

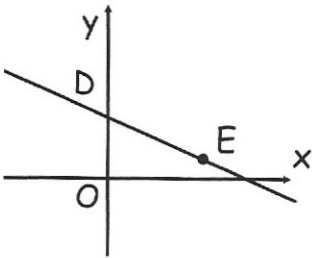


The volumes of two mathematically similar solids are in the ratio 8 : 125  
The surface area of the smaller solid is 24 cm<sup>2</sup>

Work out the surface area of the larger solid.

$$\begin{aligned} V &= 8 : 125 \\ S &= 2 : 5 \\ A &= 4 : 25 \end{aligned}$$

$$\begin{aligned} 24 \div 4 &= 6 \\ 6 \times 25 &= 150 \text{ cm}^2 \end{aligned}$$



Find the equation of the line perpendicular to DE and passing through F(0, -8)

$$y = 2x - 8$$

A straight line passes through the points D(0,10) and E (16, 2)

$$\begin{aligned} \text{gradient of DE} &= \frac{2-10}{16-0} \\ &= \frac{-8}{16} \\ &= -\frac{1}{2} \end{aligned}$$

$$\begin{aligned} -\frac{1}{2}x + 10 &= 2x - 8 & x &= 7.2 \\ 18 &= 2.5x & y &= 6.4 \end{aligned}$$

Find the shortest distance between the line passing through DE and the point F

$$\begin{aligned} &7.2^2 + 14.4^2 \\ &= 259.2 \\ \sqrt{259.2} &= 16.0997 \end{aligned}$$

$$a = \frac{c}{w} \quad \text{Max } a = \frac{120.5}{41.205} = 2.924$$

$c = 120$  correct to 3 significant figures.  
 $w = 41.21$  correct to 2 decimal places.

$$\text{Min } a = \frac{119.5}{41.215} = 2.899$$

By considering bounds, work out the value of a to a suitable degree of accuracy.

2.9 to 1dp

Find the minimum point of the graph  $y = x^2 - 11x + 1$

$$y = (x - 5.5)^2 - 30.25 + 1$$

$$y = (x - 5.5)^2 - 29.25$$

$$(5.5, -29.25)$$