

Hundred Starter 28<sup>th</sup> September

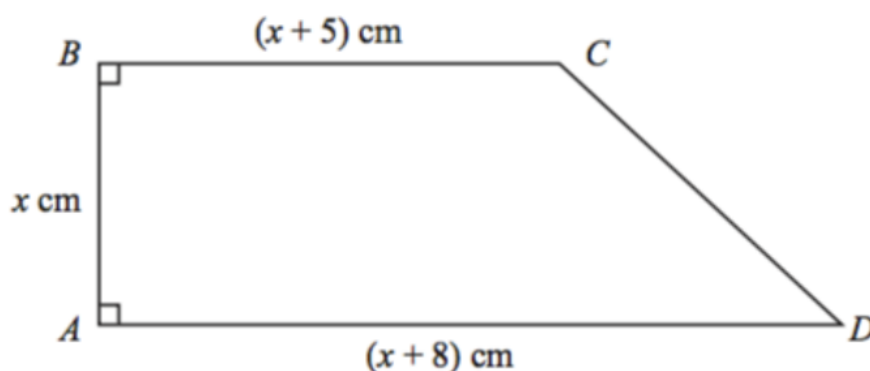


Diagram **NOT**  
accurately drawn

The diagram shows a trapezium ABCD with AD parallel to BC.  
AB =  $x$  cm, BC =  $(x + 5)$  cm and AD =  $(x + 8)$  cm.

The area of the trapezium is  $42 \text{ cm}^2$ .

Show that  $2x^2 + ax + b = 0$  where  $a$  and  $b$  are constants to be found.

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Show that

$$\frac{\sqrt{3} + \sqrt{27}}{\sqrt{2}}$$

can be expressed in the form  $\sqrt{k}$  where  $k$  is an integer.  
State the value of  $k$ .

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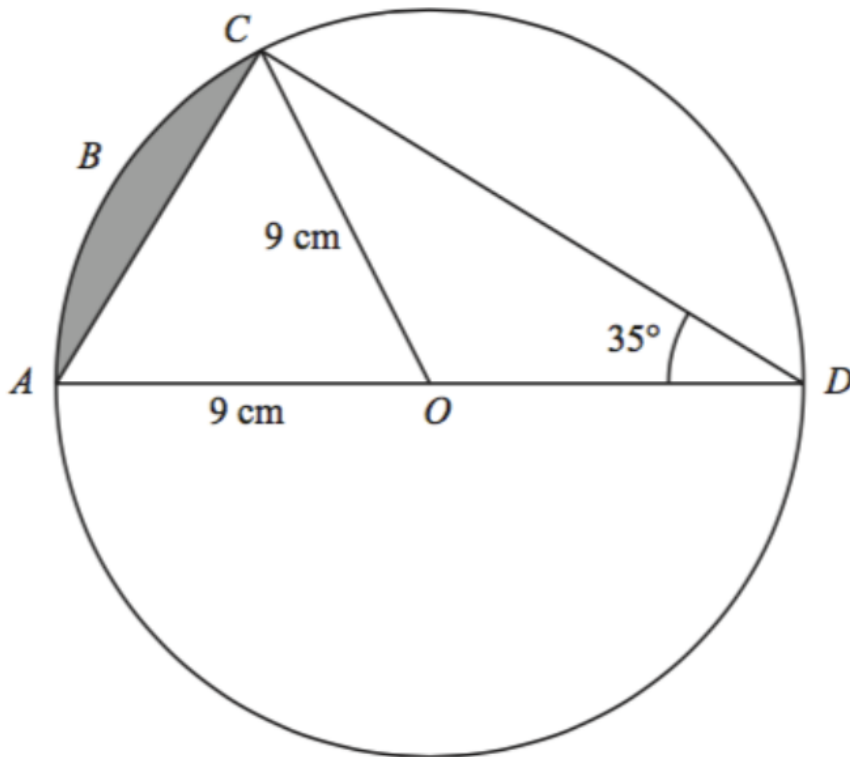


