S2 Revision
March Assessment

Calculators may be used.
Show all working.

SCIENTIFIC NOTATION

1. Write the following numbers in scientific notation.

   a) 70,000
   b) 300,000
   c) 800,000,000
   d) 9,000,000,000
   f) 0.00003
   g) 0.000009
   h) 0.0000002

2. Express the following in scientific notation.

   a) 992500000
   b) 0.0000708360
   c) 0.00527
   d) 27017
   e) 0.26377
   f) 92180000
   g) 494000
   h) 1740000000
   i) 0.000000001580
   j) 20 23340

3. In 1980, major airlines flew 5,400,000 flights. Write the number of flights in scientific notation.

4. A pollen grain measures 0.0004 m in diameter. Write this measurement in scientific notation.

5. To measure long distances in space, astronomers use a unit called a light-year. A lightyear is approximately 5,880,000,000,000 miles long. Write this in scientific notation.

6. Leah takes 2.3 x 10^4 steps during a long-distance run. Each step covers an average of 780 mm. What total distance did Leah cover during her run? Write your answer in scientific notation.

7. A small bat can eat up to 1,000 mosquitos in an hour. How many mosquitos can a small bat eat in 20.4 hours? Express your answer in scientific notation.

MIXED QUESTIONS ON RATIO

1. In a cat and dog home, the ratio of cats to dogs is 25 : 40.
   Write this ratio in its simplest form.

2. The ratio of men to women at a party is 3 : 2.
   If there are 18 men at the party, how many women are there?

3. Alex and James share £160 in the ratio 5 : 3.
   How much will each person receive?

4. The ratio of Derek's wages to Sharon's wages is 150 : 250.
   Write this ratio in its simplest form.

5. On a train the ratio of men to women is 3 : 4.
   If there are 60 men on the train, how many women are there?

6. Carol and Dennis share £80 in the ratio 3 : 1.
   How much will each person receive.

7. The ratio of tennis players to golfers at a club is 100 : 350.
   Write this ratio in its simplest form.

8. On a school trip the ratio of teachers to pupils is 3 : 10.
   If there are 12 teachers on the trip, how many pupils are there?

9. Alison and Colin share a prize of £500 in the ratio 7 : 3.
   How much will each person receive?

10. To make a shade of purple paint, blue paint and red paint are mixed in the ratio 600 : 1000. Write this ratio in its simplest form.

11. The ratio of three people's wages is 450 : 300 : 250. Write this ratio in its simplest form.

12. The ratio of vowels to consonants in a book is 4 : 9. If there are 12 000 vowels in the book, how many consonants are there?

13. Ed, Ted and Zed £200 in the ratio 2 : 3 : 5.
    How much will each person receive?

14. A 3000 kilometre "crazy rally" is being held for charity. Each participant will walk, cycle and drive in the ratio 1 : 2 : 3.

    How far will each participant: (a) walk
    (b) cycle
    (c) drive?

PROPORTION

1. 3 hats cost £120. How much will 5 hats cost?

2. 6 clocks cost £210. How much will 2 clocks cost?

3. 8 lamps cost £200. How much will 6 lamps cost

4. 5 chairs cost £300. How much will 3 chairs cost?

5. 4 gold rings cost £120. How much will 6 gold rings cost?

6. 5 cans of cola cost £2·25. How much will 8 cans of cola cost?

7. 7 cups of coffee cost £5·25. How much will 3 cups of coffee cost?

8. 3 plates of chips cost £1·65. How much will 5 plates of chips cost?

9. 3 metres of carpet tape costs £1·62. How much will 5 metres of carpet tape cost?

10. 3 metres of copper tubing costs £6·21. How much will 5 metres of copper tubing cost?

11. 40 nails weigh 800 grams. How much will 15 nails weigh?

12. 2 litres of paint covers 40 square metres of wall. How many square metres will 6 litres of this paint cover?

