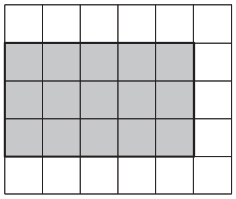
30. [Area]

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

MM7 1 1 2 3 3 4 4
MM8 1 1 2 2 3 3 4 4

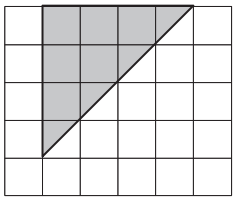
Q. Find the area, in square units, of the shaded rectangle below.



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

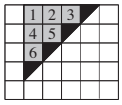
Count the number of shaded squares.
OR
You will notice that there are 5 shaded squares across the length (l) and 3 rows of shaded squares along the width (w).
$5 \times 3 = 15$
Area of a rectangle = length × width

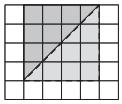
Q. Find the area, in square units, of the shaded triangle below.



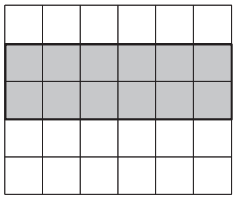
A. ***8 sq. units***

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.



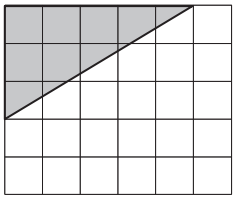


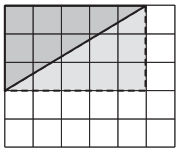
a) Find the area, in square units, of the shaded rectangle below.



12 ..... sq. units

b) Find the area, in square units, of the shaded triangle below.

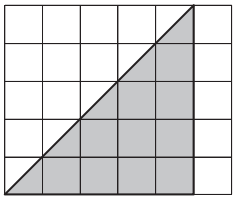




Area rectangle = 5 × 3 = 15
Area triangle = 15 ÷ 2 = 7.5

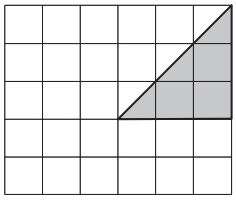
..... sq. units

c) Find the area, in square units, of the shaded triangle below.



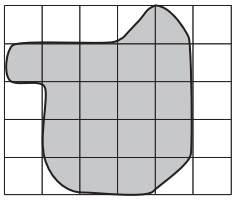
..... sq. units

d) Find the area, in square units, of the shaded triangle below.



..... sq. units

Q. Find the area, in square units, of the shape below. [Round off to the nearest whole number.]

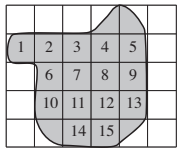


A. *17 sq. units*

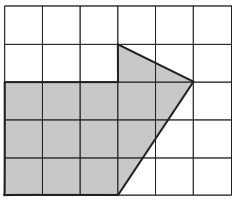
First count the number of squares that are approximately fully shaded.
There are 15 fully shaded squares.

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

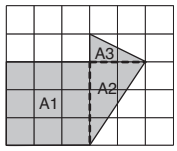
15 + 2 = 17 sq. units



Q. Find the area, in square units, of the shaded shape below. [Round off to the nearest whole number.]

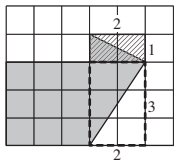


A. *13 sq. units*



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

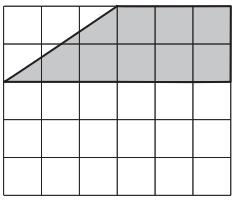
Count the squares in A1:
A1 = 9 sq. units
The area of the triangle A2 is half of the dashed rectangle of 6 sq. units:
A2 = 3 sq. units

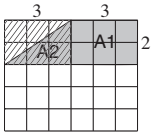


The area of the triangle A3 is half of the striped rectangle of 2 sq. units:
A3 = 1 sq. unit

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

a) Find the area, in square units, of the shaded shape below.

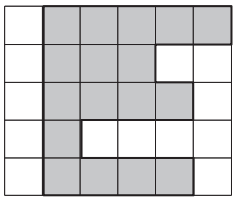




$A1 = 6$
$A2 = \frac{1}{2} \times 6 = 3$
$A1 + A2 = 6 + 3 = 9$

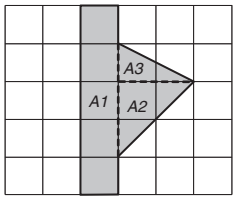
9 ..... sq. units

b) Find the area, in square units, of the shaded shape below.



