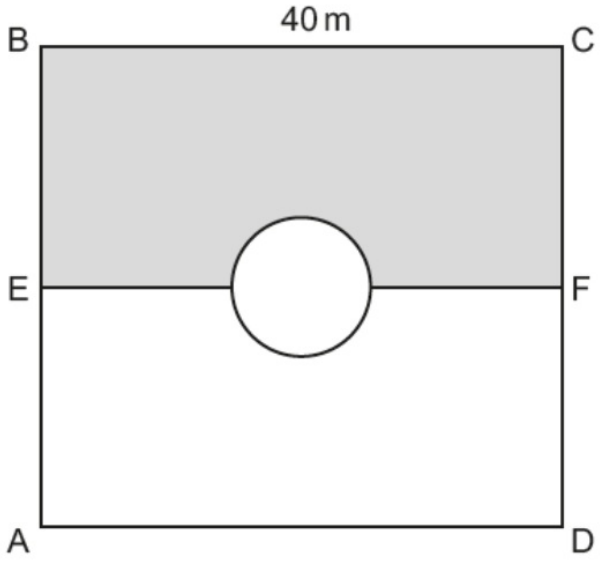
G21/22 Introduce Pi

Circumference of a circle

OCR

18 The diagram shows all the paths in a park.
ABCD is a square of side 40 metres.
E is the midpoint of AB. F is the midpoint of CD.
The circular path is in the centre of the square and has radius 5 metres.

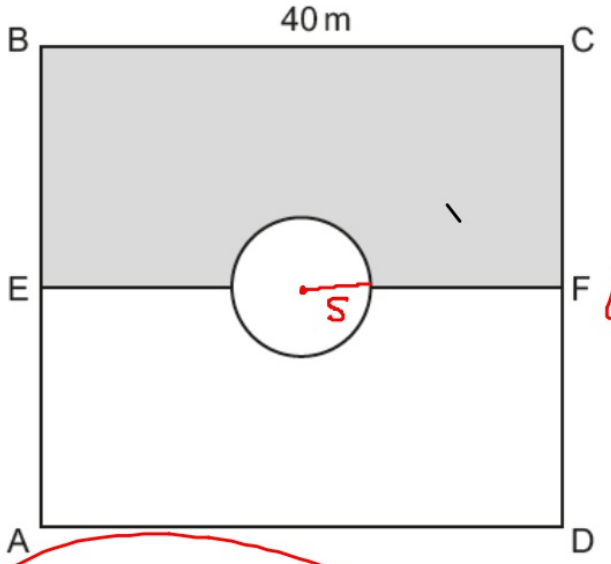


(a) Work out the percentage of the square ABCD that is shaded.

(a) ..... % **[6]**

reated by W Neill

18 The diagram shows all the paths in a park.
ABCD is a square of side 40 metres.
E is the midpoint of AB. F is the midpoint of CD.
The circular path is in the centre of the square and has radius 5 metres.



40m

full square = 40 x 40
= 1600m²

Circle r² x π or πr²
5² x π = 78.5398m²

1600 - 78.5398m²
= 1521.46m²
÷ 2
= 760.73m³

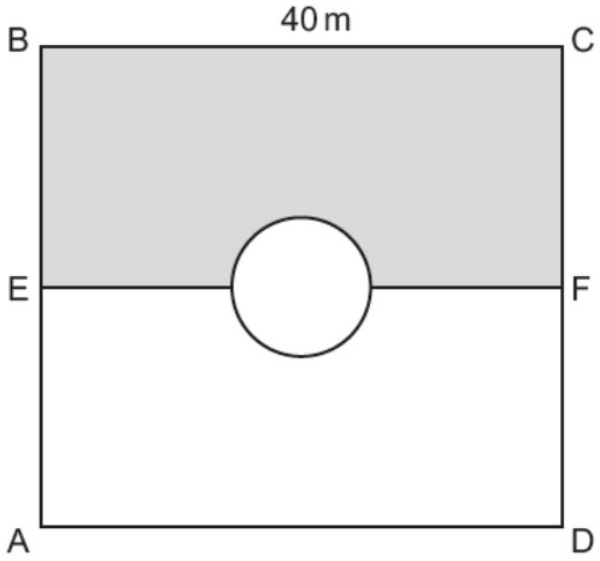
grey

(a) Work out the percentage of the square ABCD that is shaded.

760.73 / 1600 x 100 = 47.55%

(a) 47.55 % **[6]**

18 The diagram shows all the paths in a park.
ABCD is a square of side 40 metres.
E is the midpoint of AB. F is the midpoint of CD.
The circular path is in the centre of the square and has radius 5 metres.

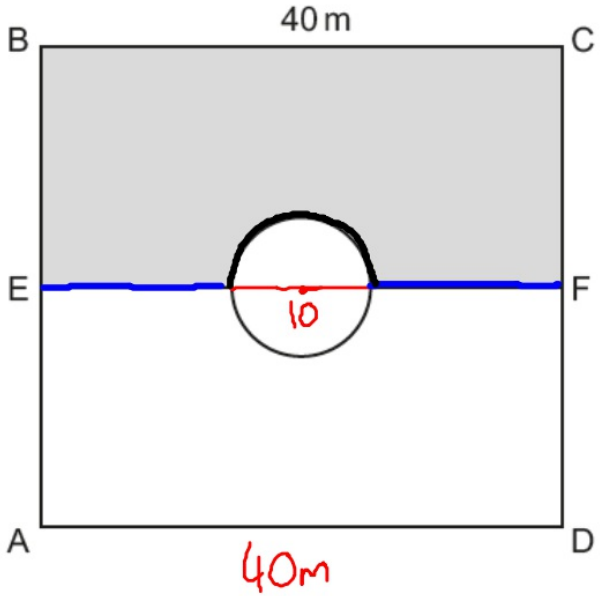


(b) Work out the shortest distance from E to F across the park, using only the paths shown.

