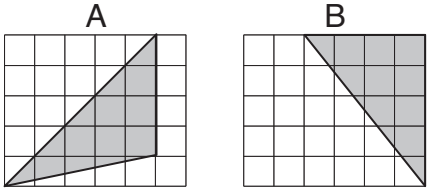
e) Do the rectangle and the trapezoid below have the same area?



Area A = ...

Area B = ...

f) Do these triangles have the same area?

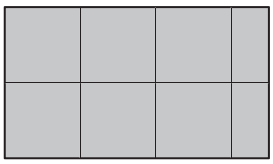


Area A = ...

Area B = ...

Skill 30.4 Calculating the area of a rectangle.

Q. Find the area of this rectangle.



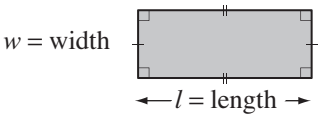
A. *7 cm²*

Count square centimetres and half centimetres on the grid.

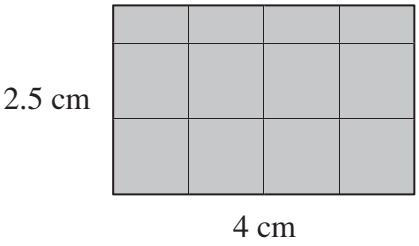
OR

Use: *Area of a rectangle = length × width*

$A = l \times w$
$= 3.5 \times 2$
$= 7\ cm^2$

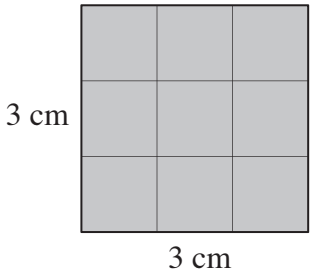


a) Find the area of this rectangle.



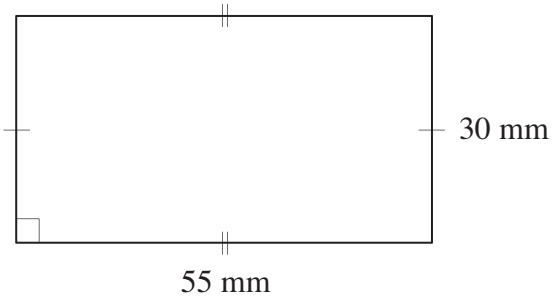
A = ... = ... cm^2

b) Find the area of this rectangle.



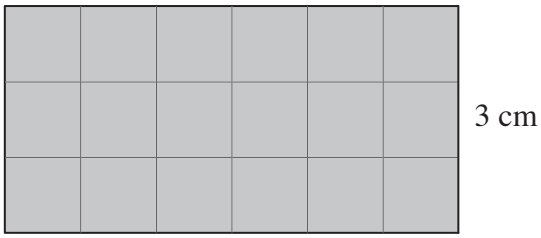
A = ... = ... cm^2

c) Find the area of this rectangle.



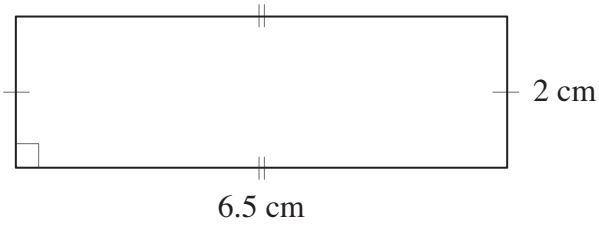
A = ... = ... mm^2

d) Find the area of this rectangle.



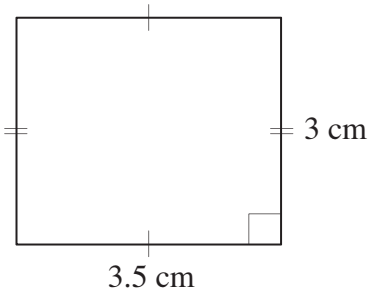
A = ... = ... cm^2

e) Find the area of this rectangle.



