I.G.C.S.E. Area
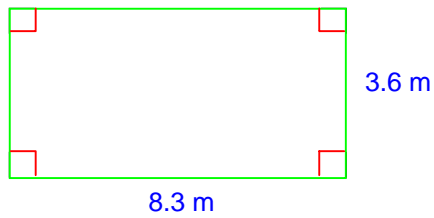
Index:

Please click on the question number you want

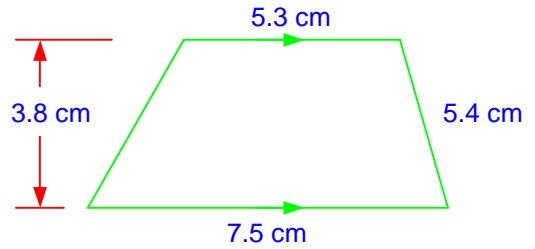**You can access the solutions from the end of each question**

Question 1

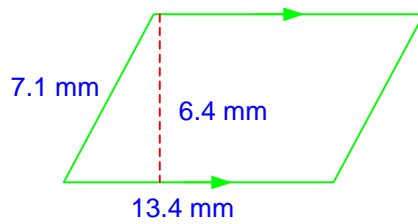For each of the questions, find the area of each shape. Decide which information to use: you may not need all it.
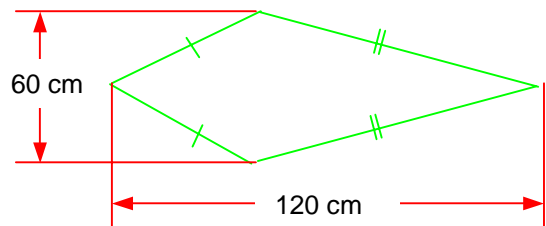
a.

3.6 m

8.3 m

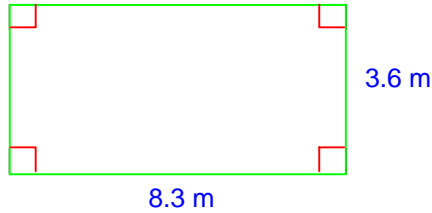**b**

5.3 cm

3.8 cm

5.4 cm

7.5 cm

c.

7.1 mm

6.4 mm

13.4 mm

d.

60 cm

120 cm

*Click **here** to read the solution to this question*

*Click **here** to return to the index*

Solution to question 1

a. **Rectangle**

Area $=$ length $\times$ width
$= 3.6 \times 8.3$
$= 29.88$
$= 29.9 \, m^2$

b **Trapezium**
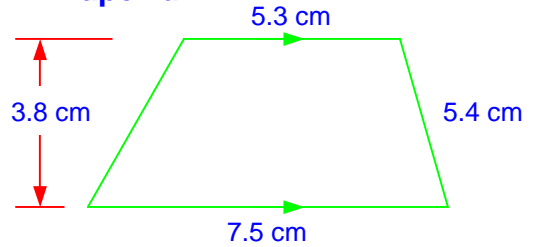
Area $= \dfrac{1}{2}(a+b)h$

$= \dfrac{1}{2}(5.3+7.5)3.8$

$= 24.32$

$= 24.3 \, cm^2$

c. **Parallelogram**
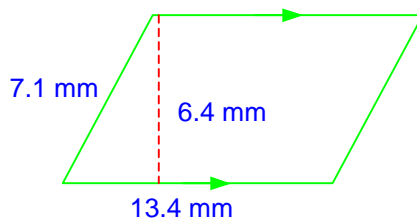
Area $=$ length $\times$ height
$= 13.4 \times 6.4$
$= 85.76$
$= 85.8 \, mm^2$

d. **Kite**
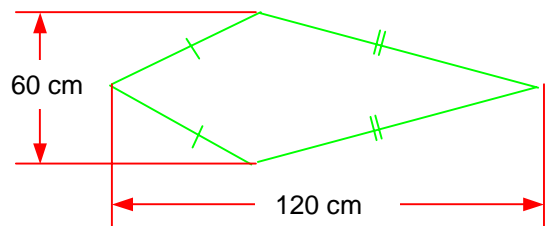
Area $= \dfrac{1}{2} \times$ length of the product diagonals