(b) ..... m **[4]**

reated by W Neill

18 The diagram shows all the paths in a park.
ABCD is a square of side 40 metres.
E is the midpoint of AB. F is the midpoint of CD.
The circular path is in the centre of the square and has radius 5 metres.



— = 30m

half a circle

Circumference = D × π
= 10 × π ÷ 2
= 15.70 m

(b) Work out the shortest distance from E to F across the park, using only the paths shown.

Total = 30m + 15.7m

(b) 45.7m ..... m **[4]**

Created by W Neill

12 A circle has radius 6 cm.

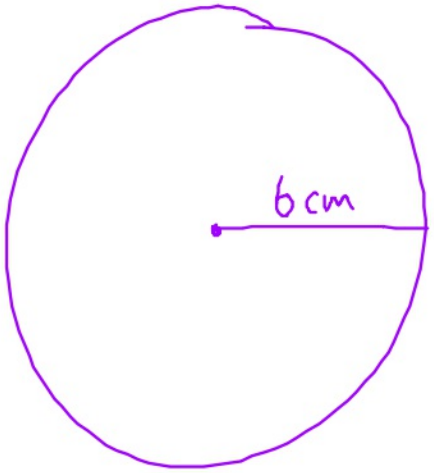
Calculate its circumference.
Give your answer in centimetres, correct to 1 decimal place.

..... cm **[3]**

Created by W Neill

12 A circle has radius 6 cm.

G22 Calculate its circumference.
Give your answer in centimetres, correct to 1 decimal place.



D =

Cir = D x π

Area = R^2 x π

12 x π

37.699 cm

37.7

..... cm **[3]**

Video created by W Neill

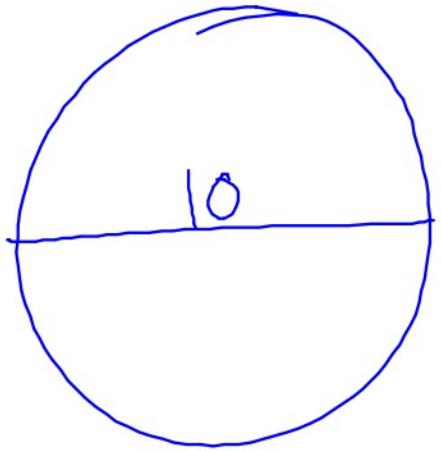
13 Calculate the circumference of a circle with diameter 10 cm.

G22

..... cm **[2]**

13 Calculate the circumference of a circle with diameter 10 cm.

G22



D x π

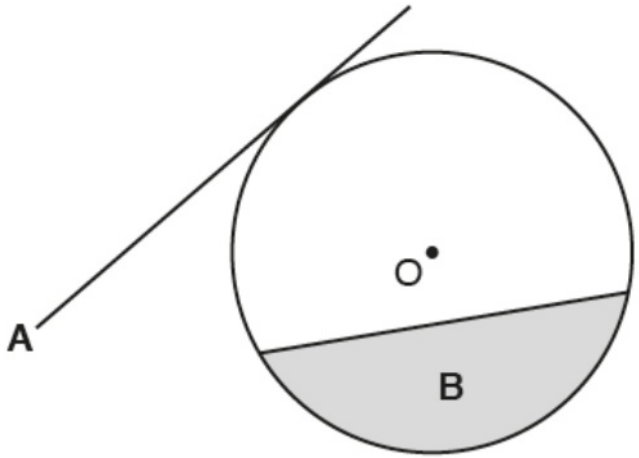
10π / 31.4 cm /

..... cm **[2]**

Created by W Neill

G21

1 The diagram shows a circle, centre O.



Write down the mathematical name of

(a) line **A**,

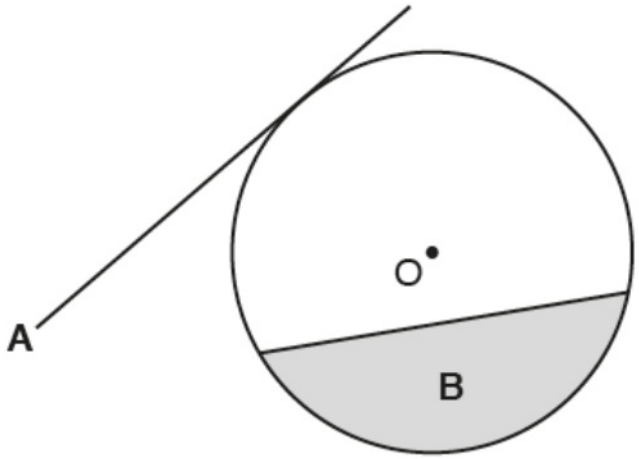
(a) ..... **[1]**

(b) shaded region **B**.

