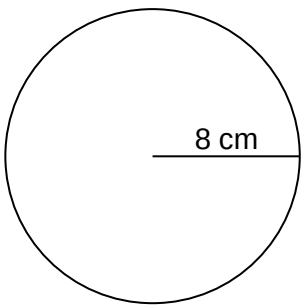
Area and Circumference of Circles

SCAN ME

REVISE THIS TOPIC

1 A circle has a radius of 8 cm.



Not drawn accurately

1 (a) Work out the area of the circle.
Give your answer to 1 decimal place. **[2 marks]**

$\pi \times 8^2 = 201.06192 98$

Answer 201.1 cm^2

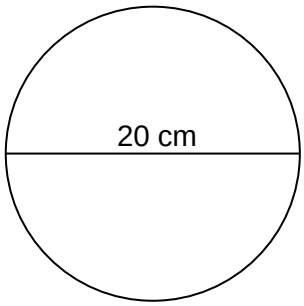
1 (b) Work out the circumference of the circle.
Give your answer to 1 decimal place. **[2 marks]**

$\pi \times 16 = 50.26548246$

Answer 50.3 cm

4

2 A circle has a diameter of 20 cm.



Not drawn accurately

2 (a) Work out the area of the circle.
Give your answer to 1 decimal place. **[2 marks]**

$\pi \times 10^2 = 314.1592654$

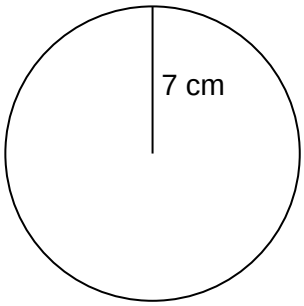
Answer 314.2 cm^2

2 (b) Work out the circumference of the circle.
Give your answer to 1 decimal place. **[2 marks]**

$\pi \times 20 = 62.83185307$

Answer 62.8 cm

3 A circle has a radius of 7 cm.



Not drawn accurately

3 (a) Work out the area of the circle.
Give your answer in terms of π

[2 marks]

$\pi \times 7^2 = 49\pi$

Answer 49π cm^2

3 (b) Work out the circumference of the circle.
Give your answer in terms of π

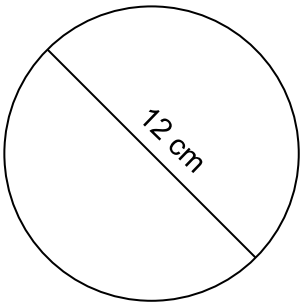
[2 marks]

$\pi \times 14 = 14\pi$

Answer 14π cm

8

4 A circle has a diameter of 12 cm.



Not drawn accurately

4 (a) Work out the area of the circle.
Give your answer in terms of π **[2 marks]**

$\pi \times 6^2 = 36\pi$

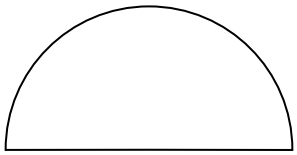
Answer 36π cm^2

4 (b) Work out the circumference of the circle.
Give your answer in terms of π **[2 marks]**

$\pi \times 12 = 12\pi$

Answer 12π cm

5 Here is a semicircle with a diameter of 30 cm.



30 cm

Not drawn accurately

5 (a) Work out the area of the semicircle.
Give your answer to 1 decimal place. **[3 marks]**

$\pi \times 15^2 = 706.8583471$

$706.8... \div 2 = 353.4291735$

Answer 353.4 cm^2

5 (b) Work out the perimeter of the semicircle.
Give your answer to 1 decimal place. **[3 marks]**

$\pi \times 30 = 94.24777961$

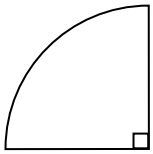
$94.2... \div 2 = 47.12388898$

$47.1... + 30 = 77.12388898$

Answer 77.1 cm

10

6 Here is a quarter circle with a radius of 9 cm.



Not drawn accurately

6 (a) Work out the area of the quarter circle.
Give your answer to 1 decimal place. **[3 marks]**

$\pi \times 9^2 = 254.469\,0049$

$254.4\ldots \div 4 = 63.617\,25124$

Answer 63.6 cm^2

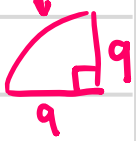
6 (b) Work out the perimeter of the quarter circle.
Give your answer to 1 decimal place. **[3 marks]**

$\pi \times 18 = 56.548\,66776$

$56.5\ldots \div 4 = 14.137\,16694$

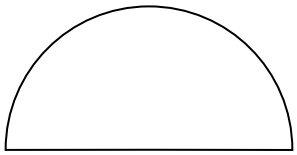
$14.1\ldots + 9 + 9 = 32.137\,16694$

14.1...