..... sq. units

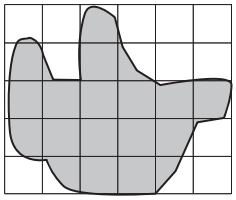
c) Find the area, in square units, of the shaded shape below. [Round off to the nearest whole number.]



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

..... sq. units

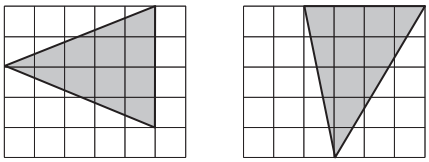
d) Find the area, in square units, of the rounded shape below. [Round off to the nearest whole number.]



..... sq. units

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

Q. Do the triangles below have the same area?



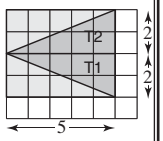
A. *Yes*

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

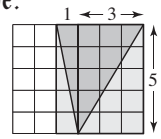
Area of T1 $= \frac{1}{2}(5 \times 2) = 5$

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

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

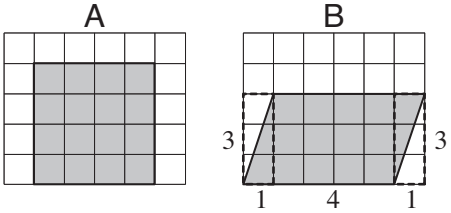


Repeat this method for the second triangle.
The area of the second triangle is
2.5 + 7.5 = 10 sq. units
Compare your results.
The triangles have the same area.



a) Do the square and the parallelogram below have the same area?

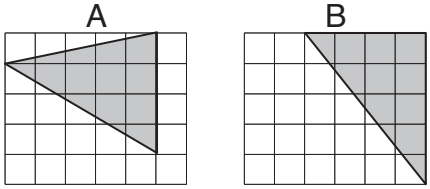
No



Area A = 16

Area B = 1.5 + 12 + 1.5 = 15

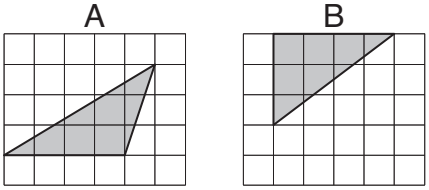
b) Do the triangles below have the same area?



Area A = ...

Area B = ...

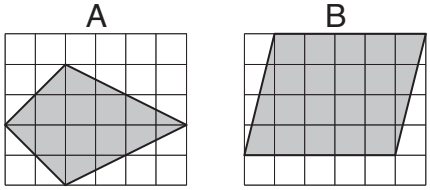
c) Do the triangles below have the same area?



Area A = ...

Area B = ...

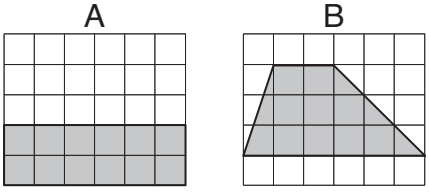
d) Do the kite and the parallelogram have the same area?



Area A = ...

Area B = ...

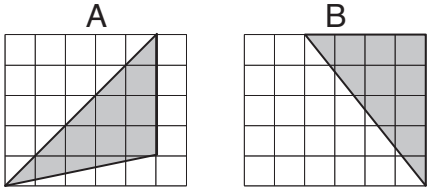
e) Do the rectangle and the trapezium below have the same area?



Area A = ...

Area B = ...

f) Do the triangles below have the same area?

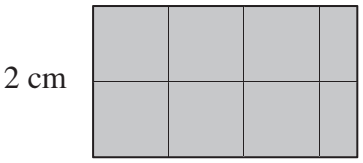


Area A = ...

Area B = ...

Skill 30.4 Calculating the area of a rectangle.

Q. Find the area, in square centimetres, of the rectangle below.



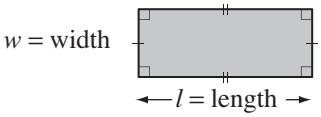
A. *7 cm²*

Count square centimetres and half centimetres on the grid.