(b) ..... **[1]**

1 The diagram shows a circle, centre O.

G21



Write down the mathematical name of

(a) line **A**,

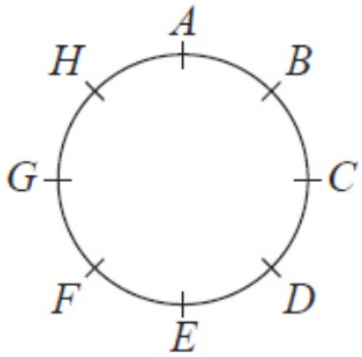
(b) shaded region **B**.

(a) Tangent ..... [1]

(b) Segment ..... [1]

Edexcel

18 Hasmeet walks once round a circle with diameter 80 metres.



There are 8 points equally spaced on the circumference of the circle.

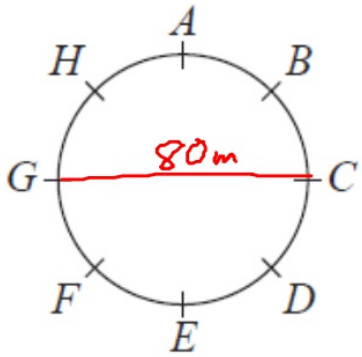
(a) Find the distance Hasmeet walks between one point and the next point.

.....m

(2)

Created by W Neill

Hasmeet walks once round a circle with diameter 80 metres.



There are 8 points equally spaced on the circumference of the circle.

(a) Find the distance Hasmeet walks between one point and the next point.

Cir = D × π

= 80m × π

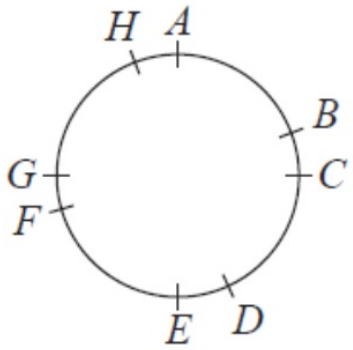
= 80π or 251.32....

$\frac{80\pi}{8}$ =

31.4 ..... m

(2)

Four of the points are moved, as shown in the diagram below.



Hasmeet walks once round the circle again.

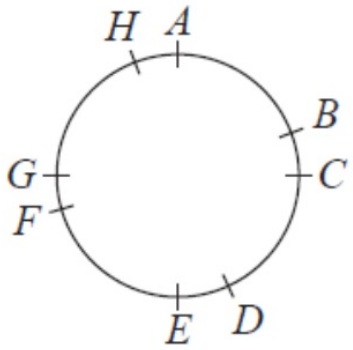
(b) Has the mean distance that Hasmeet walks between one point and the next point changed?
You must give a reason for your answer.

.....

.....

(1)

Four of the points are moved, as shown in the diagram below.



Hasmeet walks once round the circle again.

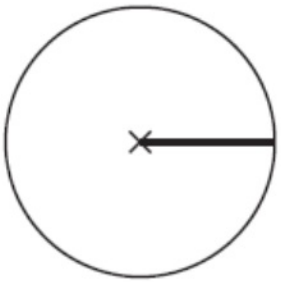
(b) Has the mean distance that Hasmeet walks between one point and the next point changed?
You must give a reason for your answer.

Mean $\frac{\text{Total distance}}{\text{spaces}}$ No $\frac{\text{distance doesn't change}}{\text{Space don't change}}$

(1)

Video created by W Neill

9 The centre of this circle is marked with a cross (×).



(a) Write down the mathematical name of the straight line shown in the circle.

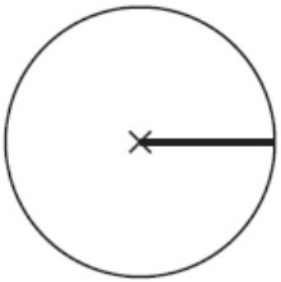
G21

.....

(1)

Video created by W Neill

9 The centre of this circle is marked with a cross (×).



(a) Write down the mathematical name of the straight line shown in the circle.

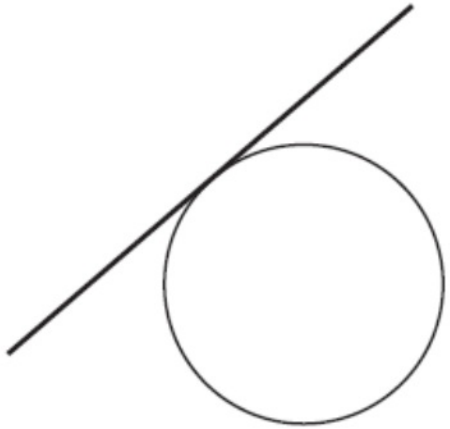
G21

Radius

(1)

(b) Write down the mathematical name of the straight line that is touching the circle.

G21

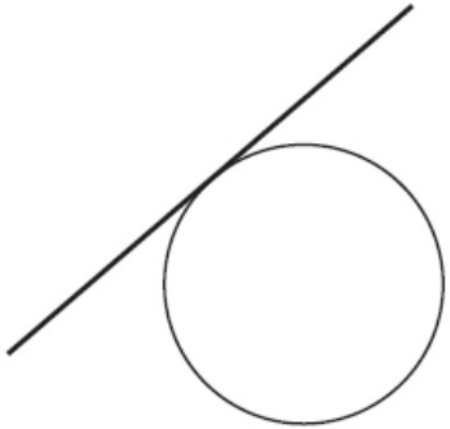


.....

(1)

(b) Write down the mathematical name of the straight line that is touching the circle.

