



EXAM PAPERS PRACTICE

GCSE OCR Math J560

Circle Area & Circumference

Answers

*"We will help you to
achieve A Star "*

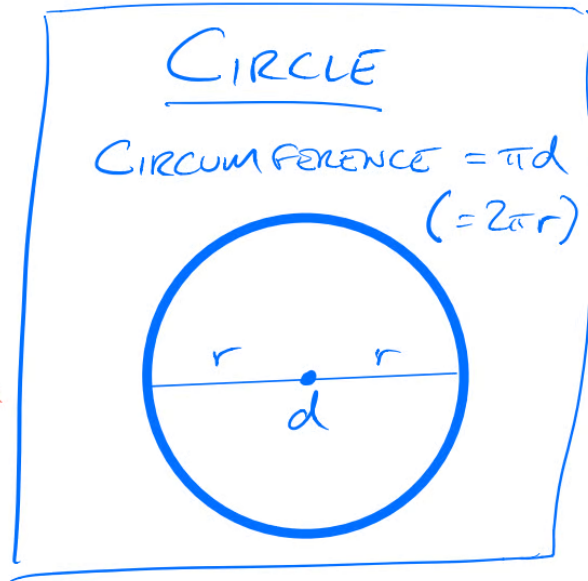


Answer 1

A circle has a diameter of 140 cm.

Work out the circumference of the circle.
Give your answer correct to 3 significant figures.

$$\begin{aligned} \text{CIRCUMFERENCE} &= \pi \times 140 \\ &= \underline{\underline{440 \text{ cm}}} \end{aligned}$$



Answer 2

A circle has a diameter of 7.6 cm.

Work out the circumference of the circle.
Give your answer correct to 3 significant figures.

$$\begin{aligned} \pi D &= \text{Circumference} \\ \pi \times 7.6 &= \underline{\underline{23.9}} \end{aligned}$$

23.9..... cm



Answer 3

The radius, 7.6 cm, is correct to 1 decimal place.

(b) (i) Write down the upper bound of the radius.

$$7.6 \pm 0.05 \text{ cm}$$

$$\underline{7.65} \text{ cm}$$

(ii) Write down the lower bound of the radius.

$$\underline{7.55} \text{ cm}$$

Answer 4

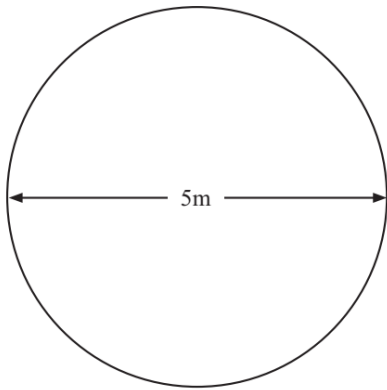


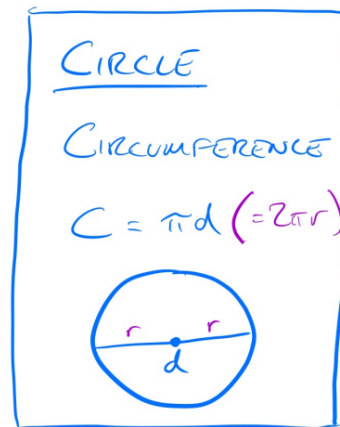
Diagram NOT accurately drawn

Jon has a flower garden in the shape of a circle.
The diameter of the garden is 5 metres.

Jon wants to put fencing around the edge of the garden.
The fencing costs £1.80 per metre.

Work out the total cost of the fencing.

$$\begin{aligned} \text{CIRCUMFERENCE} &= \pi \times 5 \\ &= \underline{5\pi} \text{ METRES} \end{aligned}$$



$$\begin{aligned} \text{COST} &= \text{LENGTH} \times \pounds 1.80 \\ &= 5\pi \times 1.8 \\ &= \underline{\underline{\pounds 28.27}} \end{aligned}$$



Answer 5

Here is a circle.

