Name:

Exam Style Questions

Area of a Circle

Corbettmaths

Equipment needed: Calculator, pen

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

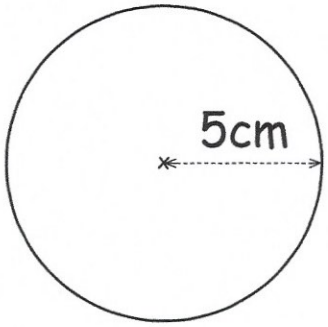
Video Tutorial

www.corbettmaths.com/contents

Video 40 and 59

Answers and Video Solutions

1. Shown is a circle with radius 5cm.



Work out the area of the circle.

State the units for your answer.
Give your answer to 2 decimal places.

$A = \pi \times 5^2$

$= 78.53981... cm^2$

78.54cm²
.....

(3)

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2. A circle has radius 3cm.

Work out the area of the circle.
Give your answer in terms of π

$A = \pi \times 3^2$

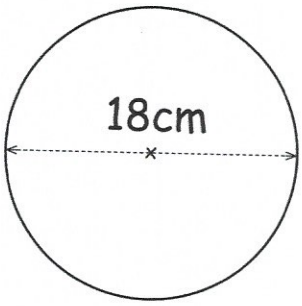
$= \pi \times 9$

$= 9\pi \ cm^2$

9π
.....cm²

(2)

3. A circle has a diameter of 18cm.



Work out the area of the circle.
Give your answer to 1 decimal place.

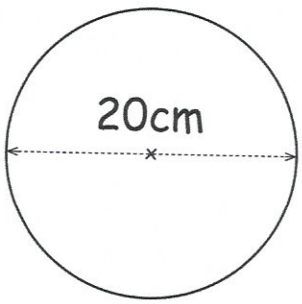
$A = \pi \times 9^2$

$= 254.469..\ cm^2$

254.5 .....cm²

(2)

4. A circle has a diameter of 20cm.



Work out the area of the circle.
Use $\pi = 3.14$

$A = \pi \times 10^2$

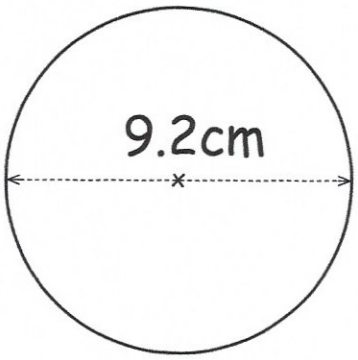
$= 3.14 \times 100$

$= 314$

314 .....cm²

(2)

5. A circle has a diameter of 9.2cm



Work out the area of the circle.

$A = \pi \times 4.6^2$

$= 66.4761...$

$= 66.5 \text{ cm}^2$ to 1 dp

66.5 .....cm²

(2)

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6. A circular fishpond has radius 2.5m

Calculate the area of the fishpond.
Include units for your answer.

$A = \pi \times 2.5^2$

$= \pi \times 6.25$

$= 19.63495...$

19.635 m² .....

(3)

7. A mobile phone mast has a range of 3km.

Calculate the area of the shaded region.
Give your answer to 2 decimal places.

$\pi \times 3^2$

$28.27433388..\ km^2$

28.27 ..... km^2

(2)

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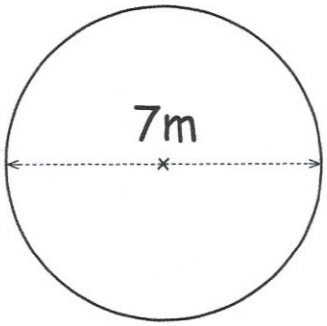
8. A circular flower bed has diameter 7 metres.



Work out the area of the flower bed.
Give your answer correct to 1 decimal place.