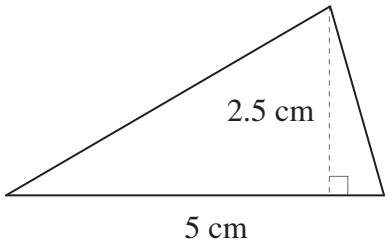
A = ... = ... cm^2

f) Find the area of this rectangle.



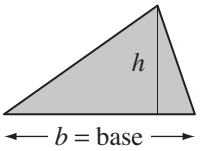
A = ... = ... cm^2

Q. Find the area of this triangle.



A. *6.25 cm²*

Use: *Area of a triangle* $= \frac{1}{2}$ *(base × height)*



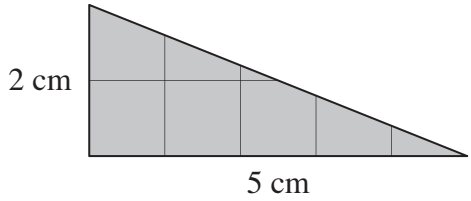
$A = \frac{1}{2}(b \times h)$

$= \frac{1}{2}(5 \times 2.5)$

$= \frac{1}{2} \times 12.5$

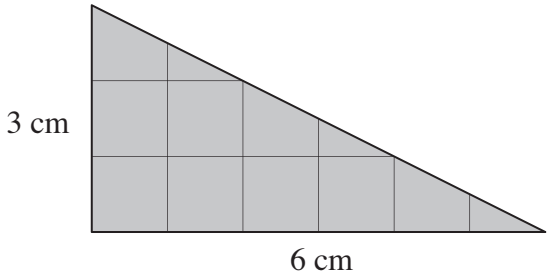
$= 6.25\ cm^2$

a) Find the area of this triangle.



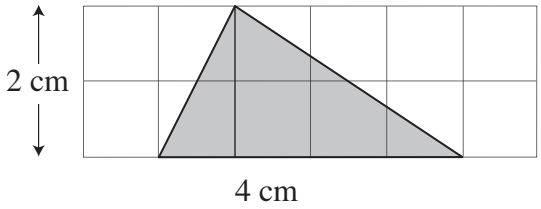
$A =$ ..... $=$ ..... cm^2

b) Find the area of this triangle.



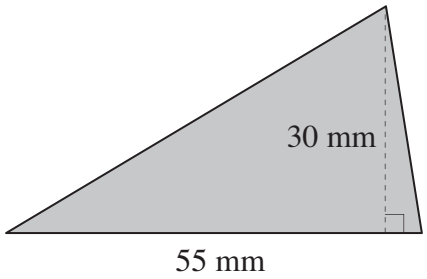
$A =$ ..... $=$ ..... cm^2

c) Find the area of this triangle.



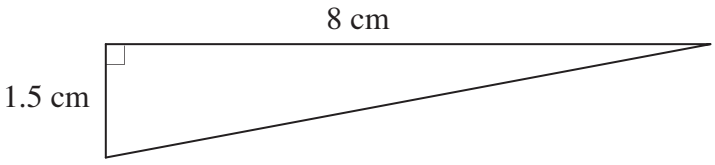
$A =$ ..... $=$ ..... cm^2

d) Find the area of this triangle.



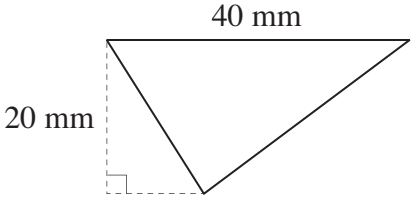
$A =$ ..... $=$ ..... mm^2

e) Find the area of this triangle.