G21

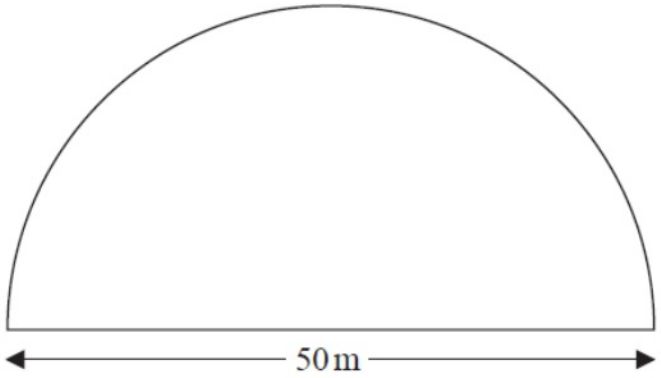


Tangent

(1)

19 A farmer has a field in the shape of a semicircle of diameter 50 m.

Video created by W Neill



The farmer asks Jim to build a fence around the edge of the field.
Jim tells him how much it will cost.

Total cost = £29.86 per metre of fence plus £180 for each day's work

Jim takes three days to build the fence.

Work out the total cost.

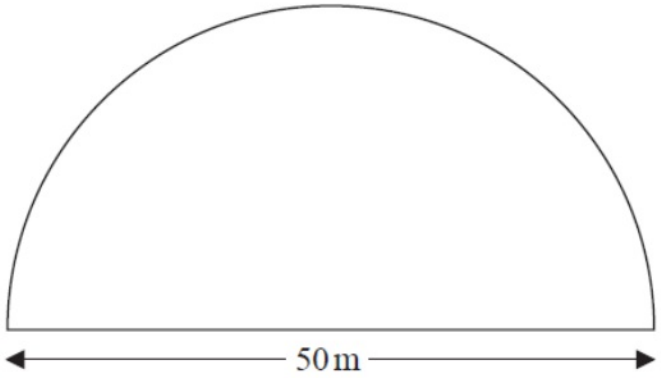
£.....

(Total for Question 19 is 5 marks)

Video created by W Neill

19 A farmer has a field in the shape of a semicircle of diameter 50 m.

G22
G23



full circle = D x π
50 x π
= 157.07m
half circle ÷ 2
= 78.53m (25π)
+ 50
178.539m

The farmer asks Jim to build a fence around the edge of the field.
Jim tells him how much it will cost.

Total cost = £29.86 per metre of fence plus £180 for each day's work

Jim takes three days to build the fence.

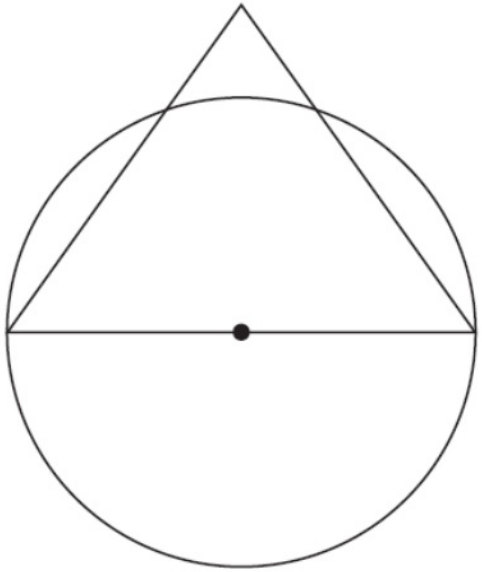
Work out the total cost. 178.539m x £29.86 = £3838.20

£180 x 3 days = £540

£ 4378.20 ✓

(Total for Question 19 is 5 marks)

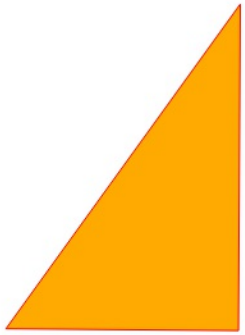
13 The diagram shows a circle and an equilateral triangle.



One side of the equilateral triangle is a diameter of the circle.
The circle has a circumference of 44 cm.

Work out the area of the triangle.
Give your answer correct to 3 significant figures.

G22
G44



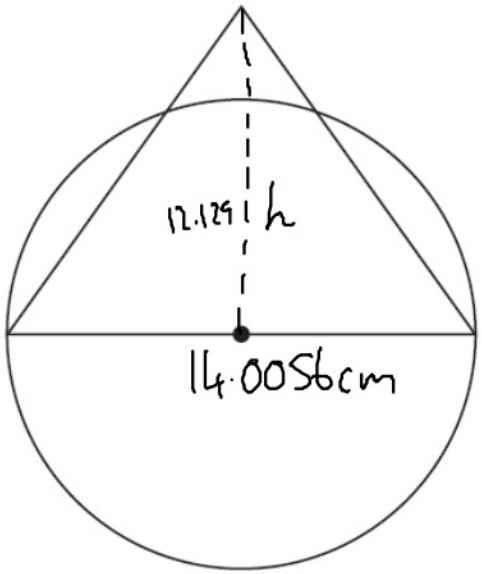
.....cm^2

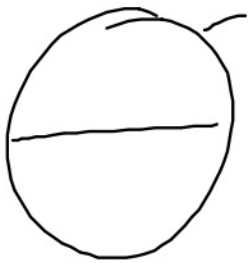
(Total for Question 13 is 3 marks)

13 The diagram shows a circle and an equilateral triangle.

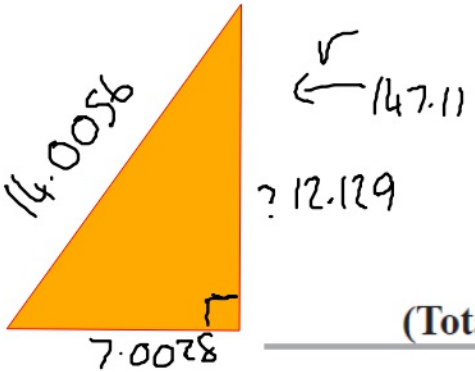
One side of the equilateral triangle is a diameter of the circle.
The circle has a circumference of 44 cm.