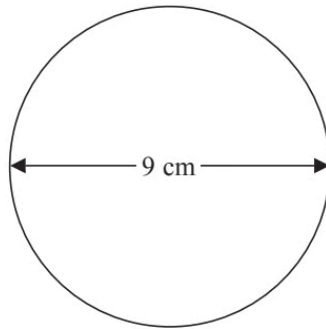
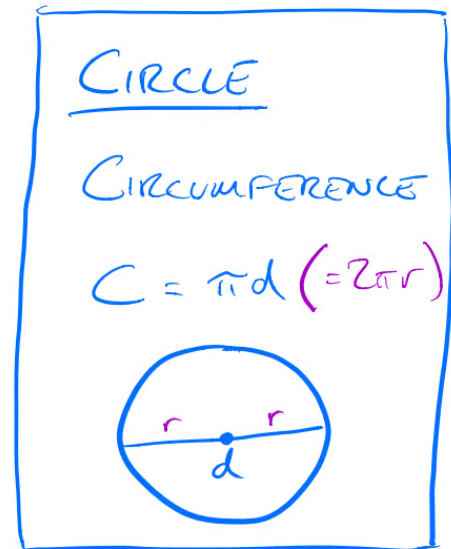


Diagram **NOT**
accurately drawn

The diameter of the circle is 9 cm.

Work out the **circumference** of this circle.
Give your answer correct to 3 significant figures.

$$\begin{aligned} C &= \pi d \\ C &= \pi \times 9 \\ &= \underline{\underline{28.3 \text{ cm}}} \end{aligned}$$





Answer 6

The diagram shows a circle inside a square.

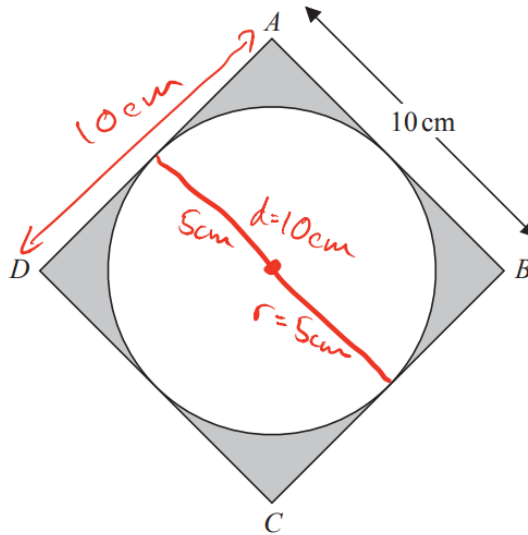
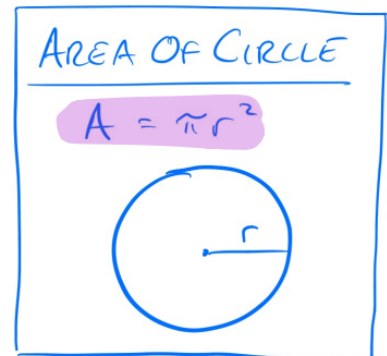


Diagram NOT
accurately drawn

$ABCD$ is a square of side 10 cm.
Each side of the square is a tangent to the circle.

Work out the total area of the shaded regions in terms of π .
Give your answer in its simplest form.

$$\begin{aligned} \text{SHADED AREA} &= \text{AREA OF } \square \\ &\quad - \text{AREA OF } \bigcirc \\ &= 10 \times 10 - \pi \times 5^2 \\ &= \underline{\underline{100 - 25\pi}} \end{aligned}$$





Answer 7

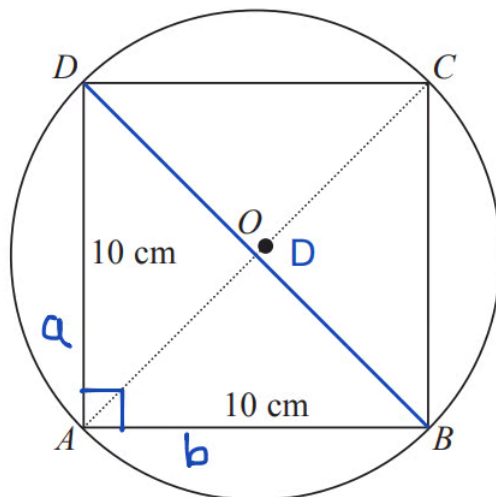


Diagram **NOT** accurately drawn

The diagram shows a square $ABCD$ drawn inside a circle, centre O .
 A , B , C and D are points on the circle.
The lengths of the sides of the square are 10 cm.
 AC is a diameter of the circle.