13. David types 90 words in 2 minutes. How many words will he type in 6 minutes?

14. It costs £20 for 4 people to get into the theatre. How much will it cost for 6 people to get into the theatre?

15. A lorry travels 120 kilometres in 2 hours. How far will the lorry travel in 4 hours?

16. A car travels 72 miles on 2 gallons of petrol. How far will the lorry travel on 5 gallons of petrol?

17. John's heart beats 168 times in 2 minutes, How many times will his heart beat in 5 minutes?

18. Andrew earns £18 for working 6 hours. How much will he earn for working 16 hours?

19. A dripping tap loses 48 litres of water in 4 days. How many litres of water will the tap lose in one week?

20. Ruth works in a soft-toy factory. She makes 60 elephants in 5 hours? How many elephants will she make in a 35-hour week?

MONEY

1. Mary is paid £165 per **week**.
Susan is paid £707 per **month**.

(a) Calculate Mary's **annual** pay.
(b) Calculate Susan's **annual** pay.
(b) Who earns more in a year and by how much?

2. John Smith earns a basic rate of £8 per hour.
One week he works 30 hours at the basic rate, 5 hours overtime at **time and a half** and 4 hours overtime at **double time**.
Calculate his **total** pay for this week.

3. A salesman earns a basic monthly salary of £800 **plus** 7·5% commission on all sales.
His total sales amounted to £16 000 one month.

(a) Calculate the commission earned.
(b) Calculate his **total** salary for this month.

4. A washing machine can be bought on hire purchase by paying a £50 deposit followed by 12 monthly instalments of £25.
Calculate the total hire purchase price.

5. The cash price of a computer is £1500.
The computer can be bought on hire purchase by paying a 20% deposit followed by 6 monthly instalments of £225.

(a) Calculate the deposit.
(b) Find the total hire purchase price.

6. A record shop bought 50 copies of a new music CD for a total of £375.
The shop then sold all 50 copies of the CD for £9·95 each.
How much **profit** did the shop make altogether after selling all 50 CDs?

PROBABILITY

1. A fair die is rolled. What is the probability of rolling:

(a) an even number (b) a number less than 3?

2. A number is picked at random from the numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. What is the probability that the number picked is:

(a) less than 6 (b) greater than 7?

3. In a game of Scrabble, the word below is worth 11 points.

W_3	I_1	N_2	N_2	E_1	R_2

The above tiles are put in a bag and one tile is picked out without looking. What is the probability that the tile picked out is:

(a) an N (b) worth 2 points (c) a vowel?

4. A basket contains 16 eggs. 4 are brown and the rest are white. 5 eggs are cracked and one is bad.
Find the probability that an egg picked at random will be:

(a) brown (b) white (c) bad (d) **not** cracked?

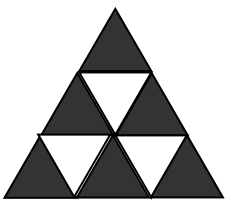
5. The table shows the number of each type of tree in a park.

Type	Number
Oak	8
Elm	12
Chestnut	16
Beech	24

(a) How many trees are there altogether?

(b) Someone reports that one tree has been damaged.
Estimate the probability that the damaged tree is:
(i) an oak (ii) a beech tree.

6. A pin is stuck at random into the network of congruent triangles opposite.



Find the probability that the pin lands in:
(a) a white triangle (b) a shaded triangle.