Work out the area of the triangle. — $\frac{B \times H}{2}$
Give your answer correct to 3 significant figures.





$\frac{44}{\pi} = 14.0056\text{cm}$



$\frac{B \times H}{2} = \frac{14.0056 \times 12.129}{2}$

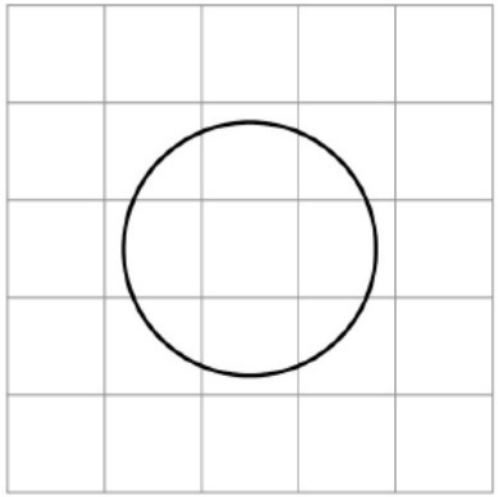
84.9 cm²

(Total for Question 13 is 3 marks)

AQA

13 A circle is drawn on a centimetre grid.

13 (a) Draw a tangent to the circle.



13 (b) Grace works out that the area of the circle is more than 9 cm^2

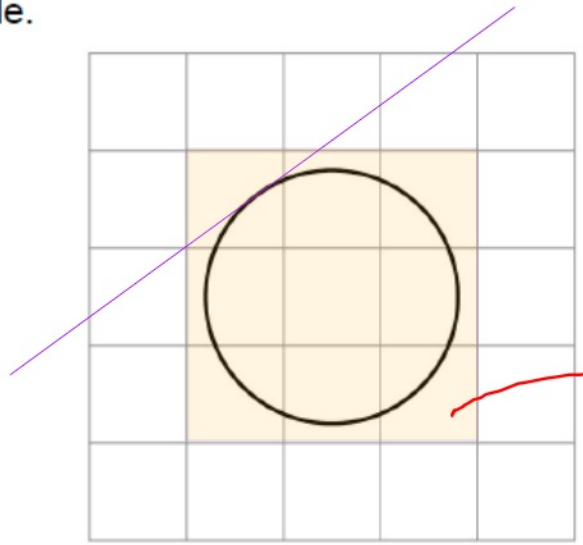
Why must this be wrong?

[1 mark]

13 A circle is drawn on a centimetre grid.

13 (a) Draw a tangent to the circle.

G21



This square is 9cm^2

circle < square

13 (b) Grace works out that the area of the circle is more than 9 cm^2

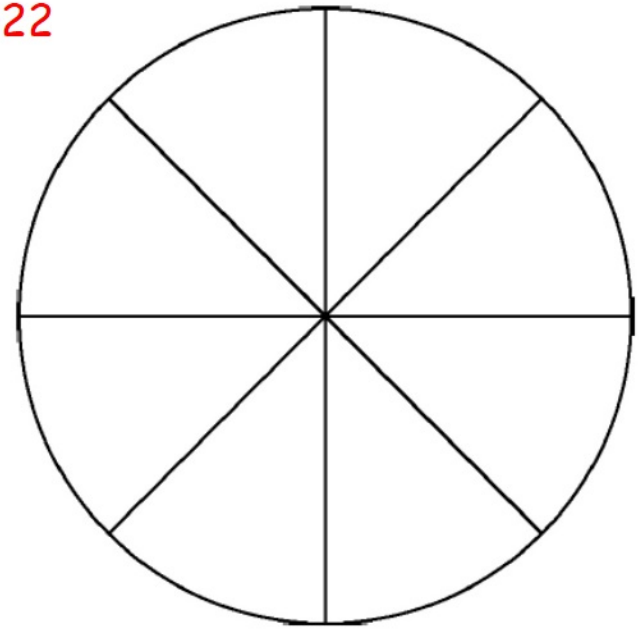
G8 Why must this be wrong?

[1 mark]