$A =$ ..... $=$ ..... cm^2

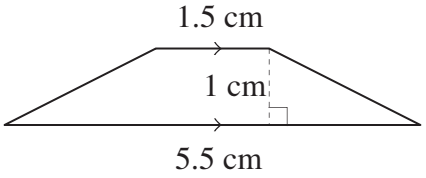
f) Find the area of this triangle.



$A =$ ..... $=$ ..... mm^2

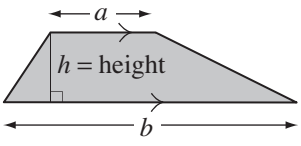
Skill 30.6 Calculating the area of a trapezoid.

Q. Find the area of the trapezoid below.



A. *3.5 cm²*

Use: Area of a trapezoid $= \frac{1}{2}(a+b) \times$ height



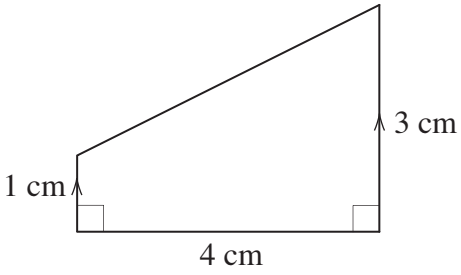
$A = \frac{1}{2}(a+b) \times h$

$= \frac{1}{2}(1.5+5.5) \times 1$

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

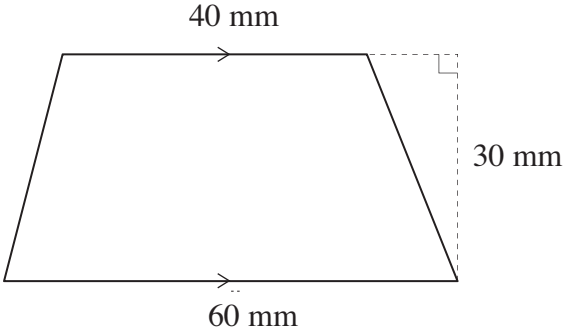
$= 3.5\ cm^2$

a) Calculate the area of this trapezoid.



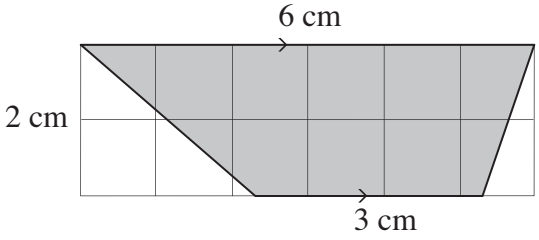
$A =$ ..... $=$ ..... cm^2

b) Find the area of this trapezoid.



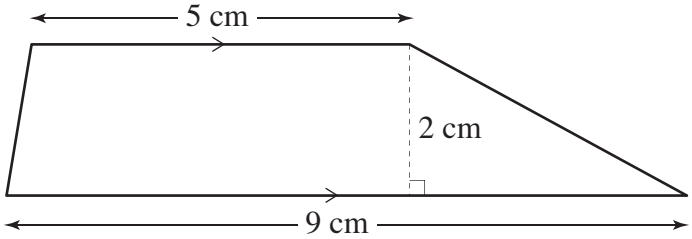
$A =$ ..... $=$ ..... mm^2

c) Calculate the area of this trapezoid.



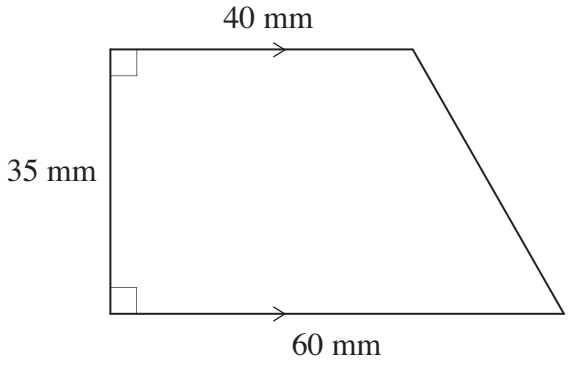
$A =$ ..... $=$ ..... cm^2

d) Find the area of this trapezoid.