Diagram **NOT**  
accurately drawn

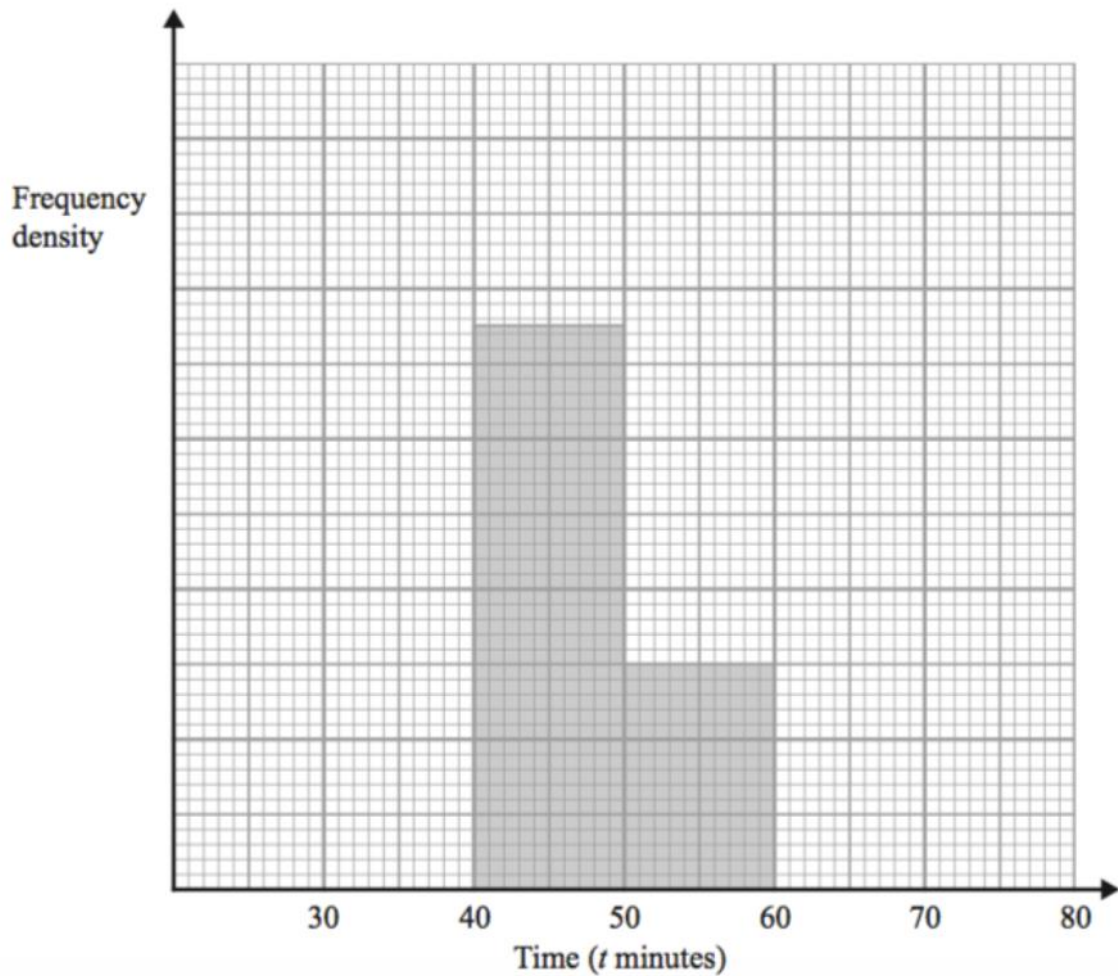
$AOD$  is a diameter of a circle, with centre  $O$  and radius  $9\text{ cm}$ .  
 $ABC$  is an arc of the circle.  
 $AC$  is a chord.  
 Angle  $ADC = 35^\circ$

Calculate the area of the shaded segment.  
 Give your answer correct to 3 significant figures.

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The incomplete table shows information about the times, in minutes, that runners took to complete a race.

Time ( $t$ minutes)	$30 \leq t < 35$	$35 \leq t < 40$	$40 \leq t < 50$	$50 \leq t < 60$	$60 \leq t < 80$
Number of runners	12	20		12	16



Runners who achieved a time between 37 and 48 minutes to complete the race were each awarded a silver medal.

Calculate an estimate of the number of runners awarded silver medals.