Answer 32.1 cm

7 Here is a semicircle with a diameter of 8 m.



Not drawn accurately

7 (a) Work out the area of the semicircle.
Give your answer in terms of π **[3 marks]**

$\pi \times 4^2 = 16\pi$

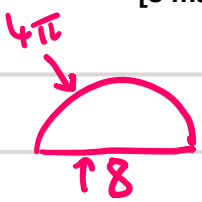
$16\pi \div 2 = 8\pi$

Answer 8π m^2

7 (b) Work out the perimeter of the semicircle.
Give your answer in terms of π **[3 marks]**

$\pi \times 8 = 8\pi$

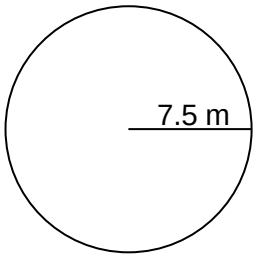
$8\pi \div 2 = 4\pi$



Answer $4\pi + 8$ m

12

8 The diagram below shows a circular shaped garden with a radius of 7.5 m



8 (a) A gardener plans to cover the garden in grass seed.
A box of grass seed will cover 40 square metres of the garden.
Work out how many boxes of grass seed the gardener will need. **[3 marks]**

$\pi \times 7.5^2 = 176.7145868\ m^2$

$176.714\ldots \div 40 = 4.417864669$

Answer 5 boxes

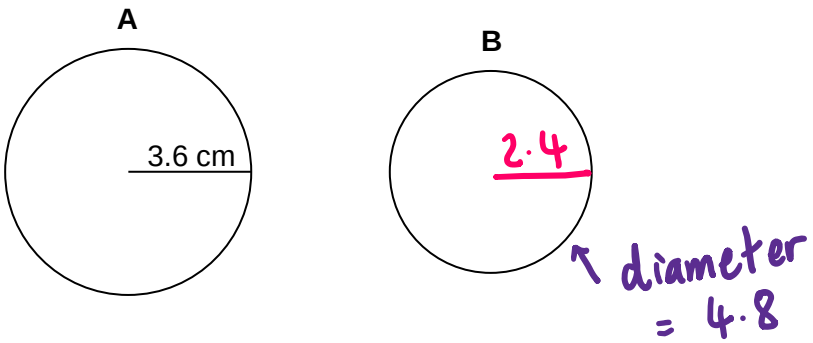
8 (b) The gardener also wishes to put a fence around the outside of the garden.
The fencing costs £30 per metre.
Work out the total cost of putting a fence around the out of the garden.
Give your answer to the nearest pound. **[3 marks]**

$\pi \times 15 = 47.1238898\ m$

$47.1\ldots \times £30 = £1413.716694$

Answer £ 1414

9 Here is circle **A** and circle **B**.



Radius of circle **A** : Radius of circle **B** = 3 : 2

Work out the circumference of circle **B**
Give your answer to 1 decimal place. **[3 marks]**

x1.2 3 : 2 x1.2
3.6 : 2.4

π x 4.8
= 15.079644774

Answer 15.1 cm

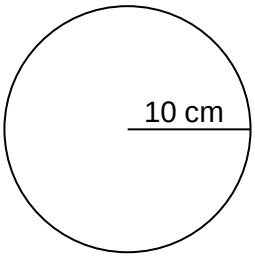
10 The circumference of a circle is 200 cm.
Work out the radius of the circle.
Give your answer to 2 decimal places. **[3 marks]**

200 ÷ π = 63.661977724 (diameter)
63.6... ÷ 2 = 31.83098862 (radius)

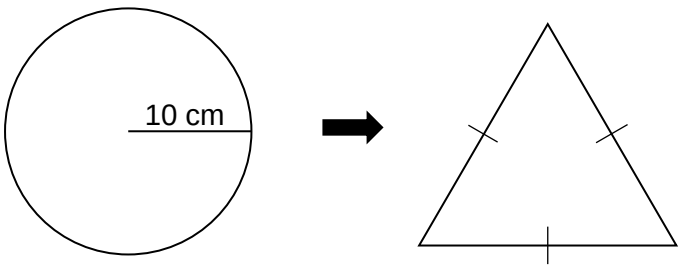
Answer 31.83 cm

12

11 Here is a circular wire with a radius of 10 cm.



The circular wire is bent to form an equilateral triangle.