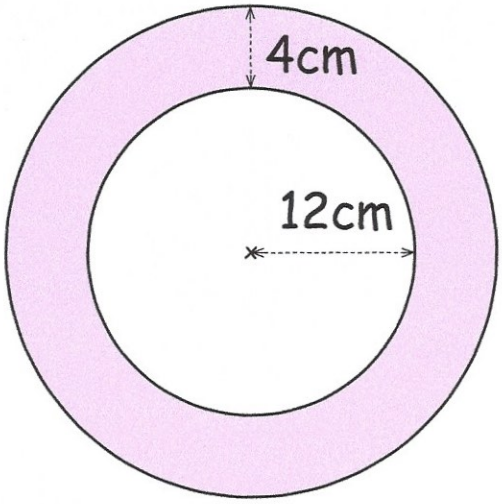
$\pi \times 3.5^2$

38.48451001

38.5 ..... m^2

(2)

9. Shown below is a circular photo surrounded by a frame.



The photo has radius 12cm.
The frame has width 4cm.

Work out area of the frame.
This area is shaded in the diagram.

$\pi \times 16^2 = 804.2477...$ (256π)

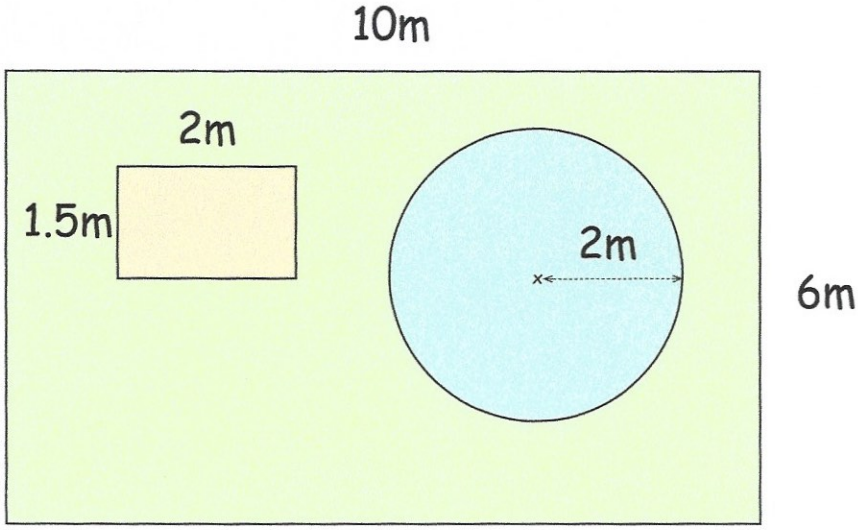
$\pi \times 12^2 = 452.38934...$ (144π)

$804.2477... - 452.389... = 351.8583...$ (112π)

351.86 .....cm²
or
112π cm²

(3)

10. Shown below is a rectangular garden.



Belle wants to re-seed the grass in her garden.

(1) The garden is 10 metres long and 6 metres wide.
(2) There is a vegetable patch that is 2 metres long and 1.5 metres long.
(3) There is a circular pond that has radius 2 metres.
The remainder of the garden is grass.

Each bag of grass seed costs £4.60 and covers $10m^2$.

Work out the total cost to re-seed the garden.

(1) $10 \times 6 = 60m^2$

(2) $2 \times 1.5 = 3m^2$

(3) $\pi \times 2^2 = 12.566\ldots m^2$ (4π)

$60 - 3 - 12.566\ldots = 44.433\ldots m^2$

$44.43\ldots \div 10 = 4.43\ldots$ bags

5 bags

$5 \times 4.60 = £23$

£ 23

(6)

11. A circle has an area of 200cm²

Work out the radius of the circle.

$\pi \times r^2 = 200$

$r^2 = 63.6619...$

$r = \sqrt{63.6619...}$

$r = 7.978...$

7.98 ..... cm

(2)

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12. A circle has an area of 64π cm²

Work out the radius of the circle.

$\pi r^2 = 64\pi$

$r^2 = 64$

$r = 8$

8 ..... cm

(2)

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13. A circle has a circumference of 40cm.