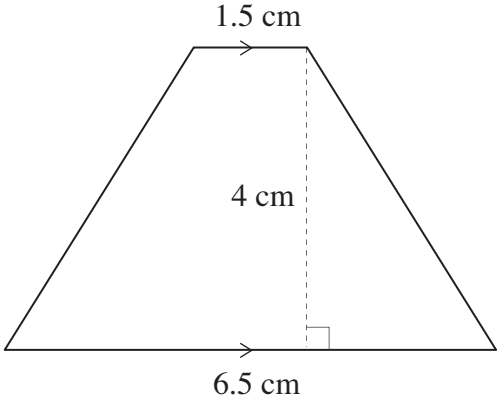
$A =$ ..... $=$ ..... cm^2

e) Calculate the area of this trapezoid.



$A =$ ..... $=$ ..... mm^2

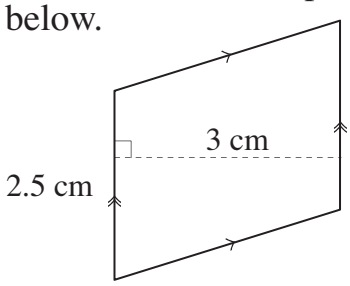
f) Find the area of this trapezoid.



$A =$ ..... $=$ ..... cm^2

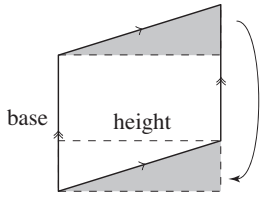
Skill 30.7 Calculating the area of a parallelogram.

Q. Find the area of the parallelogram below.

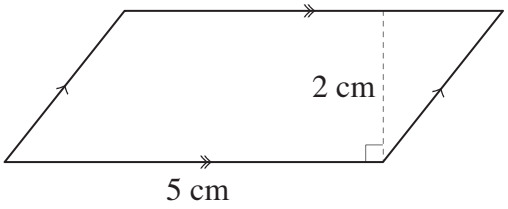


A. *10 cm²*

Use: *Area of a parallelogram = Area of a rectangle*
= base × height
A = b × h
= 3 × 2.5
= 7.5 cm²

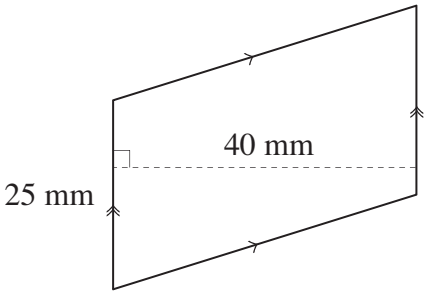


a) Calculate the area of this parallelogram.



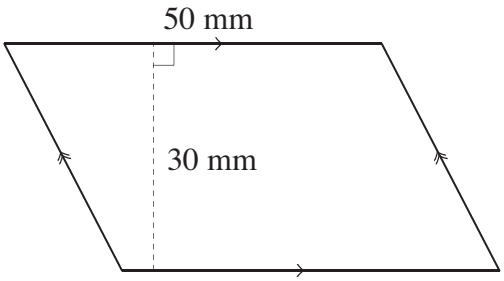
A = ... = ... cm²

b) Find the area of this parallelogram.



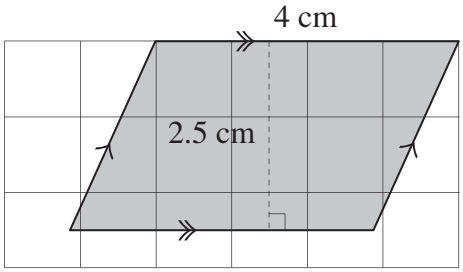
A = ... = ... mm²

c) Calculate the area of this parallelogram.



