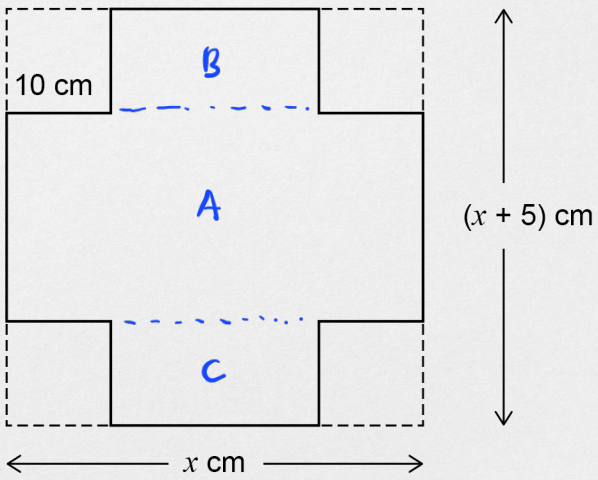
1 Kate has the following question for homework.

The net of a box is made by cutting four squares from a piece of cardboard.
The cardboard is a rectangle with width x cm and length $(x + 5)$ cm
Each square has side length 10 cm
The area of the net is 1000 cm^2
Work out the value of x.

Not drawn accurately



1 (a) Show that Kate can form the equation $x^2 + 5x - 1400 = 0$

[3 marks]

Area of A : $(x-15)(x) = x^2 - 15x$ (1)

Area of B : $(x-20)(10) = 10x - 200$

Area of C : $(x-20)(10) = 10x - 200$

Area of net = total area A, B and C

$1000 = x^2 - 15x + 10x - 200 + 10x - 200$

$1000 = x^2 + 5x - 400$ (1)

$x^2 + 5x - 400 - 1000 = 0$

$x^2 + 5x - 1400 = 0$ (shown)

(1)

1 (b) Kate correctly factorises the equation to get $(x + 40)(x - 35) = 0$

Her answer to the homework question is $x = -40$ or $x = 35$

Is her answer correct?

Tick a box.

☐ Yes ☑ No

Give a reason for your answer.

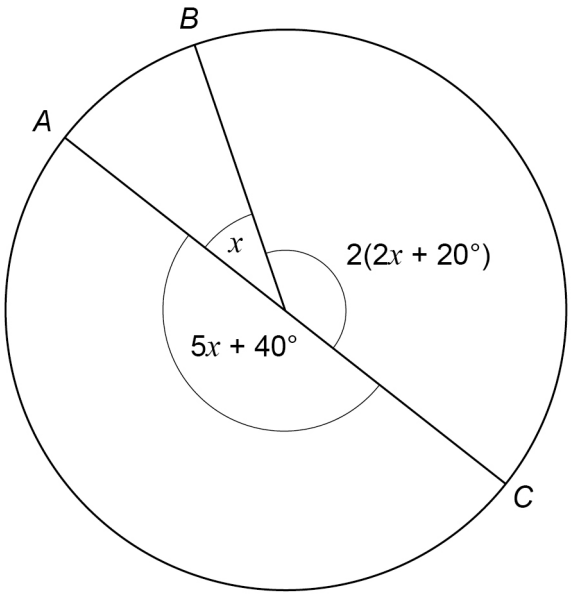
x cannot be negative (1)

[1 mark]

2 *A*, *B* and *C* are three points on a circle.

The radii from *A*, *B* and *C* are shown.

Not drawn accurately



Is *AC* a diameter of the circle?

You **must** show your working.