$= \dfrac{1}{2} \times 60 \times 120$

$= 3600 \, cm^2$

Click here to read the question again

Click here to return to the index

Question 2

Find the shaded area of each of the following.

a.
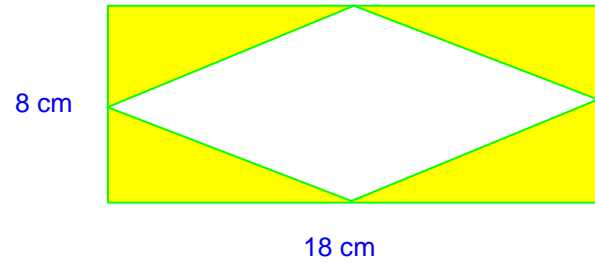
10 m

6.5 m

6 m

b

8 cm

18 cm

Click here to read the solution to this question

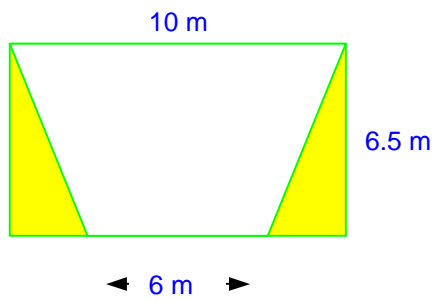*Click here to return to the index*

Solution to question 2

a.

10 m

6 m
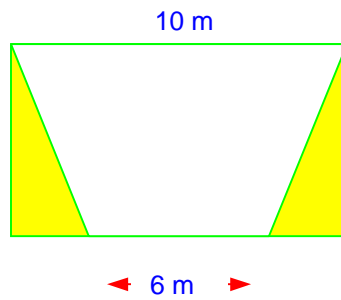
Shaded area = area of rectangle − area of trapezium

$$= 10 \times 6.5 - \frac{1}{2}(10 + 6) \times 6.5$$

$$= 65 - 52$$

$$= 13 \, \text{m}^2$$

b.

8 cm

18 cm
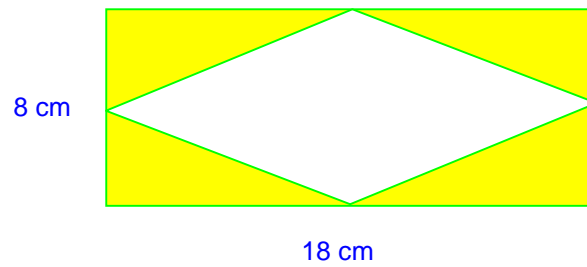
Shaded area = area of rectangle − area of kite

$$= 8 \times 18 - \frac{1}{2}(8 \times 18)$$

$$= 144 - 72$$

$$= 72 \, \text{cm}^2$$

*Click **here** to read the question again*

*Click **here** to return to the index*

Question 3

A trapezium of area of $120 \, \text{cm}^2$ has parallel sides 6 cm apart and one of these sides is 10 cm long. Find the length of the other parallel side.

Click here to read the solution to this question

Click here to return to the index

Solution to question 3

A trapezium of area of $120\,\text{cm}^2$ has parallel sides 6 cm apart and one of these sides is 10 cm long. Find the length of the other parallel side
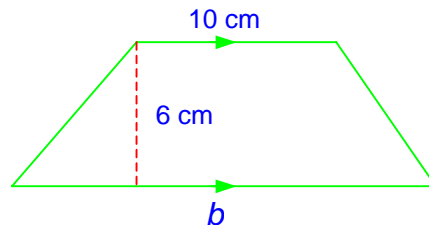
Drawing a diagram

10 cm

6 cm

b

$$\text{Area of a trapezium} = \frac{1}{2}(a+b)h$$

$$120 = \frac{1}{2}(10+b)6$$

$$120 = 3(10+b)$$

$$40 = 10+b$$

$$b = 30\,\text{cm}$$

Click here to read the question again

Click here to return to the index

Question 4

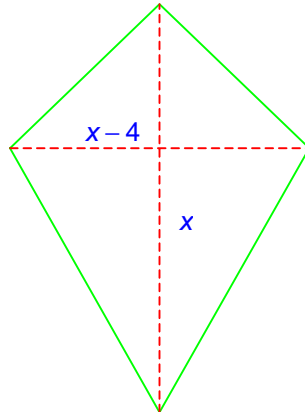A kite of area $6\,\text{cm}^2$ has one diagonal 4 cm shorter than the other. Find the length of each diagonal.