STRAIGHT LINE

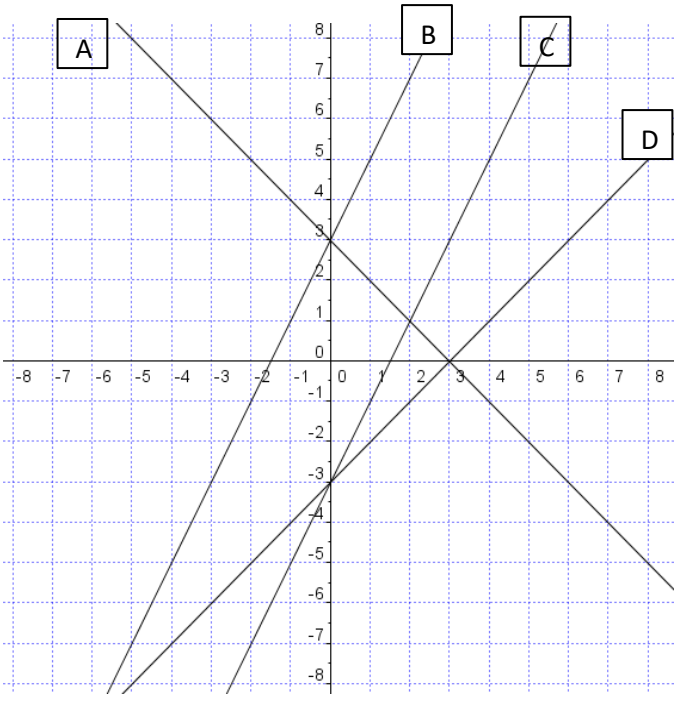
1. Write down the gradient and the y-intercept for the following straight line equations:

   a. $y = 3x + 2$
   b. $y = 4x - 7$
   c. $y = 5x + 12$
   d. $y = 4x - 9$
   e. $y = 5x$
   f. $y = x + 2$
   g. $y = -x + 3$
   h. $y = -3x + 7$

2. Using the gradient and the y-intercept, write down the equations of these lines:

   a. gradient: 4 intercept: (0,3)
   b. gradient: 2 intercept: (0,-4)
   c. gradient: 5 intercept: (0,-3)
   d. gradient: 1 intercept: (0,11)
   e. gradient: -3 intercept: (0,4)
   f. gradient: -4 intercept: (0,0)