16 A wheel is made of a circular rim and 8 spokes as shown.

Video created by W Neill

G22



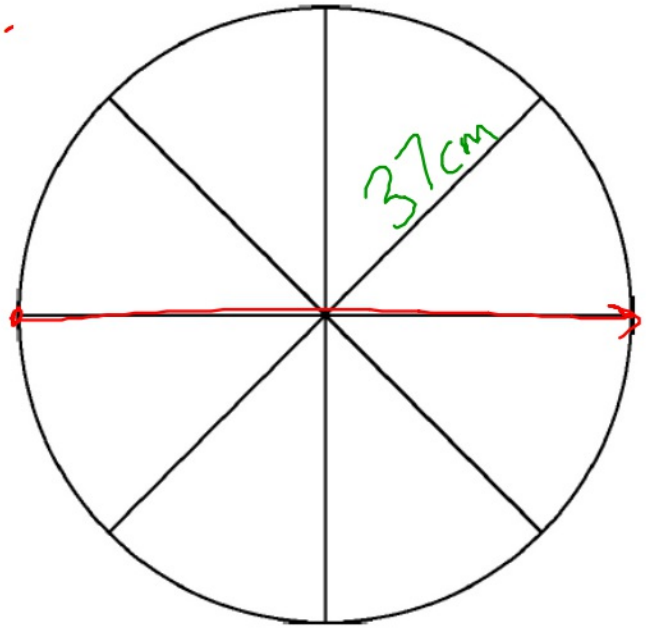
The length of each spoke is 37 cm

Work out the **total** length of the rim and spokes. **[3 marks]**

Not drawn accurately

Answer _____ cm

16 A wheel is made of a circular rim and 8 spokes as shown.



Not drawn accurately

The length of each spoke is 37 cm

Work out the **total** length of the rim and spokes. **[3 marks]**

8 spokes

$= 8 \times 37\text{cm} = 296\text{cm}$

Circumference +

$= D \times \pi$

$74 \times \pi = 232.47\ldots\text{cm}$

Answer 528.48 ✓ cm

21 (a) A circle has radius 4.2 cm

Work out the length of the circumference.

Give your answer to 1 decimal place.

[3 marks]

Answer _____ cm

Video created by W Neill

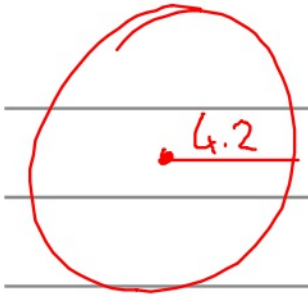
21 (a) A circle has radius 4.2 cm

G22

Work out the length of the circumference.

Give your answer to 1 decimal place.

[3 marks]



D x π

8.4 x π

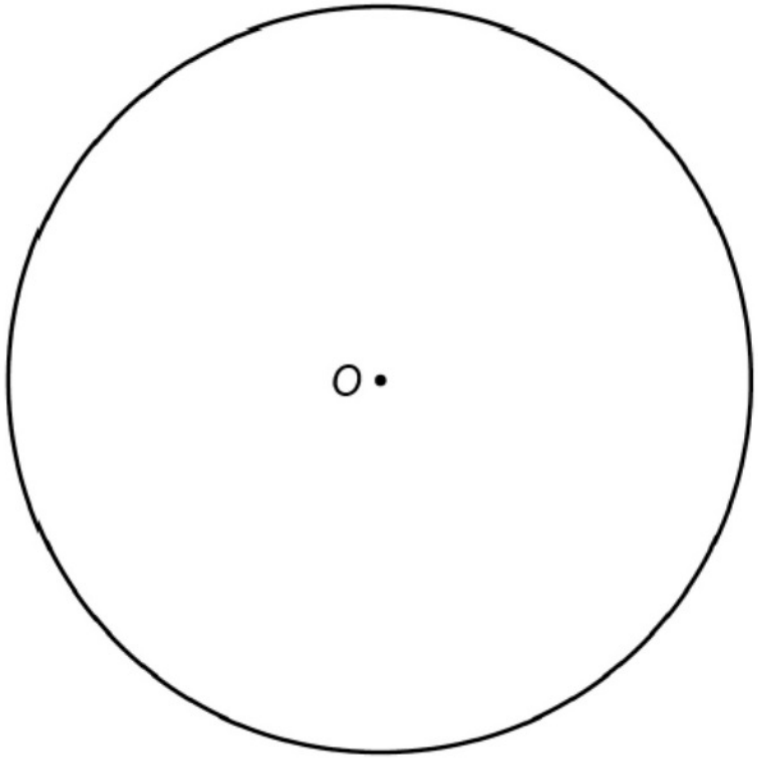
= 26.389

Answer 26.4 cm

Video created by W Neill

21 (b) The circle below has centre O.

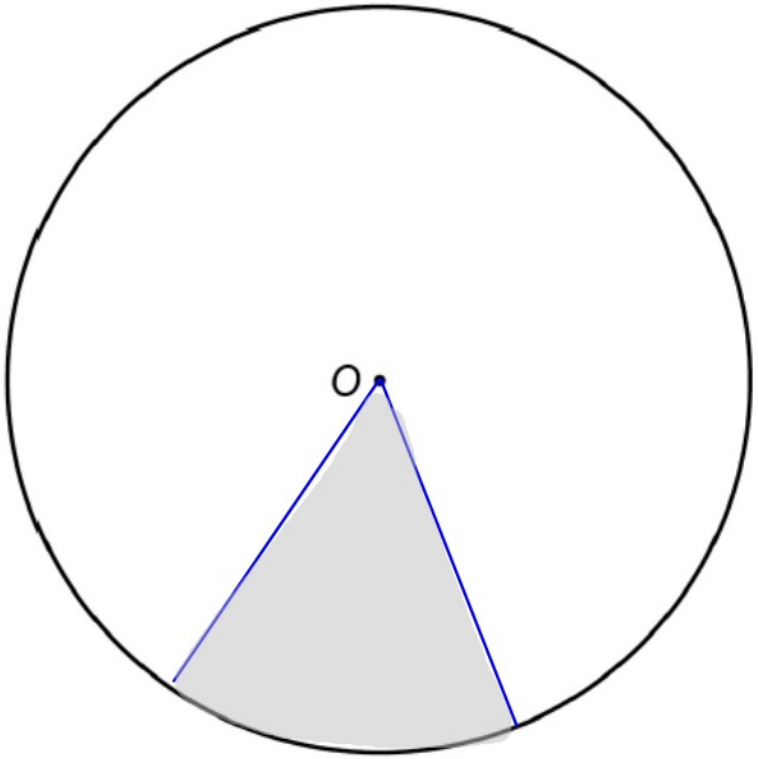
G21 Draw a sector on the circle. **[1 mark]**



Video created by W Neill

21 (b) The circle below has centre O.