Click here to read the solution to this question

Click here to return to the index

Solution to question 4

A kite of area $6\,\mathrm{cm}^2$ has one diagonal 4 cm shorter than the other. Find the length of each diagonal.

First draw a diagram

Let the length of the longer diagonal be x cm. Therefore the length of the shorter diagonal is $x - 4$ cm.

Area of kite $= \dfrac{1}{2} \times$ the product of the diagonals

$$6 = \frac{1}{2}x(x-4)$$
$$12 = x^2 - 4x$$
$$0 = x^2 - 4x - 12$$

$\text{product} = -12$
$\text{sum} = -4$
$\text{factors} = -6,\ 2$

$$0 = x^2 - 6x + 2x - 12$$
$$0 = x(x-6) + 2(x-6)$$
$$0 = (x-6)(x+2)$$

either $x - 6 = 0$ or $x + 2 = 0$

$\qquad\qquad x = 6 \qquad\qquad\quad x = -2$ (not possible)

Therefore the lengths of the diagonals are $x = 6\,\mathrm{cm}$ or $x - 4 = 6 - 4 = 2\,\mathrm{cm}$.

Click here to read the question again

Click here to return to the index

Question 5

A floor 6 m by 12 m is covered by square tiles with side 20 cm. How many tiles are needed?

Click here to read the solution to this question

Click here to return to the index

Solution to question 5

A floor 6 m by 12 m is covered by square tiles with side 20 cm. How many tiles are needed?

The area of the floor in cm^2 is $6\,m \times 12\,m = 600\,cm \times 1200\,cm = 720000\,cm^2$

Each tile has area $20\,cm \times 20\,cm = 400\,cm^2$

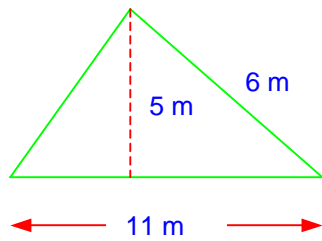Number of tiles needed $= \dfrac{720000}{400} = 1800 \text{ tiles}$

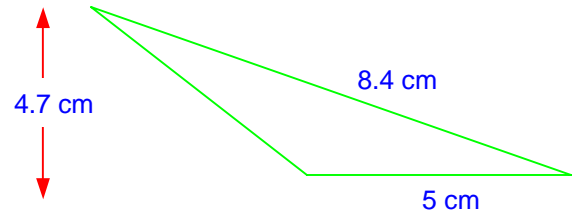*Click here to read the question again*

Click here to return to the index
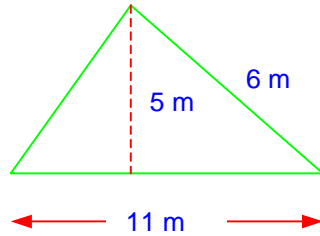
Question 6

Find the area of the following shapes

a.

b.

*Click **here** to read the solution to this question*
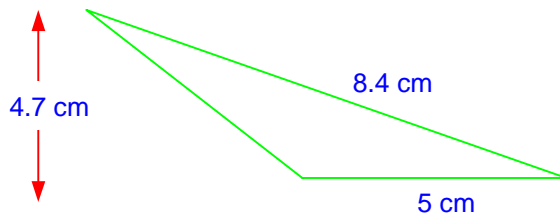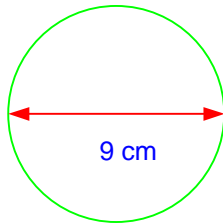
*Click **here** to return to the index*

Solution to question 6

a.

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

$$= \frac{1}{2} \times 11 \times 5$$

$$= 27.5 \, \text{m}^2$$

b.