11 (a) Work out the length of one side of the equilateral triangle.
Give your answer to 1 decimal place. **[3 marks]**

$\pi \times 20 = 62.831853\ldots$

$62.8\ldots \div 3 = 20.943951\ldots$

Answer 20.9 cm

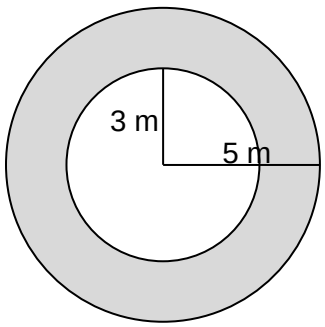
11 (b) Instead, the circular wire is bent into the shape of a square.

What does this mean about the length of one size of the square?

Tick **one** box. **[1 mark]**

- ☐ It is more than the answer to part (a)
- ☐ It is the same the answer to part (a)
- ☑ It is less than the answer to part (a)

12 The shaded region below is made from two circles.



The radius of the smaller circle is 3 m.
The radius of the larger circle is 5 m.

Calculate the area of the shaded region. **[3 marks]**

$\pi \times 5^2 = 78.539816\ldots$

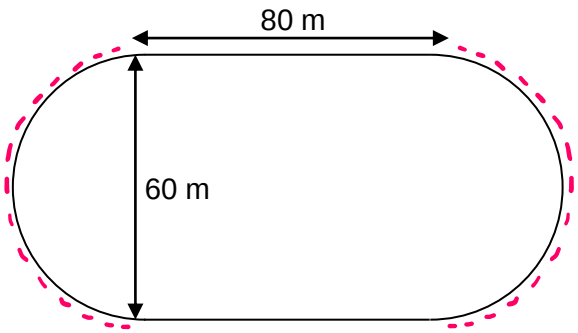
$\pi \times 3^2 = 28.274333\ldots$

$78.5\ldots - 28.2\ldots = 50.265482\ldots$

Answer 50.3 m^2

7

13 A running track is made from two straight sections and two semicircles.



The straight sections are 80 m long.
The semicircles both have a diameter of 60 m.

13 (a) Work out the total length of the running track.
Give your answer to the nearest metre.

[3 marks]

(and) gives ○

$\pi \times 60 = 188.49555592$

$188.4... + 80 + 80 = 348.495...$

Answer 348 m

13 (b) The inside of the running track is covered with grass.
Work out the area of the grass on the inside of the running track.
Give your answer to 1 decimal place.

[3 marks]

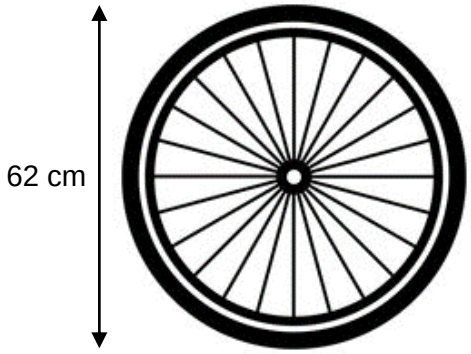
Circle: $\pi \times 30^2 = 2827.433388$

Rectangle: $60 \times 80 = 4800$

$4800 + 2827.4... = 7627.433388$

Answer 7627.4 m^2

14 The diameter of Lenny's bike wheel is 62 cm.



Lenny rides his bike 800 metres.

Work out how many complete revolutions his bike wheel will complete. **[4 marks]**

(one revolution)

$\pi \times 62 = 194.7787445$ cm

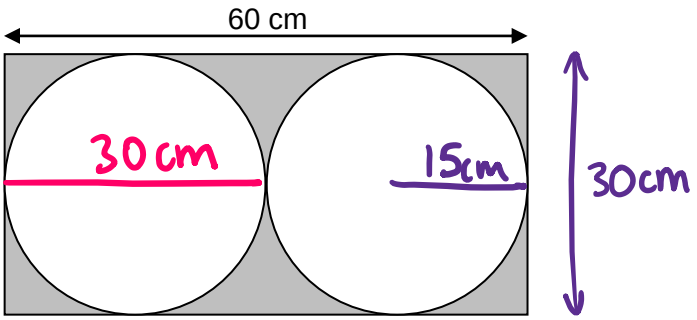
$800\text{m} \xrightarrow{\times 100} 80000\text{cm}$