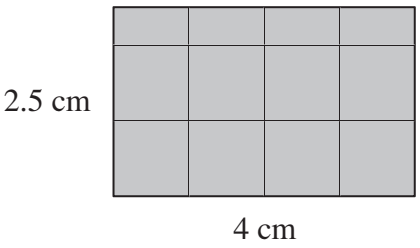
OR

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

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

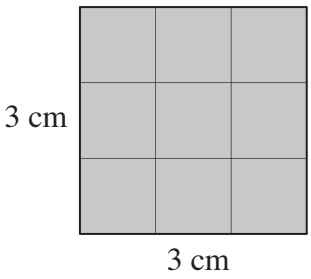


a) Find the area, in square centimetres, of the rectangle below.



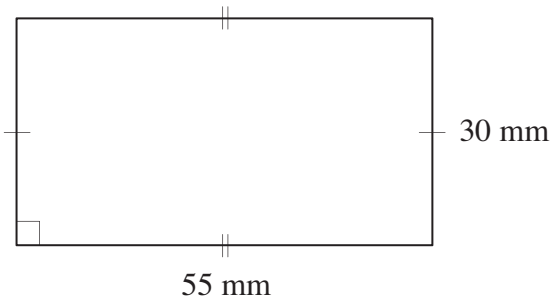
$A =$ ..... $=$ ..... cm^2

b) Find the area, in square centimetres, of the square below.



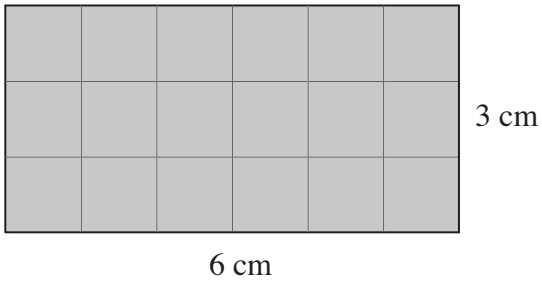
$A =$ ..... $=$ ..... cm^2

c) Find the area, in square millimetres, of the rectangle below.



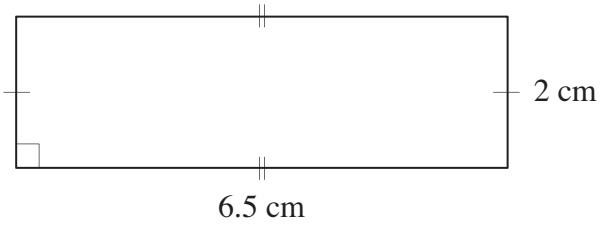
$A =$ ..... $=$ ..... mm^2

d) Find the area, in square centimetres, of the rectangle below.



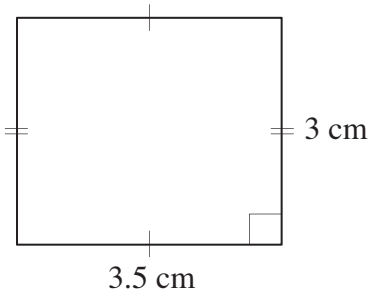
$A =$ ..... $=$ ..... cm^2

e) Find the area, in square centimetres, of the rectangle below.



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

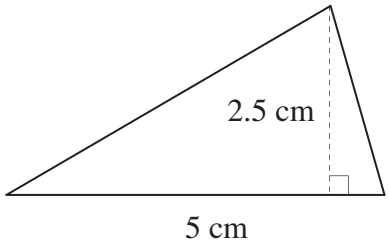
f) Find the area, in square centimetres, of the rectangle below.



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

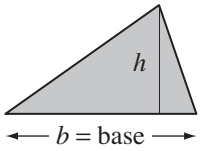
Skill 30.5 Calculating the area of a triangle.

