













































































































**11 a** 
$$\frac{20 - h}{20} = \frac{r}{10}$$

$$\therefore 10(20 - h) = 20r$$

$$\therefore 200 - 10h = 20r$$

$$\therefore 20 - h = 2r$$

$$\therefore h = 20 - 2r$$

$$= 2(10 - r)$$

**b** 
$$V = \pi r^2 h$$

$$= 2\pi r^2(10 - r)$$

**c** Use CAS calculator to solve the equation  $2\pi r^2(10 - r) = 500$ , given that  $0 < r < 10$ .  
 This gives  $r = 3.49857 \dots$  or  $r = 9.02244 \dots$   
 When  $r = 3.49857 \dots$ ,  $h = 2(10 - 3.49857 \dots)$   
 $= 13.00285 \dots$

When  $r = 9.02244 \dots$ ,  $h = 2(10 - 9.02244 \dots)$   
 $= 1.95511 \dots$

Therefore the volume of the cylinder is  $500 \text{ cm}^3$  when  $r = 3.50$  and  $h = 13.00$  or when  $r = 9.02$  and  $h = 1.96$ , correct to two decimal places.