Work out the area of the circle.

$C = \pi \times d$

$40 = \pi \times d$

$d = 40 \div \pi = 12.732...$

$r = 12.732... \div 2 = 6.36619...$

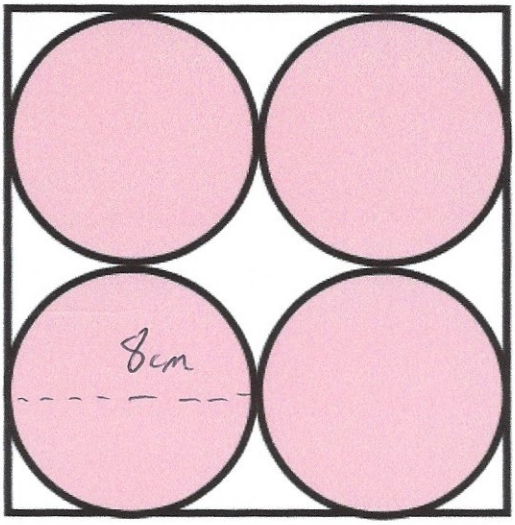
$\pi \times 6.36619...^2$

$127.3239...$

127.3 ..... cm²

(3)

14. A logo is designed that has four pink circles within a white square.



The square has side length 16cm.

Find the area of the logo that is white.

$\pi \times 4^2 = 16\pi$ (50.26548...)

$16\pi \times 4 = 64\pi$ (201.0619...)

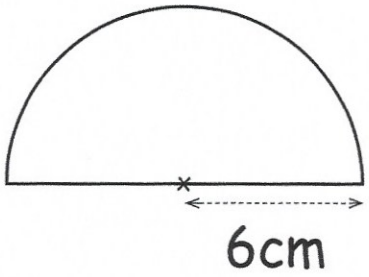
$16 \times 16 = 256$

$256 - 64\pi = 54.938...$

54.94 .....cm²

(5)

15. Shown below is a semicircle with radius 6cm.



Work out the area of the semicircle.
Give your answer to 1 decimal place.

$\pi \times 6^2 = 113.09733...$ (36π)

$113.09733... \div 2 = 56.5486...$ cm^2 (18π)

56.5

.....cm^2

(2)

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16. A pizza shop sells two different size pizzas.

A small pizza has a diameter of 6 inches.
A large pizza has a diameter of 12 inches.

Jackson says that if he orders two small pizzas, he will receive the same amount of pizza as one large pizza.

Explain why Jackson is incorrect.

Area of a small pizza: $\pi \times 3^2$

$= 28.274...$ (9π) square inches

Area of a large pizza: $\pi \times 6^2$

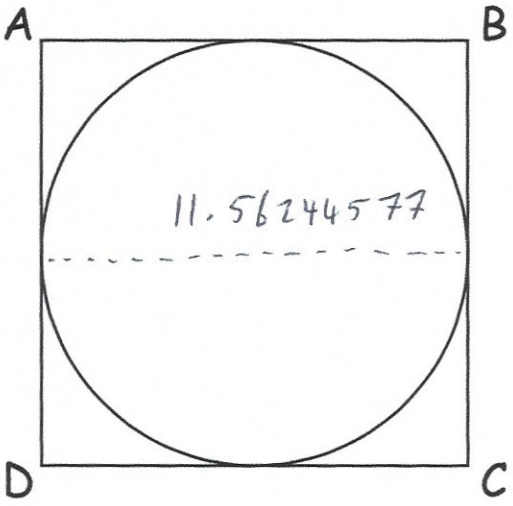
$= 113.09733...$ (36π) square inches

$113.09733... \div 28.274... = 4$

Jackson is incorrect as he would need 4 small pizzas, not 2.

(3)

17. Shown below is a circle inside of a square, ABCD.
The circle touches the 4 sides of the square.



The area of the circle is 105cm²

Find the area of the square, ABCD.