Q. Find the area of the triangle below.



A. *6.25 cm²*

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



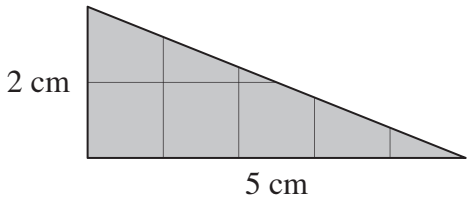
$A = \frac{1}{2}(b \times h)$

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

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

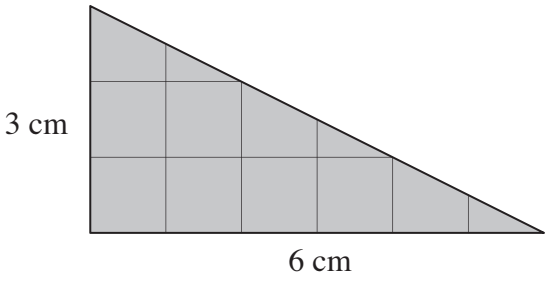
$= 6.25 \text{ cm}^2$

a) Find the area, in square centimetres, of the triangle below.



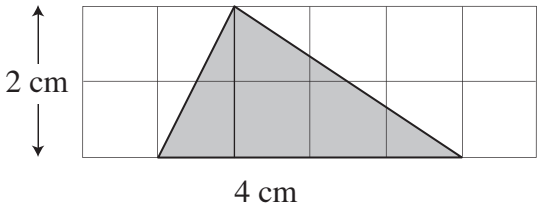
$A =$ ..... $=$ ..... cm^2

b) Find the area, in square centimetres, of the triangle below.



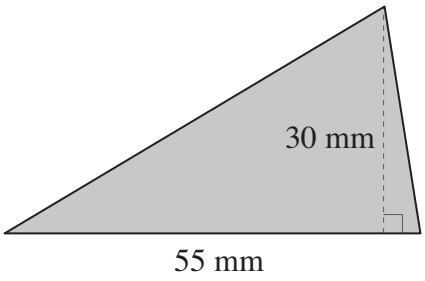
$A =$ ..... $=$ ..... cm^2

c) Find the area, in square centimetres, of the triangle below.



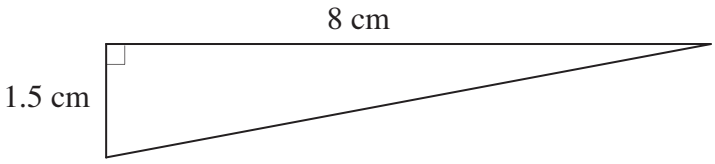
$A =$ ..... $=$ ..... cm^2

d) Find the area, in square millimetres, of the triangle below.



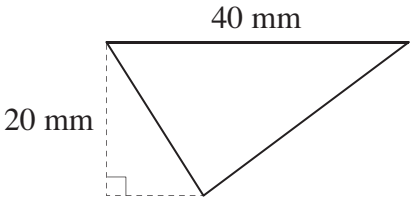
$A =$ ..... $=$ ..... mm^2

e) Find the area, in square centimetres, of the triangle below.



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

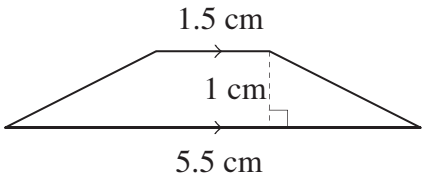
f) Find the area, in square millimetres, of the triangle below.



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

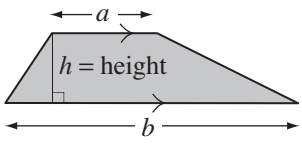
Skill 30.6 Calculating the area of a trapezium.

Q. Find the area of the trapezium below.



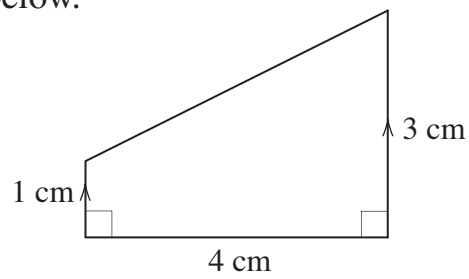
A. *3.5 cm²*

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



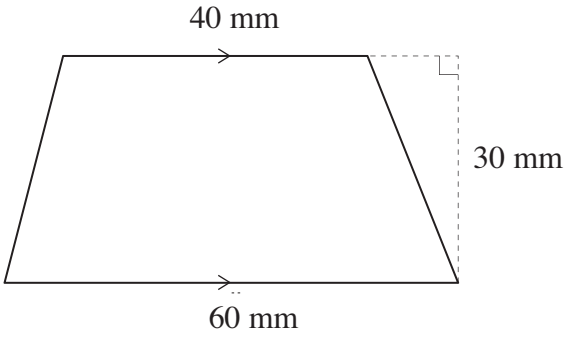
$$A = \frac{1}{2}(a+b) \times h$$
$$= \frac{1}{2}(1.5+5.5) \times 1$$
$$= \frac{1}{2} \times 7 \times 1$$
$$= 3.5 \text{ cm}^2$$

a) Calculate the area of the trapezium below.