Calculate the circumference of the circle.
Give your answer correct to 3 significant figures.

$$D^2 = 10^2 + 10^2 \quad (\text{applying Pythagoras theorem})$$

$$D = \sqrt{200} = 14.1\dots$$

Circumference of a circle = π X the diameter

$$\text{Circumference} = \pi \times 14.1\dots = 44.4$$

44.4
..... cm



Answer 8

The wheel takes 30 minutes to rotate once.

(b) Work out the average speed of a point on the circumference of the wheel as it rotates once.

Give your answer in metres per second correct to 3 significant figures.

$$30 \text{ minutes} = 1800 \text{ seconds}$$

The point has to travel 1
circumference = 471m

$$\text{Speed} = \text{distance} / \text{time}$$
$$471 / 1800 = 0.262$$

0.262
..... metres per second



Answer 9

The diagram shows a circle drawn inside a square.

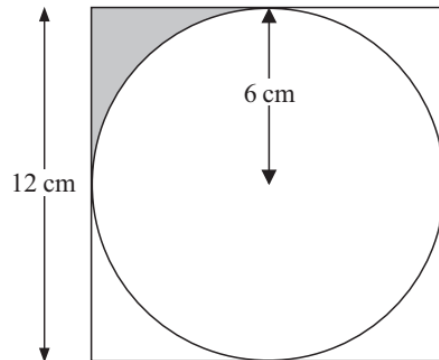


Diagram **NOT** accurately drawn

The circle has a radius of 6 cm.
The square has a side of length 12 cm.

$$\begin{aligned} &\rightarrow A = \pi r^2 \\ &\rightarrow A = L^2 \end{aligned}$$

Work out the shaded area.

Give your answer in terms of π .

All four corners:

AREA OF SQUARE - AREA OF CIRCLE

$$12^2 - \pi \times 6^2$$

$$= 144 - 36\pi$$

$$\text{SHADED AREA} = \frac{144 - 36\pi}{4} \quad \checkmark$$

$$= \underline{\underline{36 - 9\pi}} \quad \checkmark$$

EITHER ANSWER IS FINE.



Answer 10

The diagram shows the top of Levi's birthday cake.

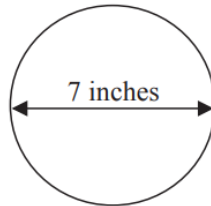


Diagram NOT accurately drawn

The top of the cake is in the shape of a circle.
The diameter of the circle is 7 inches.

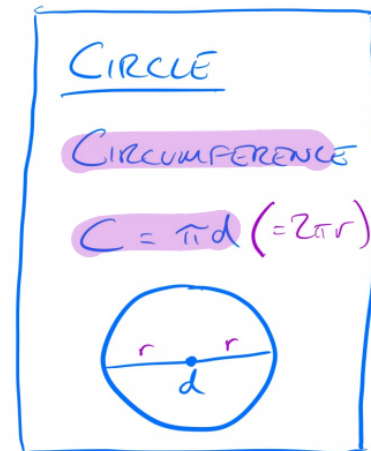
A ribbon is going to be put around the side of the cake.
Ribbons are sold in 50 cm lengths.

1 inch is 2.54 cm. — USE RATIO

Work out if one length of ribbon is long enough to go all the way around the cake.
You must show your working.

INCH : CM
1 : 2.54
DIAM : 7 : 17.78

(Handwritten notes: 'x7' with arrows pointing to the conversion of 1 inch to 2.54 cm and 7 inches to 17.78 cm.)