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

$$= \frac{1}{2} \times 5 \times 4.7$$

$$= 11.75$$

$$= 11.8 \, \text{cm}^2$$

Question 7

Find the perimeter and area of the following shapes
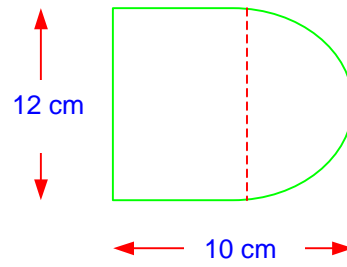
a.

9 cm

b.

12 cm

10 cm

Click here to read the solution to this question

Click here to return to the index

Solution to question 7

a.
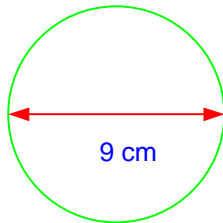
9 cm

$C = \pi d$

$\quad = \pi \times 9$

$\quad = 28.3\,\text{cm}$

$A = \pi r^2$

$\quad = \pi (4.5)^2$

$\quad = 63.6\,\text{cm}^2$

b.

a

12 cm

10 cm

Note $a = 10 - r$

$\quad = 10 - 6$

$\quad = 4\,\text{cm}$
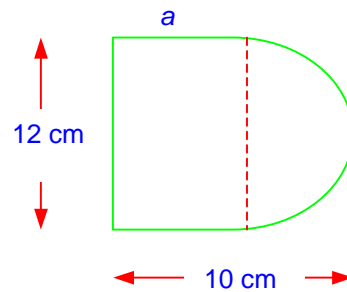
$\text{Perimeter} = 12 + 4 + 4 + \dfrac{1}{2} \times 12 \times \pi$

$\quad = 20 + 6\pi$

$\quad = 38.8\,\text{cm}$

$= 12 \times 4 + \dfrac{1}{2} \times \pi \times 6^2$

$\text{Area} = 48 + 18\pi$

$\quad = 96.5\,\text{cm}^2$

*Click **here** to read the question again*

*Click **here** to return to the index*

Question 8

A circle radius 8 cm is inscribed inside a square as shown. Find the area shaded.
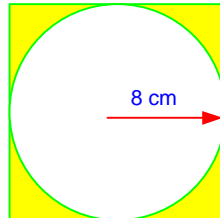
Click here to read the solution to this question

Click here to return to the index
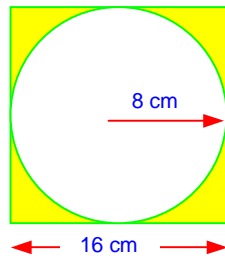
Solution to question 8

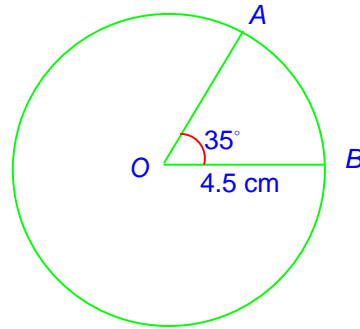Note the side of the square $= 2r = 2 \times 8 = 16 \, \text{cm}$

Shaded area $=$ area of square $-$ area of circle
$$= 16 \times 16 - \pi \times 8^2$$
$$= 256 - 64\pi$$
$$= 54.9 \, \text{cm}^2$$

***Click here* to read the question again**

***Click here* to return to the index**

Question 9

Find the minor arc length *AB* and the area of the minor sector *AOB*.

Solution to question 9
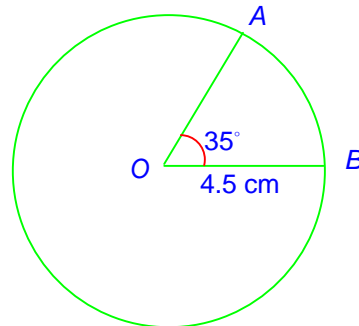
Minor arc length $AB = \dfrac{\theta}{360°} \times 2\pi r$

$$= \dfrac{35°}{360°} \times 2 \times \pi \times 4.5$$

$$= 0.875\pi$$

$$= 2.75\,\text{cm}$$

Area of minor sector $AB = \dfrac{\theta}{360°} \times \pi r^2$

$$= \dfrac{35°}{360°} \times \pi \times 4.5^2$$

$$= 6.19\,\text{cm}^2$$

Click here to read the question again

Click here to return to the index