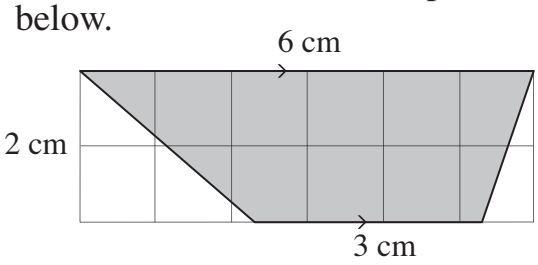
A = ... = ... cm²

b) Find the area of the trapezium below.



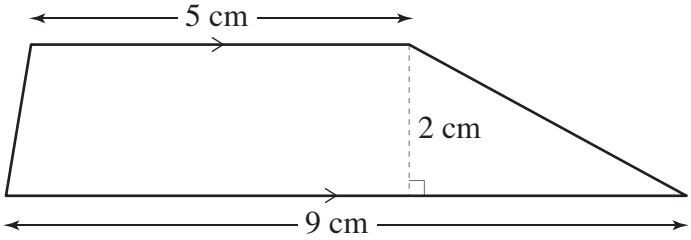
A = ... = ... mm²

c) Calculate the area of the trapezium below.



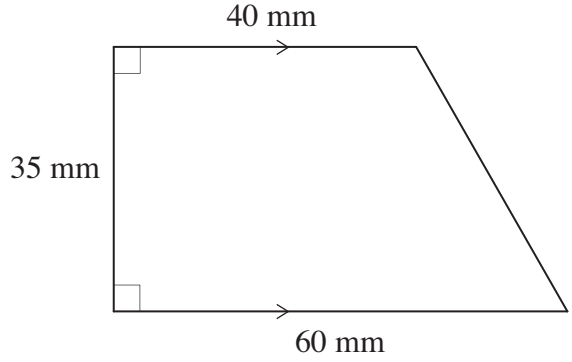
A = ... = ... cm²

d) Find the area of the trapezium below.



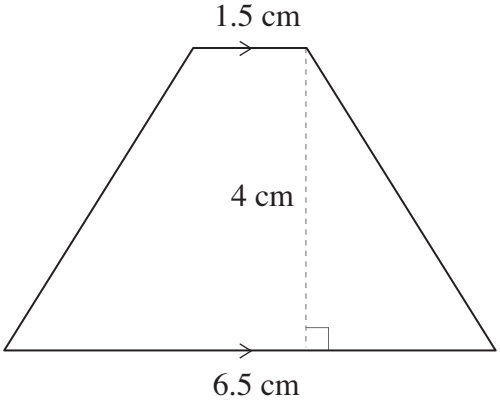
A = ... = ... cm²

e) Calculate the area of the trapezium below.



A = ... = ... mm²

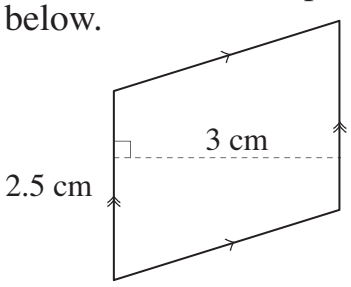
f) Find the area of the trapezium below.



A = ... = ... cm²

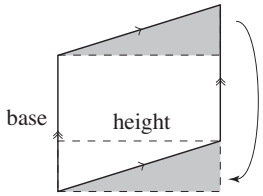
Skill 30.7 Calculating the area of a parallelogram.