$80000 \div 194.7... = 410.7224338$

Answer 410

10

15 Two touching circles fit exactly inside this rectangle.



15 (a) Work out the circumference of one of the circles.
Give your answer to the nearest centimetre. **[2 marks]**

$\pi \times 30 = 94.247\,7796\,1$ cm

Answer 94 cm

15 (b) Work out the area of the shaded region.
Give your answer to 1 decimal place. **[4 marks]**

Rectangle : $60 \times 30 = 1800$

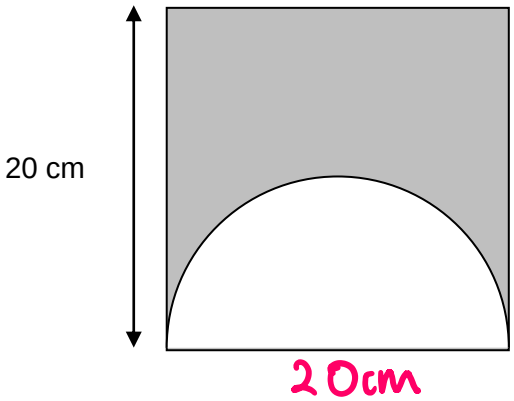
Circle : $\pi \times 15^2 = 706.8583471$

2 Circles : $706.8\ldots \times 2 = 1413.716694$

$1800 - 1413.7\ldots = 386.2833059$

Answer 386.3 cm^2

16 A semicircle is cut from a square as shown.



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

[4 marks]

Square: $20 \times 20 = 400\ cm^2$

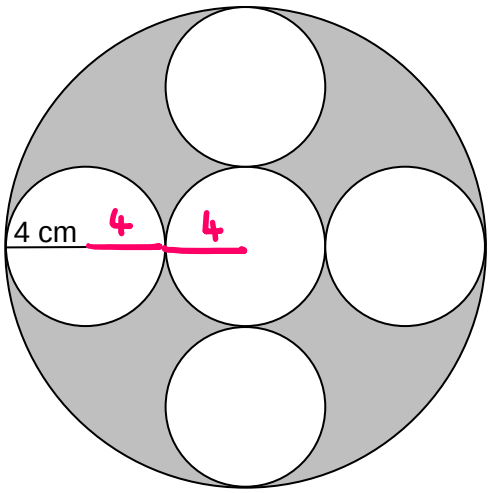
Semicircle: $\pi \times 10^2 = 100\pi$

$100\pi \div 2 = 50\pi$

Answer $400 - 50\pi$ cm^2

10

17 5 congruent circles of radius 4 cm fit inside a larger circle.



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

[4 marks]

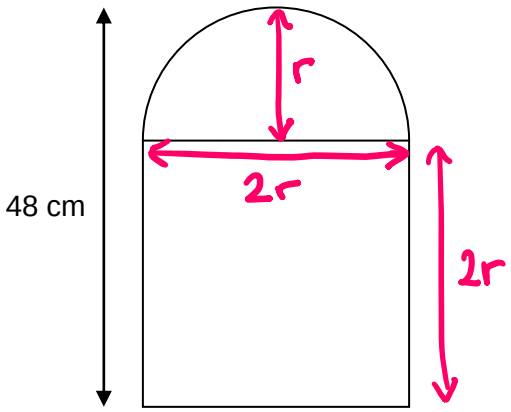
Area of large circle $= \pi \times 12^2$
$= 144\pi$

Area of small circle $= \pi \times 4^2$
$= 16\pi$

Shaded Region $= 144\pi - 5 \times 16\pi$
$= 144\pi - 80\pi$

Answer 64π cm^2

18 A design is made by placing a semicircle on top of a square.



The total height of the design is 48 cm.
Work out the total area of the design.
Give your answer to 1 decimal place.

[4 marks]

÷3 (3r = 48) ÷3

r = 16

radius = 16

diameter = 32

Square : 32 x 32 = 1024

Semicircle : $\pi \times 16^2 = 804.2477193$

$804.2... \div 2 = 402.1238597$

1024 + 402.12... = 1426.12386

Answer 1426.1 cm^2

8