3. Use the graph below to match the equations with the correct lines:



$y = 2x + 3$ matches with line

$y = 2x - 3$ matches with line

$y = x - 3$ matches with line

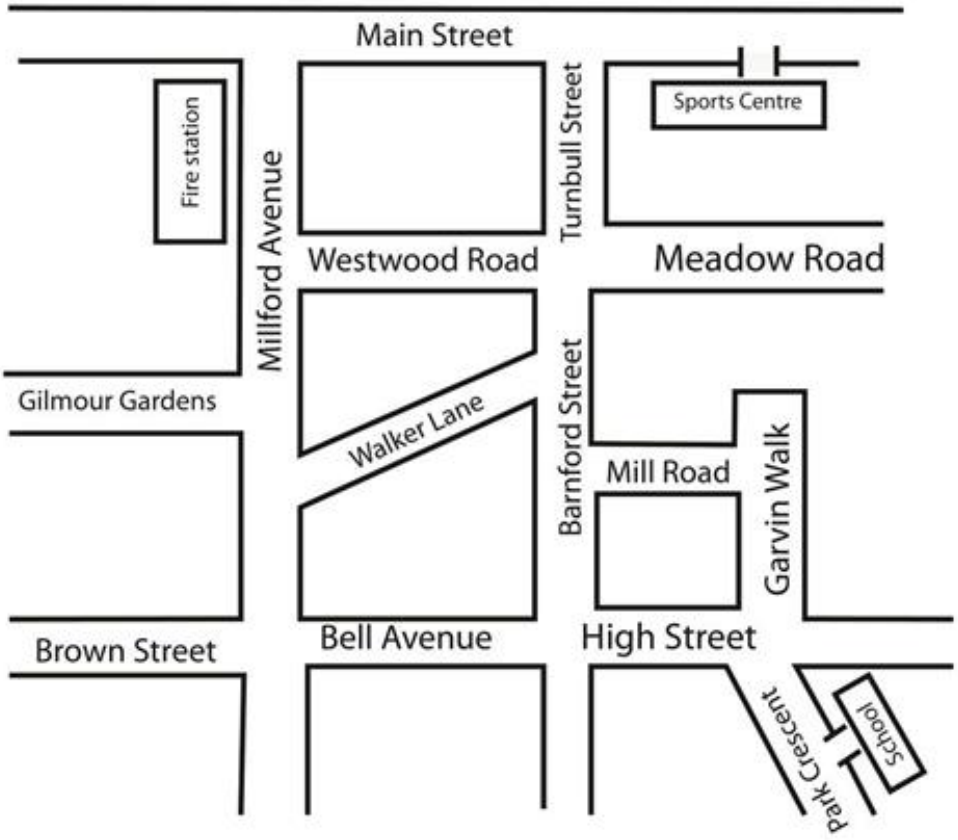
$y = -x + 3$ matches with line

SCALE DRAWING

You have been given the following directions by Sam to help you find his house in Bell Avenue.

- Come out of the Sports Centre on to Main Street and turn left.
- Go along Main Street then turn left into Turnbull Street.
- Go down Turnbull Street and Barnford Street and turn right into Bell Avenue.
- Sam's house is halfway along Bell Avenue.

(a) On the map below, show Sam's route and mark his house with X.



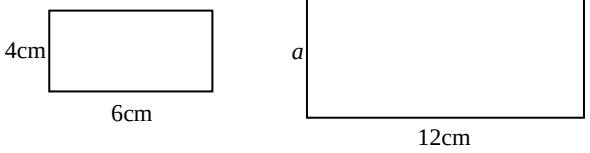
(b) The scale of the map is 1 cm = 100 m.
Estimate the distance you have to walk altogether to get from the Sports Centre to Sam's house.

(a) Give directions to get from the Fire Station to the School.

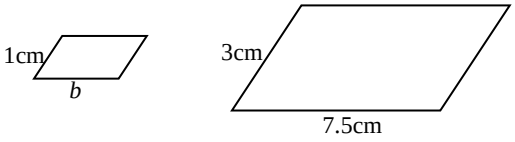
SIMILAR SHAPES

1. For each pair of similar shapes find the missing lengths.

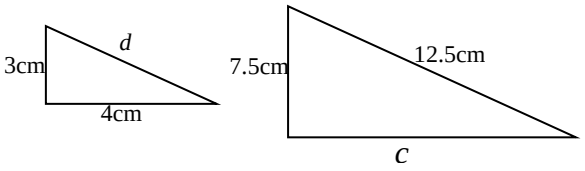
a)



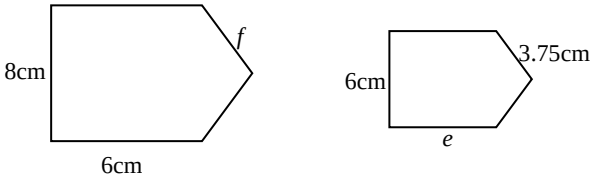
b)



c)

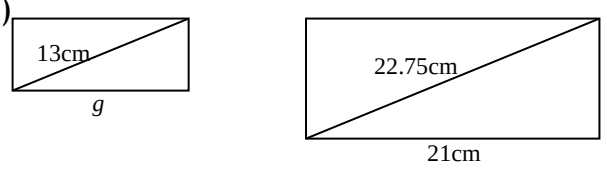


d)



2. Find the missing lengths in these similar shapes

a)



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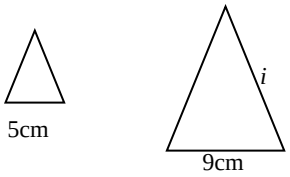
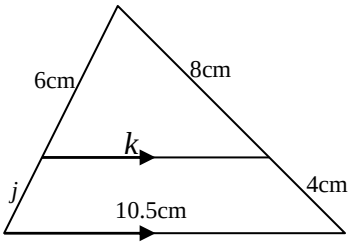


2. By drawing both triangles separately, work out the missing lengths in these diagrams.

a)