G21 Draw a sector on the circle. **[1 mark]**



Video created by W Neill

4 On a circle, which of these is **always** longer than the diameter?

Circle your answer.

G21 **[1 mark]**

chord arc radius circumference

Video created by W Neill

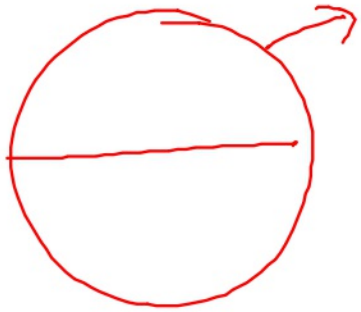
4 On a circle, which of these is **always** longer than the diameter?

Circle your answer.

G21

[1 mark]

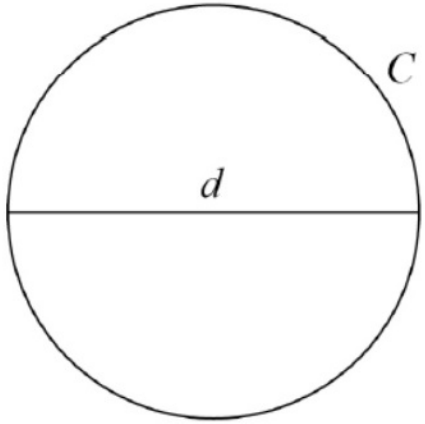
chord arc radius circumference



Video created by W Neill

17 A circle has circumference C and diameter d.

G21
G22



$C = kd$

What **value** does the constant k represent?

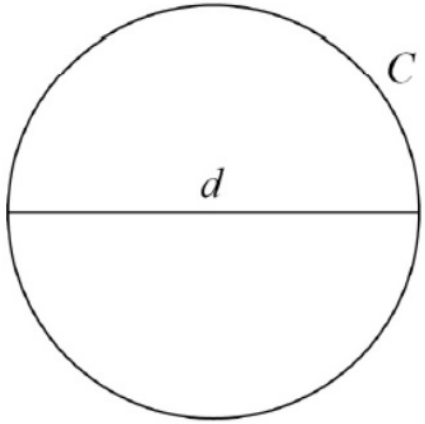
[1 mark]

Answer _____

Video created by W Neill

17 A circle has circumference C and diameter d.

G21
G22



$C = \pi \times D$

$C = K \times D$

$C = kd$

What **value** does the constant k represent?

[1 mark]

Answer $K = \pi$

Video created by W Neill

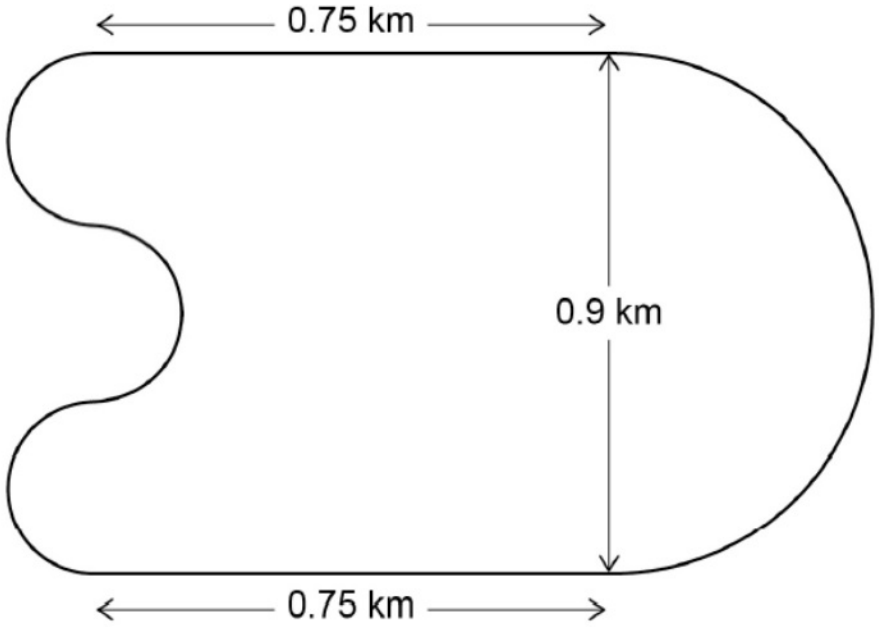
27 A motor racing circuit consists of

G22/23

two parallel straight sections, each of length 0.75 km

a semicircle of diameter 0.9 km

three equal, smaller semicircles.



The length of a motor race must be greater than 305 km

What is the lowest number of **full** laps needed at this circuit?