$\pi \times r^2 = 105$

$r^2 = 33.422538 05$

$r = 5.781222885$

$d = 11.562445 77$

$11.562445 77 \times 11.562445 77$

$= 133.69 \text{ cm}^2$ to 2dp

133.69 .....cm²

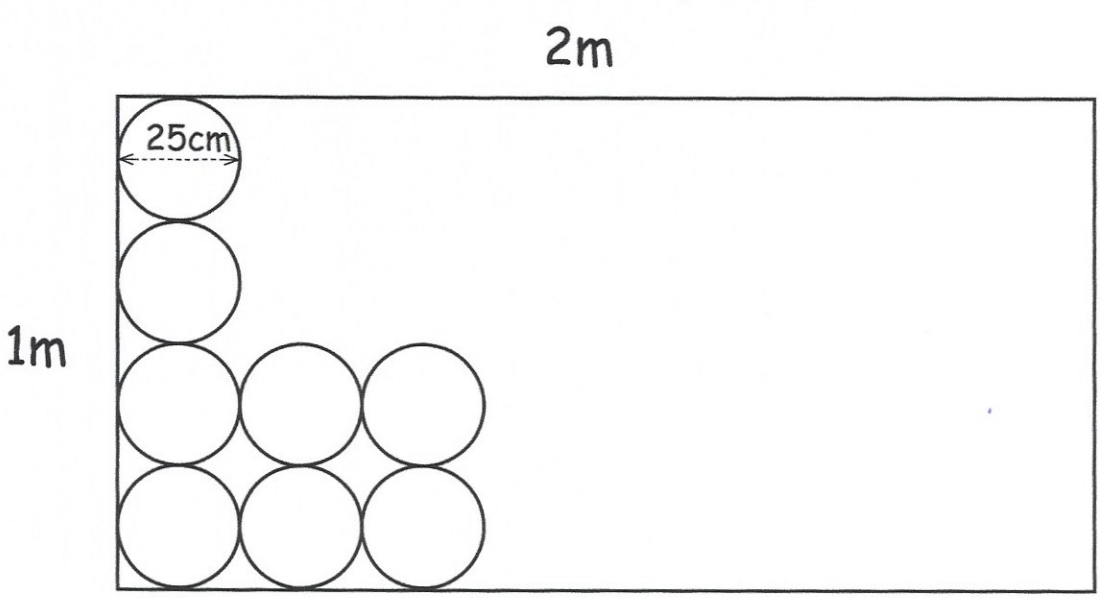
(4)

18. Oliver is cutting discs from a sheet of metal.

Each circular disc has a diameter of 25cm.
The sheet of metal measures 2 metres by 1 metre.

The diagram shows the sheet of metal after Oliver has removed 8 discs from the sheet of metal.

200 ÷ 25 = 8



(a) Calculate the area of each circular disc.

$\pi \times 12.5^2$

490.873852...

490.874 cm² to 3dp

(2)

Oliver removes as many circular discs as possible.

(b) Work out the area of metal left over.

