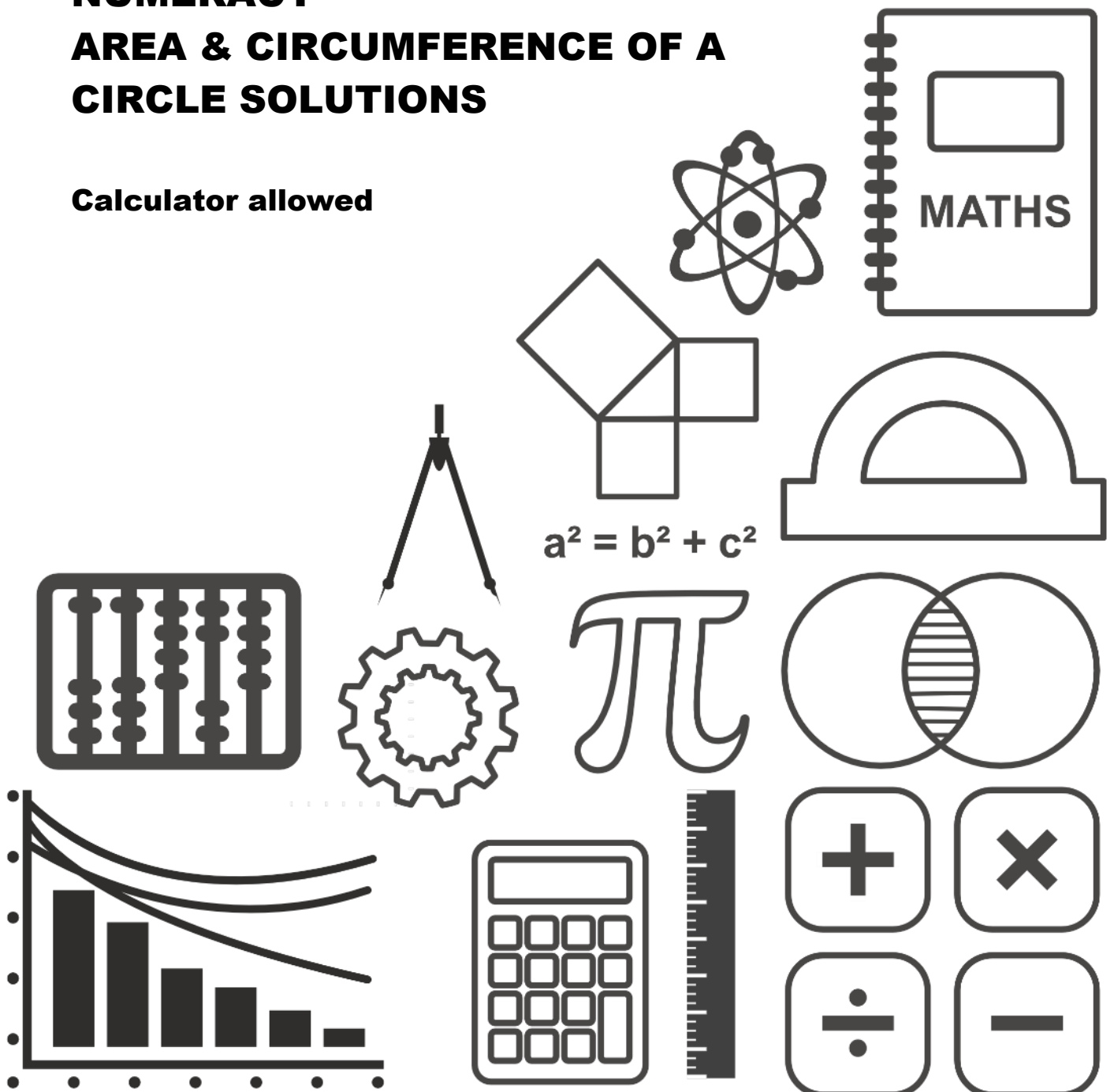


MATHSDIY

GCSE TOPIC BOOKLET NUMERACY AREA & CIRCUMFERENCE OF A CIRCLE SOLUTIONS

Calculator allowed



1. Finbar's skateboard is shown below.



The diameter of each wheel on Finbar's skateboard is 6.4 cm.
 He uses his skateboard to go to visit his friend Sab.
 Sab lives 2340 metres from Finbar.