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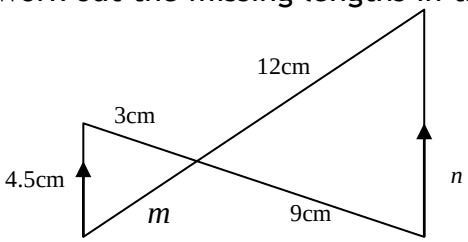

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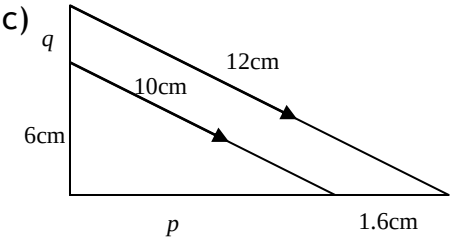
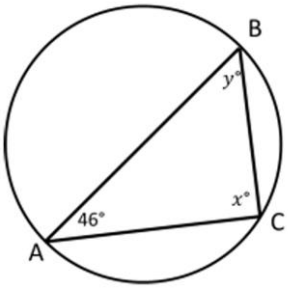


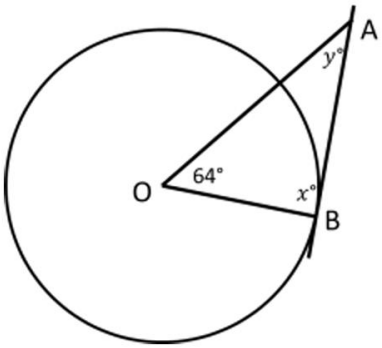
ANGLES IN CIRCLES

1. In the diagram, A, B, C are points on the circumference of a circle and the line AB is the diameter.



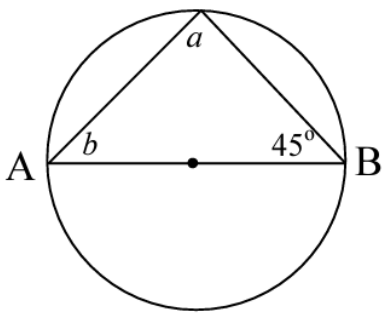
Find the size of angles x and y.

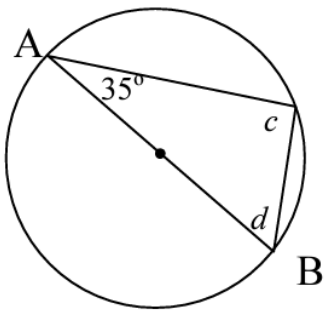
2. B is a point on the circumference of the circle, O is the centre of the circle and the line AB is a tangent to the circle.

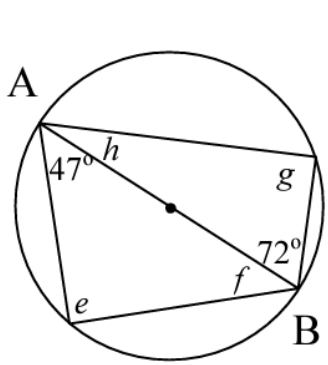


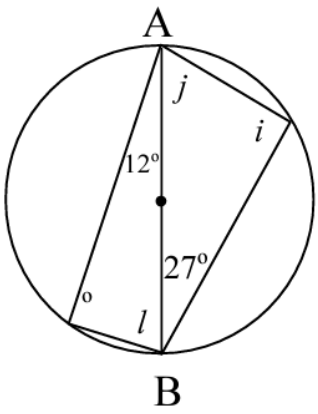
Find the size of angles x and y.