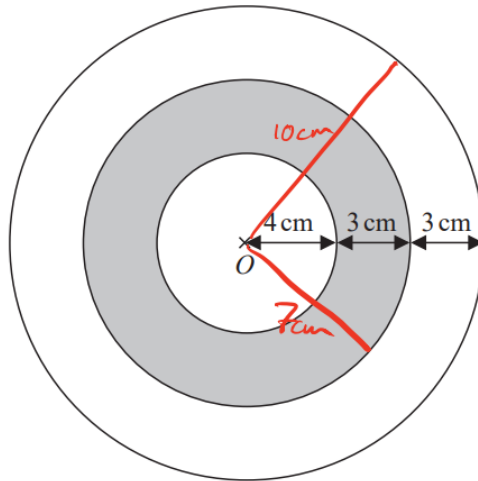
$$\begin{aligned} \text{CIRCUMFERENCE} &= \pi d \\ &= \pi \times 17.78 \\ &= 55.8575 \dots \text{ cm} \end{aligned}$$

NO, A RIBBON IS 50 cm BUT THE CIRCUMFERENCE IS 55.8... cm > 50 cm.



Answer 11

The diagram shows a logo made from three circles.

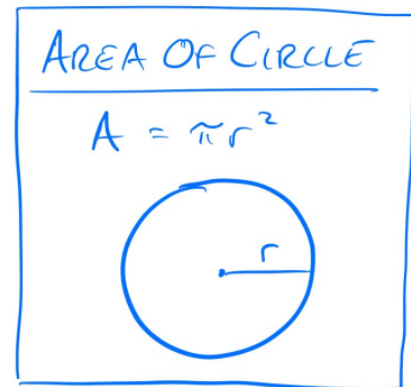


Each circle has centre O .

Daisy says that exactly $\frac{1}{3}$ of the logo is shaded.

Is Daisy correct?

You must show all your working.



$$\begin{aligned} \text{SHADED AREA} &= \text{Area of circle with radius 7} - \text{Area of circle with radius 4} \\ &= \pi \times 7^2 - \pi \times 4^2 \\ &= 49\pi - 16\pi \\ &= \underline{\underline{33\pi \text{ cm}^2}} \end{aligned}$$

$$\begin{aligned} \text{TOTAL AREA} &= \pi \times 10^2 \\ &= \underline{\underline{100\pi}} \end{aligned}$$

$$\text{SHADED FRACTION} = \frac{33\pi}{100\pi} = \underline{\underline{\frac{33}{100}}} \neq \frac{1}{3}$$

DAISY IS WRONG



Answer 12

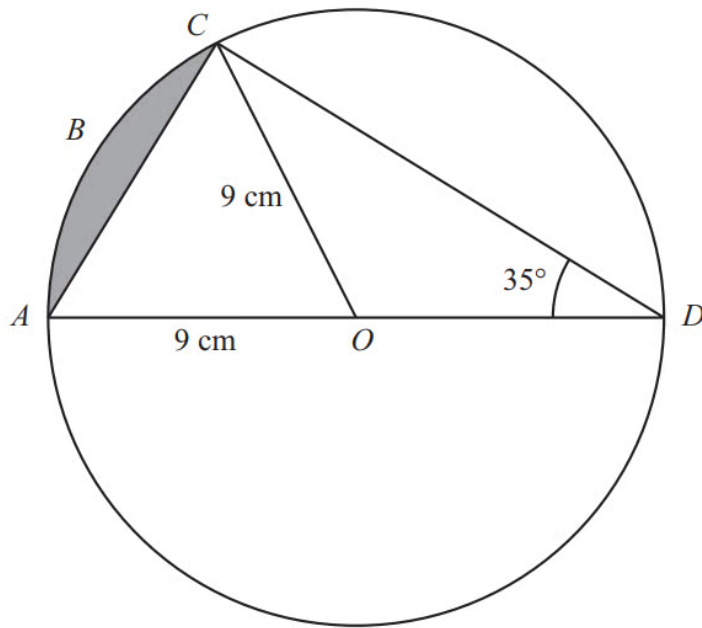


Diagram **NOT** accurately drawn

AOD is a diameter of a circle, with centre O and radius 9 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.