Q. Find the area of the parallelogram below.

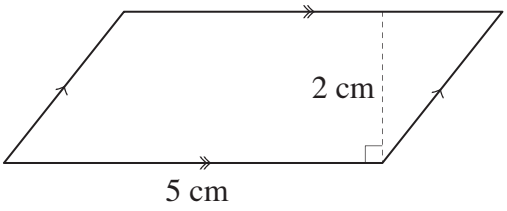


A. *10 cm²*

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

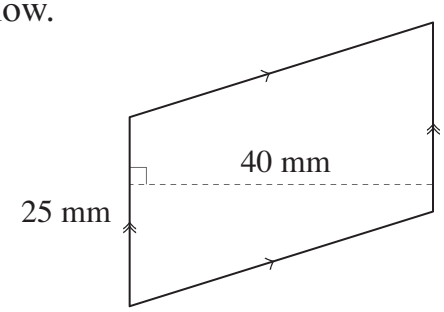


a) Calculate the area of the parallelogram below.



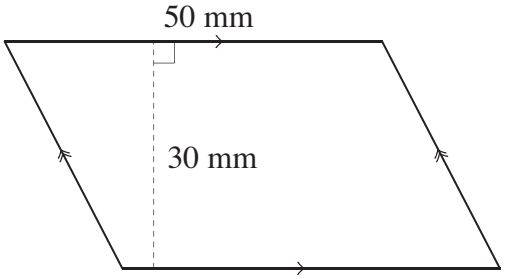
A = ... = ... cm^2

b) Find the area of the parallelogram below.



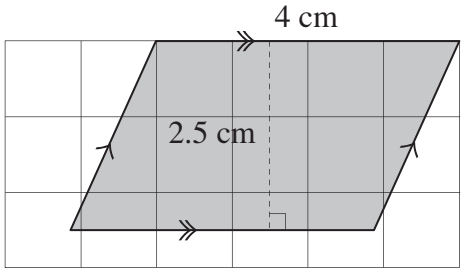
A = ... = ... mm^2

c) Calculate the area of the parallelogram below.



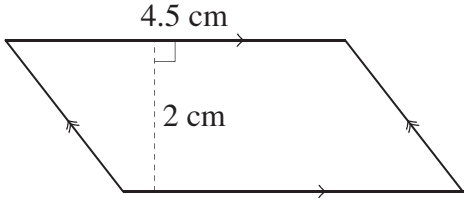
A = ... = ... mm^2

d) Find the area of the parallelogram below.



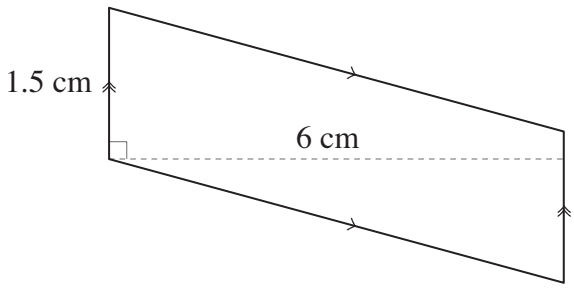
A = ... = ... cm^2

e) Calculate the area of the parallelogram below.



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

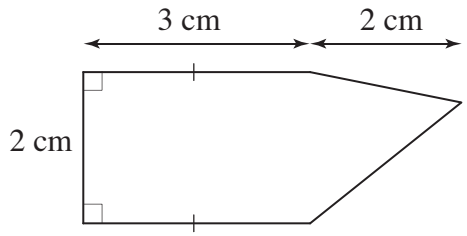
f) Find the area of the parallelogram below.



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

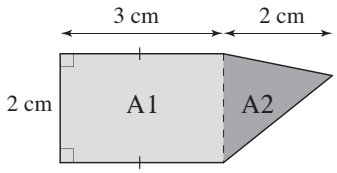
Skill 30.8 Calculating the area of a composite shape.

Q. Find the area of the shape below.



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).