3. In each of the diagrams below AB is a diameter. Find the missing angles in each diagram.

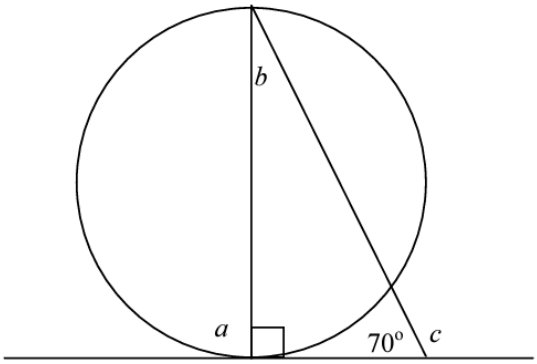


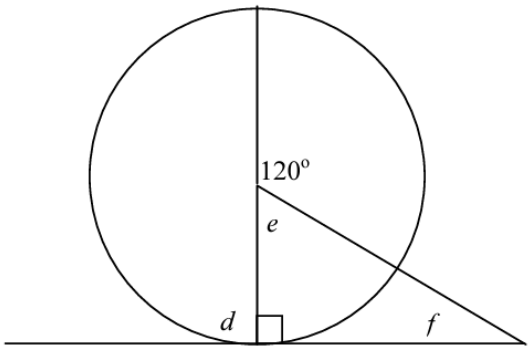


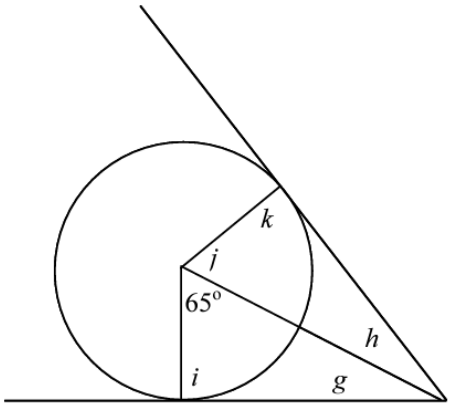


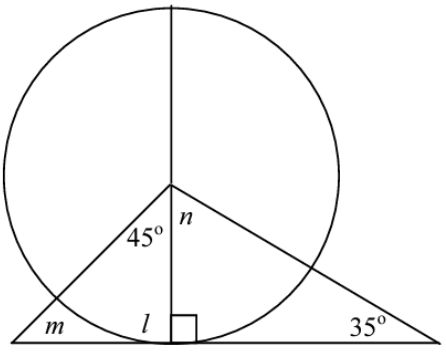


4. Calculate the sizes of the angles marked a, b, to n, in the diagrams below.





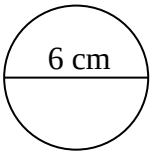




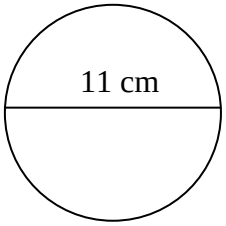
CIRCUMFERENCE OF CIRCLE

$$C = \pi d$$

1. Calculate the circumference of a circle with **diameter** 6 cm.

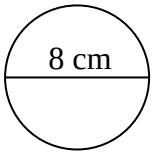


2.

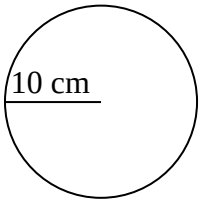


Calculate the circumference of a circle with **diameter** 11 cm.

3. Calculate the circumference of this circle.



4. Calculate the circumference of a circle with **radius** 10 cm (careful).



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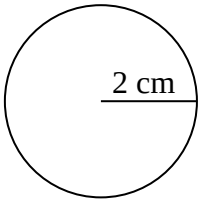
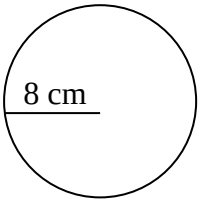
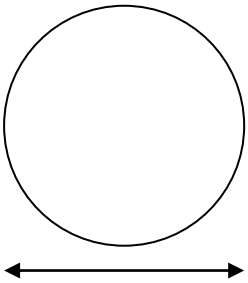


Calculate the circumference of a circle with **radius** 2 cm.