$$AOC = 2 \times 35 = 70$$

$$\text{Area of the triangle } AOC = 0.5 a b \sin(c) = 0.5 \times 9 \times 9 \times \sin(70) = 38.05\dots$$

$$\begin{aligned} \text{Area of sector} &= \theta/360 \times \pi \times r^2 \\ &= (70/360) \times \pi \times 9 \times 9 = 49.48\dots \end{aligned}$$

$$\text{Area of sector} - \text{area of the triangle} = \text{shaded area} = 49.48\dots - 38.05 = 11.4$$

11.4
..... cm²



Answer 13

- (b) Calculate the area of the pond.
Show your working clearly.
Give your answer correct to 3 significant figures.

using quadratic formula

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = x, \text{ where } ax^2 + bx + c = 0$$

$$\frac{-(-60) \pm \sqrt{(-60)^2 - (4 \times 2 \times 45)}}{2(2)} = x$$

$$\frac{(60) \pm \sqrt{(3600) - (360)}}{4}$$

$$\frac{60 \pm 6\sqrt{110}}{4} = x$$

$$X = 30.732... , -0.73$$

Discount -0.73 as a distance must be positive

$$\text{Area of pond} = \pi r^2 = \pi (30.732...)^2 = 2967.12...$$

$$\text{area of pond} = 2970$$



Answer 14

The diagram shows a square $ABCD$ inside a circle.

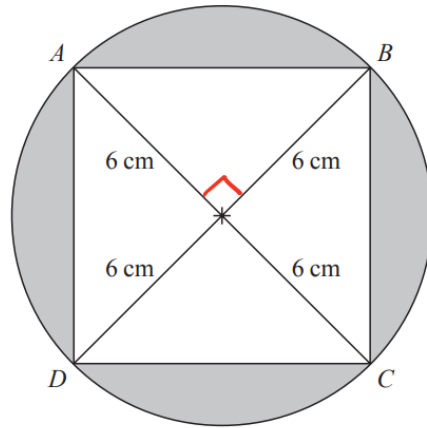


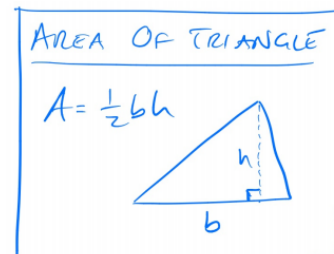
Diagram **NOT** accurately drawn

The points A , B , C and D lie on the circle.

The radius of the circle is 6 cm.

Work out the total area of the shaded regions.

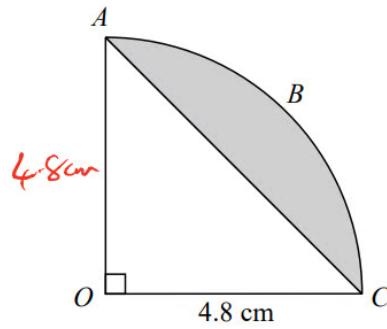
Give your answer correct to 3 significant figures.



$$\begin{aligned} \text{SHADED AREA} &= \text{Circle} - \text{Square} \\ &= \text{Circle} - 4 \times \text{triangle} \\ &= \pi \times 6^2 - 4 \times \frac{1}{2} \times 6 \times 6 \\ &= 41.0973 \dots \\ &\quad \downarrow \quad \downarrow \\ &\quad \geq 5 \quad \text{Round Up} \\ &= \underline{\underline{41.1 \text{ cm}^2}} \end{aligned}$$



Answer 15



The arc ABC is a quarter of a circle with centre O and radius 4.8 cm.
 AC is a chord of the circle.

Work out the area of the shaded segment.

Give your answer correct to 3 significant figures.

SHADEN AREA =

$$= \frac{90}{360} \times \pi \times 4.8^2 - \frac{1}{2} \times 4.8 \times 4.8$$
$$= 6.57557 \dots$$

↓
≥5
Round UP

$$= \underline{\underline{6.58 \text{ cm}^2}}$$

SECTOR OF A CIRCLE

$$\text{ARC LENGTH} = \frac{\theta}{360} \times 2\pi r$$
$$\text{SECTOR AREA} = \frac{\theta}{360} \times \pi r^2$$

AREA OF TRIANGLE

$$A = \frac{1}{2}bh$$