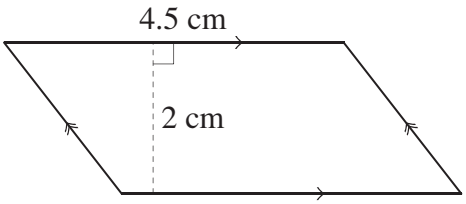
A = ... = ... mm²

d) Find the area of this parallelogram.



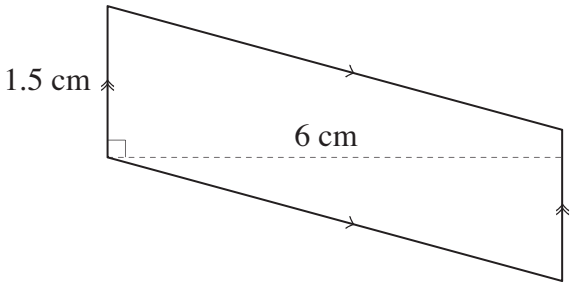
A = ... = ... cm²

e) Calculate the area of this parallelogram.



A = ... = ... cm²

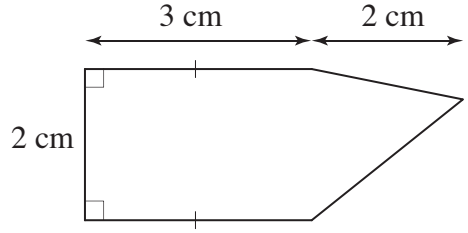
f) Find the area of this parallelogram.



A = ... = ... cm²

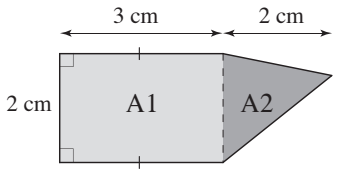
Skill 30.8 Calculating the area of an irregular shape.

Q. Find the area of this irregular shape.



A. *8 cm²*

The area of this shape is the sum of the area of a rectangle (A1) and the area of a triangle (A2).

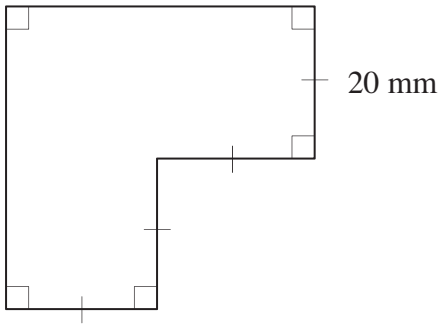


$A1 = \text{base} \times \text{height}$
$= 3 \times 2$
$= 6\ cm^2$

$A2 = \frac{1}{2} \times \text{base} \times \text{height}$
$= \frac{1}{2} \times 2 \times 2$
$= 2\ cm^2$

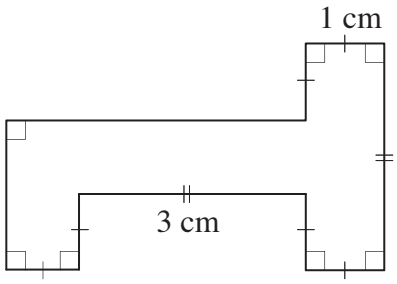
$\text{Area of the shape} = A1 + A2 = 6 + 2 = 8\ cm^2$

a) Find the area of this irregular shape.



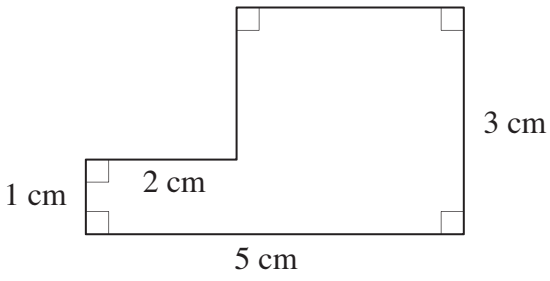
$A =$ ..... $=$ ..... mm^2

b) Find the area of this irregular shape.



