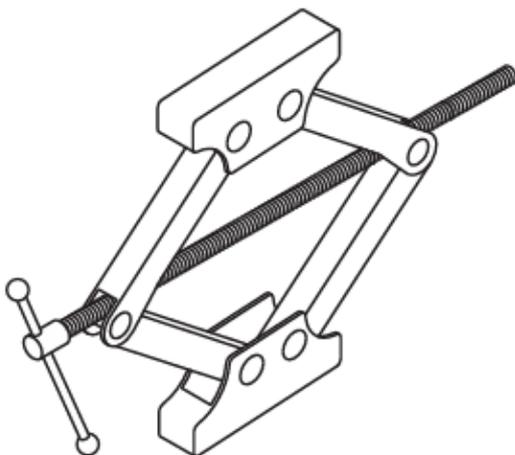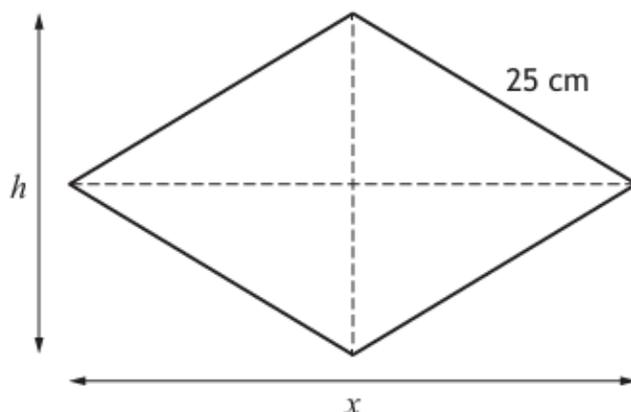An engineer has designed a lifting device. The handle turns a screw which shortens the horizontal length and increases the vertical height.

The device is modelled by a rhombus, with each side 25 cm.

The horizontal length is x cm, and the vertical height is h cm as shown.

(a) Show that $h = \sqrt{2500 - x^2}$.   1

(b) The horizontal length decreases at a rate of 0·3 cm per second as the handle is turned.

Find the rate of change of the vertical height when $x = 30$.   5

Method/answers: (a) $h^2 + x^2 = 50^2$ rearranged.   (b) $\dfrac{9}{40}$ cm s^{-1}