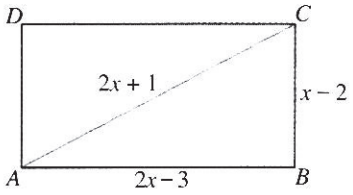
15. In the diagram, $ABCD$ is a rectangle, $AB = (2x - 3)$ cm, $BC = (x - 2)$ cm and $AC = (2x + 1)$ cm.



(a) Use Pythagoras' Theorem to form an equation involving x and show that it can be reduced to $x^2 - 20x + 12 = 0$.

(b) Solve the equation $x^2 - 20x + 12 = 0$, giving your answers correct to 2 decimal places.

(c) Find the area of $ABCD$, giving your answer correct to 3 significant figures.

16. P and Q are two places 10 km apart. Daniel walks from P to Q and then he immediately returns to P by bicycle. The total time taken for the journey is 4 hours. His average cycling speed is 12 km/h faster than his average walking speed, v km/h.

(a) Express the time taken by Daniel, in hours, to walk from P to Q in terms of v.

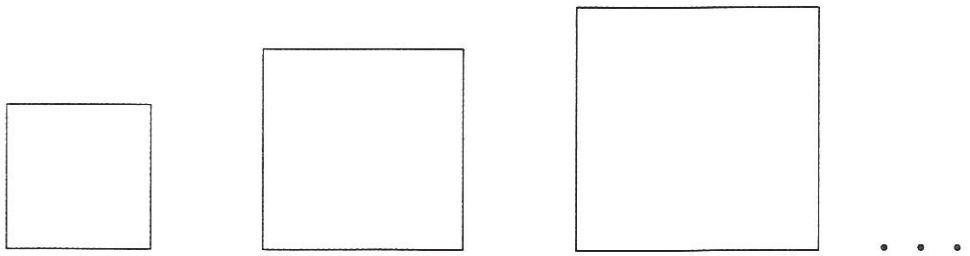
(b) Express his average cycling speed, in km/h, from Q to P in terms of v.

(c) Express the time taken by him, in hours, to cycle from Q to P in terms of v.

(d) Find the value of v.

(e) Find Daniel's average speed for the whole journey.

17. The diagram shows a sequence of square wire frames. The lengths of a side of these frames are x cm, $(x + 3)$ cm, $(x + 6)$ cm, ..., respectively. The sum of the areas of the first 3 frames is 525 cm^2.



(a) Express the length of a side of the nth frame in terms of x and n.

(b) Find the value of x.

(c) A piece of wire is 99 cm long. It is cut and bent into a frame in the sequence. Find the length of a side of the largest frame that can be formed.

18. It is given that $x = 4$ is a root of the equation $2x^2 + kx + 4 = 0$, where k is a constant.

(a) Find the value of k.

(b) Find the other root of the equation $2x^2 + kx + 4 = 0$.

(c) Draw the graph of $y = 2x^2 + kx + 4$ for $0 \leqslant x \leqslant 5$.

(d) Find the coordinates of the turning point of the graph in **(c)**.