(i) When Finbar visits Sab, how many times will each wheel on Finbar's skateboard rotate? [4]

$$\text{Circumference} = \pi \times d = \pi \times 6.4 = 20.10619... \text{ cm}$$

use a lot of decimal places
 as we want an accurate
 answer later on.

$$2340 \text{ metres} = 2340 \times 100 = 234000 \text{ cm}$$

$$\begin{aligned} \text{Number of rotations} &= 234,000 \div 20.10619... \\ &= 11638.205 \\ &= 11638 \text{ (nearest whole)} \end{aligned}$$

(examiner accepts 11636(-69) - 11644(-1083))

(ii) What assumption did you make in answering (a)(i)? [1]

- eg,
- rode all the way
 - didn't carry the skateboard
 - skated in a straight line
 - wheels perfectly circular

2. A grass racetrack is shown in the diagram below.
 This is the region shaded in the diagram.
 Each end of the grass racetrack is created from semicircles.
 The inner semicircles have a radius of 15 m.
 The outer semicircles have a radius of 20 m.
 Each of the straight sections of the racetrack has a length of 65 metres.

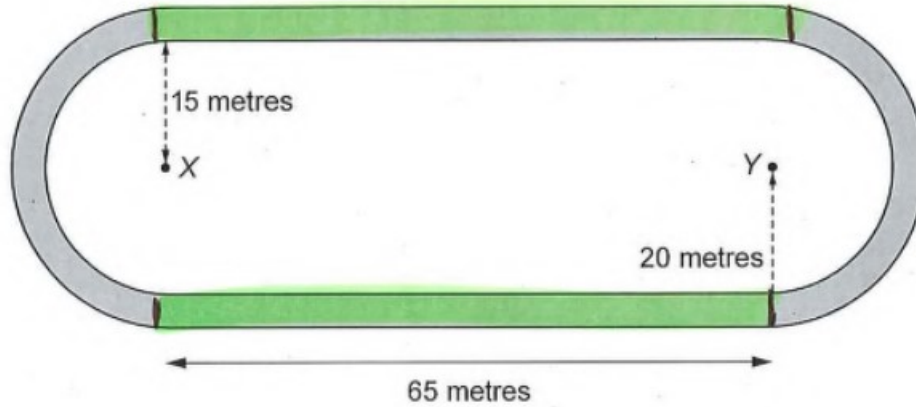
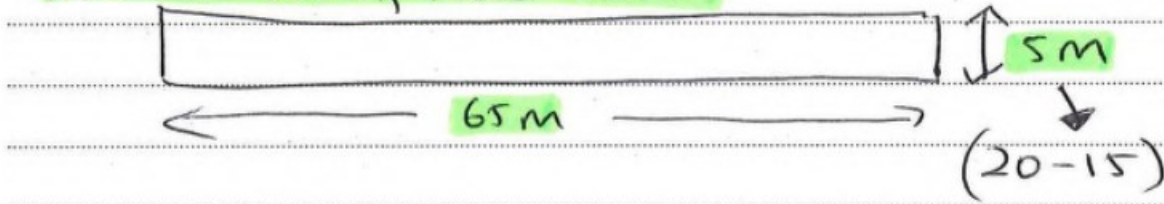


Diagram not drawn to scale

- (a) What is the total area of grass in the two **straight** sections of the racetrack?
 You must show all your working.

[2]

We need two of these areas

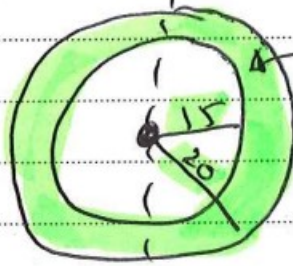


$$\begin{aligned} \text{area} &= (65 \times 5) \times 2 \\ &= \underline{\underline{650 \text{ m}^2}} \end{aligned}$$

(b) Calculate the area of the grass racetrack.
You must show all your working.

[4]

If you put the two ends together you get



we require this middle
which is
area
bigge - smaller
circle circle

$$= \pi R^2 - \pi r^2$$

$$= \pi \times 20^2 - \pi \times 15^2$$

$$= 549.7787 \dots \text{m}^2$$

Total area of the whole race track

$$= 549.78 + 650 = 1199.78$$

$$= \underline{1200 \text{m}^2} \text{ (nearest m}^2\text{)}$$

(accepts 1199-1200
or $175\pi + 650$)

(c) The grass is to be treated with a fertiliser.
It costs 20p to treat each 3m^2 of grass.
How much will it cost to treat the grass racetrack?
Give your answer correct to the nearest pound.
You must show all your working.

$$20\text{p} = \text{£}0.20$$

$$= 0.2$$

[2]

$$\frac{1200}{3} \times 0.2 = \text{£}80$$

Cost is £ 80