You **must** show your working. **[5 marks]**

Answer _____

Video created by W Neill

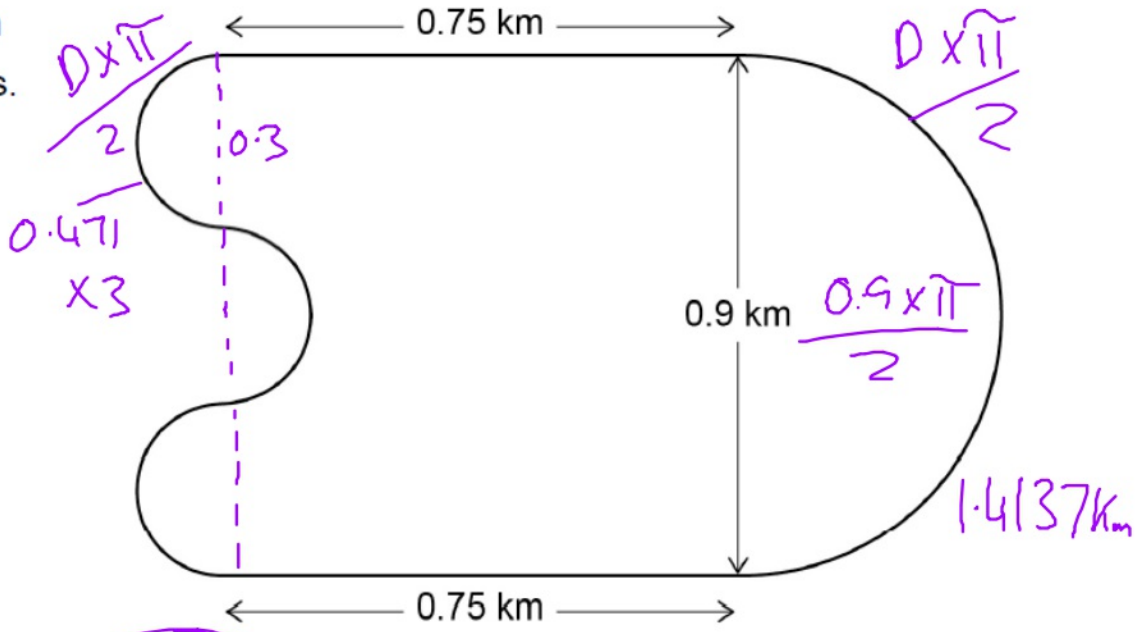
27 A motor racing circuit consists of

G22/23

two parallel straight sections, each of length 0.75 km

a semicircle of diameter 0.9 km

three equal, smaller semicircles.



1 lap = 0.75 Km
+ 0.75 Km
+ 1.4137 Km
+ 1.4137 Km
4.3274 Km

The length of a motor race must be greater than 305 km

What is the lowest number of **full** laps needed at this circuit?

You **must** show your working. **[5 marks]**

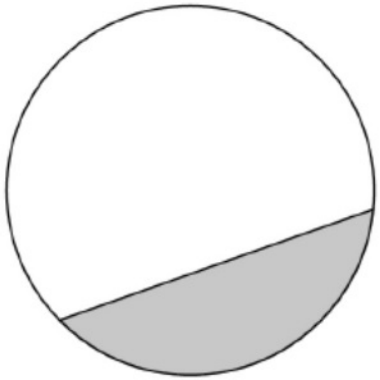
305 / 4.3274 --- 70.48 laps

Answer 71 laps ✓

Video created by W Neill

1 Here is a circle.

G21



Circle the word that describes the shaded part.

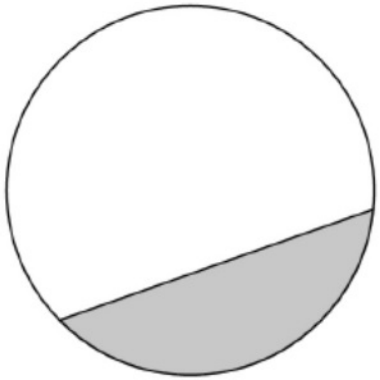
[1 mark]

segment chord sector arc

Video created by W Neill

1 Here is a circle.

G21



Circle the word that describes the shaded part.

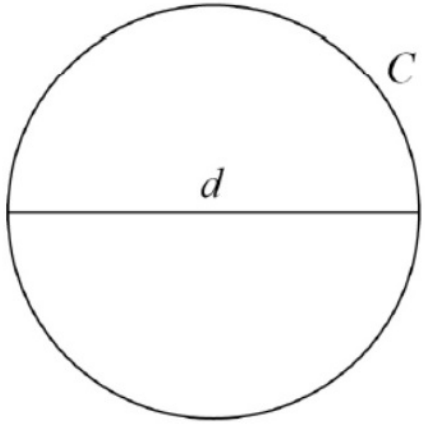
[1 mark]

segment chord sector arc

5

G21
G22

A circle has circumference C and diameter d.



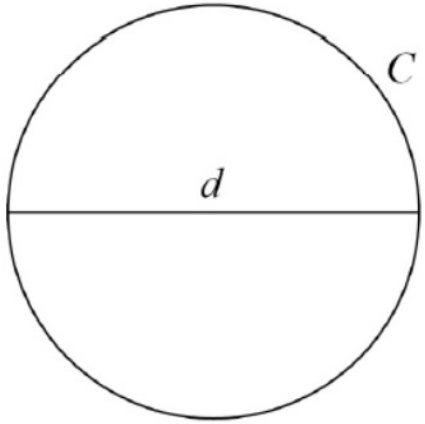
$C = kd$

What **value** does the constant k represent?

[1 mark]

Answer _____

A circle has circumference C and diameter d.



$C = kd$

What **value** does the constant k represent?

[1 mark]

Answer $k = \pi$

$C = \pi \times D$

$C = K \times D$