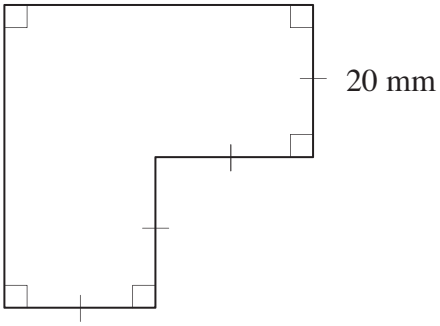


$A1 = \text{base} \times \text{height}$
$= 3 \times 2$
$= 6\ cm^2$

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

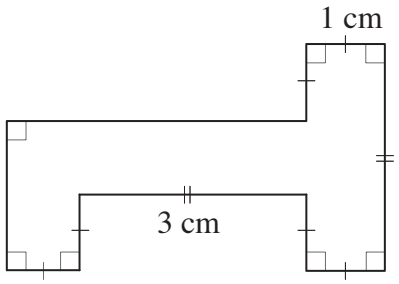
$\text{Area of the shape} = A1 + A2 = 6 + 2 = 8\ cm^2$

a) Find the area of the shape below.



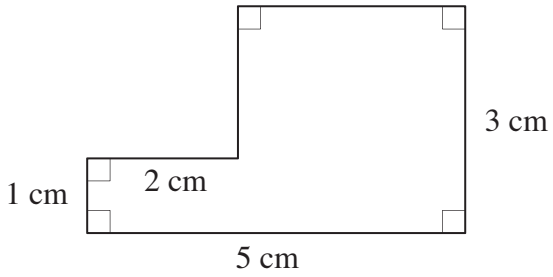
$A =$ ..... $=$ ..... mm^2

b) Calculate the area of the shape below.



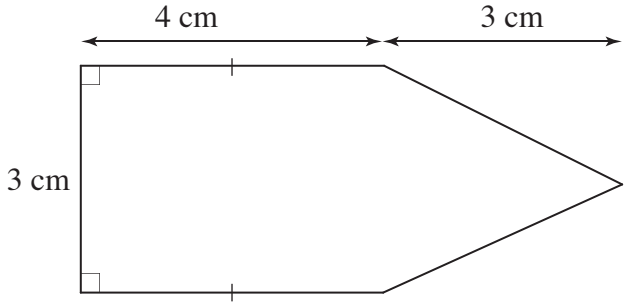
$A =$ ..... $=$ ..... cm^2

c) Find the area of the shape below.



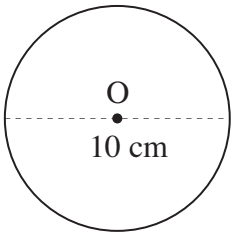
$A =$ ..... $=$ ..... cm^2

d) Calculate the area of the shape below.



$A =$ ..... $=$ ..... 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: $r = \frac{d}{2} = \frac{10}{2} = 5$

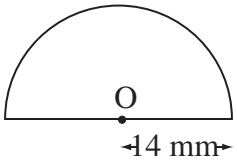
Use: *Area of a circle* $= \pi r^2$

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

$= 15.7 \times 5$

$= 78.5 \text{ cm}^2$

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



A. *308 mm²*

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

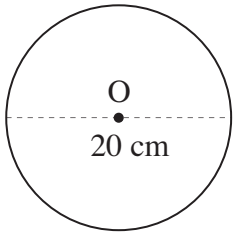
$A \approx \frac{1}{\cancel{2}} \times \frac{\overset{11}{\cancel{22}}}{\cancel{7}} \times \frac{\overset{2}{\cancel{14}}}{1} \times \frac{14}{1}$

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

$= 22 \times 14$

$= 308 \text{ mm}^2$

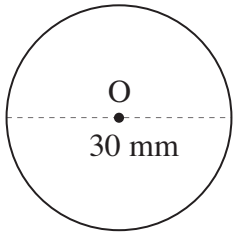
a) Using $A = \pi r^2$ and $\pi \approx 3.14$, find the area of the circle below.



If d = 20 cm
then r = 10 cm

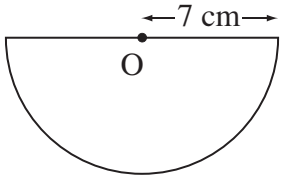
$A =$ *3.14 × 10 × 10* $=$ 314 cm^2

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



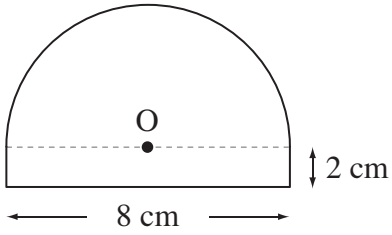
$A =$ ..... $=$ ..... mm^2

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



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

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



Area of semicircle =

Area of rectangle =

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