4 rows of 8 = 32 circles

100 × 200 = 20000 cm²

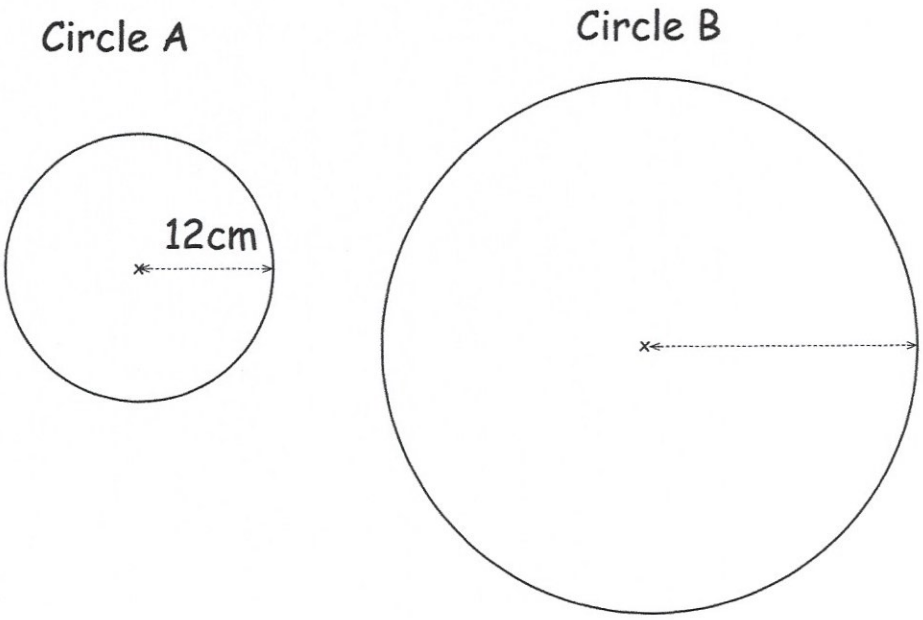
32 × 490.873... = 15707.9632...

20000 − 15707.9632...

4292.04 cm²

(3)

19. Shown below are two circles, A and B.



Circle A has a radius of 12cm

The area of circle B is 4 times larger than the area of circle A.

Find the ratio of the radius of circle A : the radius of circle B

Circle A : $\pi \times 12^2 = 144\pi$ (452.389...)

Circle B : $144\pi \times 4 = 576\pi$ (1809.557...)

$A = \pi r^2$

$576\pi = \pi r^2$

$576 = r^2$

$r = 24$

$12 : 24$

$1 : 2$

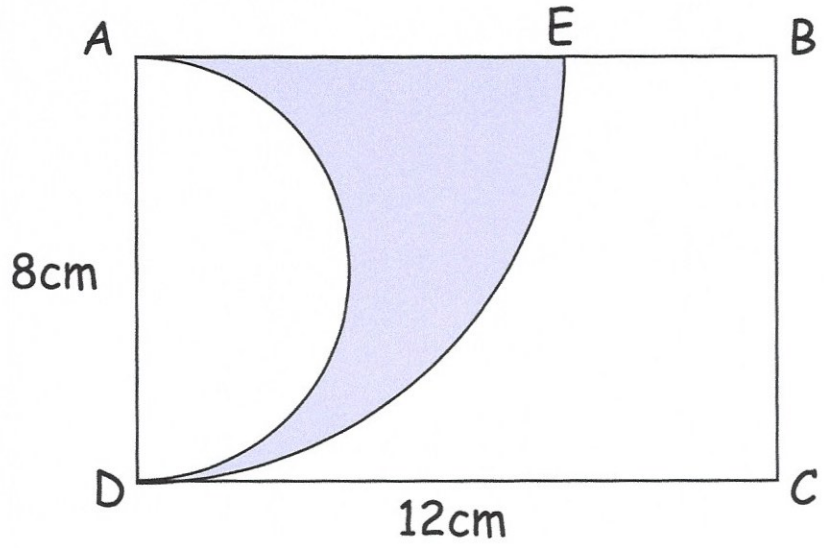
1 : 2

.....

(4)

20. Kirsty is designing a logo for her company.

She has drawn rectangle ABCD, where AD = 8cm and CD = 12cm.
AD is the diameter of a semicircle.
DE is an arc of a circle, centre A.



Find the percentage of the logo that is shaded.

$8 \times 12 = 96 cm^2$

Quarter circle : $\frac{1}{4} \times \pi \times 8^2 = 16\pi$ (50.265...)

Semi-circle : $\frac{1}{2} \times \pi \times 4^2 = 8\pi$ (25.1327...)

Shaded : $16\pi - 8\pi = 8\pi$ (25.1327...)

$\frac{8\pi}{96} \times 100 = 26.1799...$

26.18 .....%

(5)