[3 marks]

(1)

$x + 2(2x + 20^\circ)$

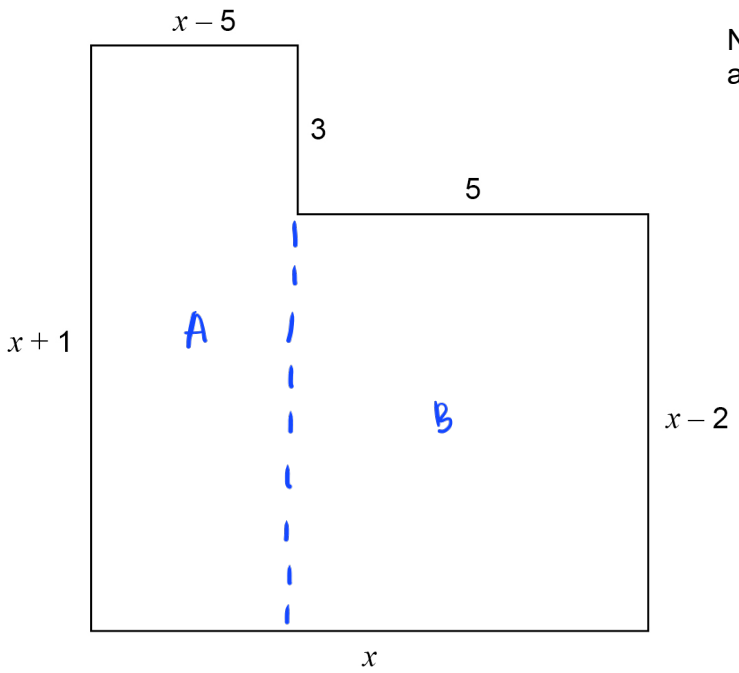
$= x + 4x + 40^\circ$ (1)

$= 5x + 40^\circ$ (1)

Yes.

3 Here is the plan of the floor of an L-shaped room.

All lengths are in metres.



Not drawn accurately

3 (a) The area of the floor is $75\,m^2$

Show that $x^2 + x - 90 = 0$

[3 marks]

Area of A : $(x-5)(x+1) = x^2 - 4x - 5$ (1)

Area of B : $5(x-2) = 5x - 10$

$x^2 - 4x - 5 + 5x - 10 = 75$ (1)

$x^2 + x - 15 - 75 = 0$ (1)

$x^2 + x - 90 = 0$

3 (b) By factorising $x^2 + x - 90$ work out the value of x.

You **must** show your working

[2 marks]

$(x-9)(x+10)$

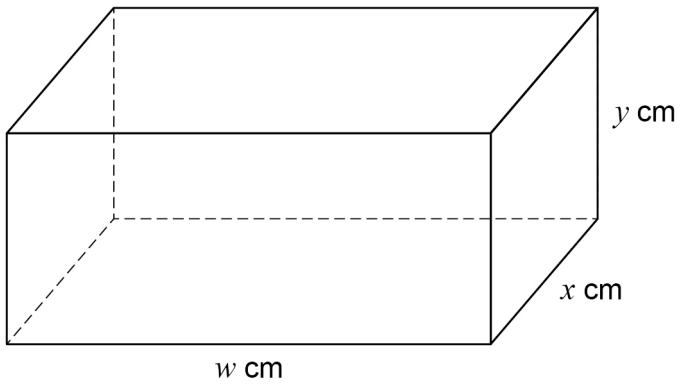
$x = 9$ or $x = -10$ (1)

$x = 9$ only since length can't be negative

$x =$ 9 (1)

4 (a) Here is a cuboid.

w, x and y are **different** whole numbers.



The total length of **all** the edges of the cuboid is 80 cm

The volume is **greater** than 200 cm^3

Work out one possible set of values for w, x and y.

[2 marks]

$4w + 4y + 4x = 80$

$4(w + x + y) = 80$

$w + x + y = 20$

$w \times x \times y > 200$

let $w = 8$, $x = 7$, $y = 5$

$8 + 7 + 5 = 20$, $8 \times 7 \times 5 = 280$

(2)

$w =$ 8 $x =$ 7 $y =$ 5

5 A chef has a tub of blueberries.

She wants to

use all the blueberries

put the same number of blueberries on each dessert.

$$D = \frac{k}{b}$$

D is the number of desserts.

b is the number of blueberries on each dessert.

5 (a) What does the constant k represent?

Tick the correct box.

[1 mark]

- [✓] The number of blueberries in the tub
- [ ] The number of desserts
- [ ] The number of blueberries on each dessert
- [ ] None of the above