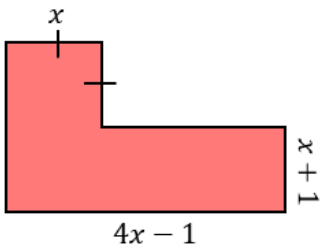
Solving Harder Quadratic Equations in Context

(a)

The shape shown has an area of $13\ cm^2$. All lengths on the diagram are in cm.

(i) Show that $5x^2 + 3x - 14 = 0$

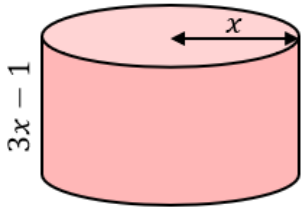


(ii) Hence, find the value of x and the dimensions of the shape.

(b)

The cylinder shown has a total surface area of $78\pi\ cm^2$. All lengths on the diagram are in centimetres.

(i) Show that $4x^2 - x - 39 = 0$

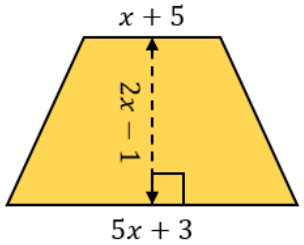


(ii) Hence, find the value of x and the height of the cylinder.

(c)

The trapezium shown has an area of $30\ cm^2$. All lengths on the diagram are in centimetres.

(i) Show that $6x^2 + 5x - 34 = 0$

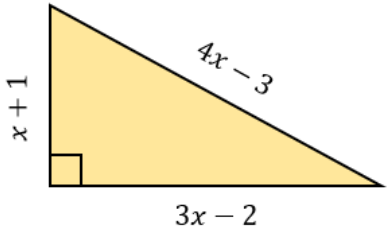


(ii) Hence, find the value of x and the dimensions of the trapezium.

(d)

A right-angled triangle has sides of lengths $(x + 1)\ cm, (3x - 2)\ cm$ and $(4x - 3)\ cm$ as shown.

(i) Show that $3x^2 - 7x + 2 = 0$



(ii) Hence find the value of x and the length of the hypotenuse.