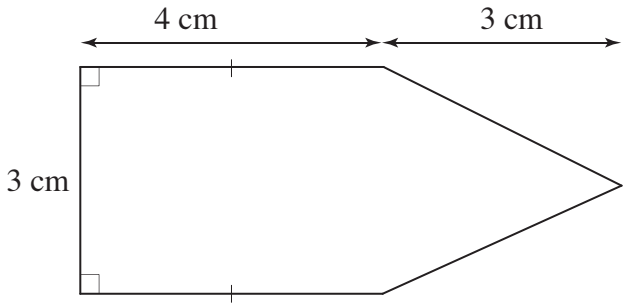
$A =$ ..... $=$ ..... cm^2

c) Find the area of this irregular shape.



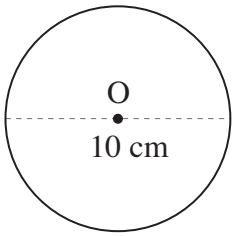
$A =$ ..... $=$ ..... cm^2

d) Find the area of this irregular shape.



$A =$ ..... $=$ ..... cm^2

Q. Using $A = \pi r^2$ and $\pi \approx 3.14$, find the area of a circle with a diameter of 10 cm.



A. *78.5 cm²*

First find the radius: $r = \frac{d}{2} = \frac{10}{2} = 5$

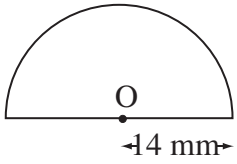
Use: *Area of a circle* $= \pi r^2$

$A \approx 3.14 \times 5 \times 5$

$= 15.7 \times 5$

$= 78.5 \text{ cm}^2$

Q. Using $A = \frac{1}{2}\pi r^2$ and $\pi \approx \frac{22}{7}$, find the area of this semi-circle.



A. *308 mm²*

Use: *Area of a semi-circle* $= \frac{1}{2}\pi r^2$

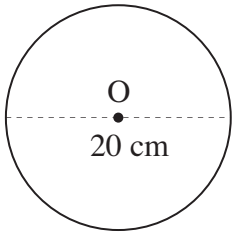
$A \approx \frac{1}{\cancel{2}} \times \frac{\overset{11}{\cancel{22}}}{\cancel{7}} \times \frac{\overset{2}{\cancel{14}}}{1} \times \frac{14}{1}$

$= 1 \times 11 \times 2 \times 14$

$= 22 \times 14$

$= 308 \text{ mm}^2$

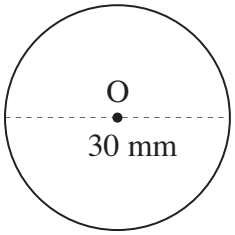
a) Using $A = \pi r^2$ and $\pi \approx 3.14$, find the area of this circle.



If d = 20 cm
then r = 10 cm

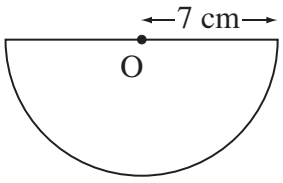
$A =$ *3.14 × 10 × 10* $=$ 314 cm^2

b) Using $\pi \approx 3.14$, find the area of this circle.



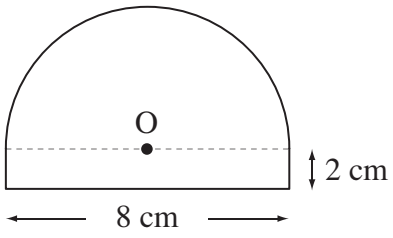
$A =$ ..... $=$ ..... mm^2

c) Using $A = \frac{1}{2}\pi r^2$ and $\pi \approx \frac{22}{7}$, find the area of this semi-circle.



$A =$ ..... $=$ ..... cm^2

d) Using $\pi \approx 3.14$, find the area of this shape.



Area of semicircle =

Area of rectangle =

$A =$ ..... $=$ ..... cm^2