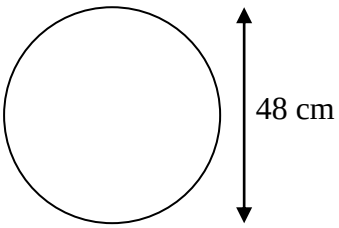
6. Calculate the circumference of this circle.



7. A large bicycle wheel has a **diameter** of 102 cm.
Calculate the circumference of the wheel.



8. A dart board has a **diameter** of 48 cm.
Calculate the circumference of the board.



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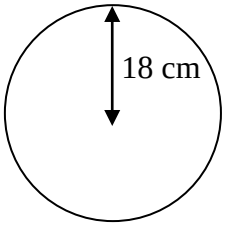
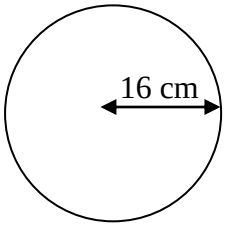
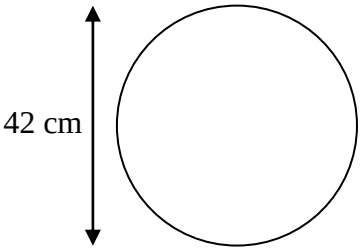


The **radius** of a circle is 18 cm.
Calculate the circumference of the circle.

10. The **radius** of the top of a plate is 16 cm.
Calculate the circumference of the plate.



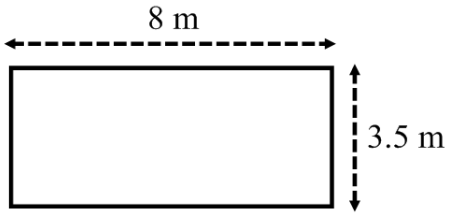
11.



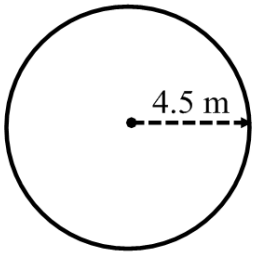
A wall clock has a **diameter** of 42 cm.
Calculate the circumference of the clock.

12. In the park, two new flower beds are being planted with roses.

- One flower bed is rectangular and measures 8 metres by 3·5 metres.

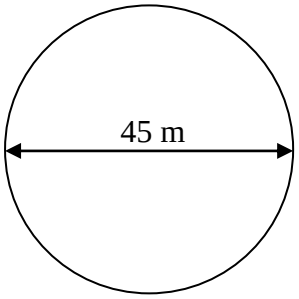


- The other flower bed is circular with a radius of 4·5 metres.



A fence is to be put round **each** flower bed.
Find the **total** length of fencing required.

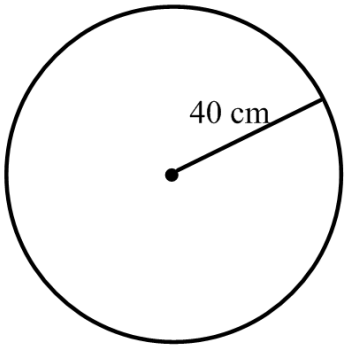
13. A circular race track is shown opposite.
The **diameter** of the track is 45 metres.



(a) Calculate the distance round one lap of the track (the circumference of the circle).

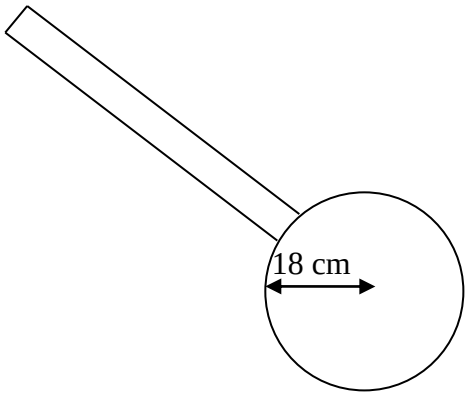
(b) A cyclist goes round the track 20 times during a race.
How far has he cycled altogether?

14. A battery operated toy train travels on a circular track.
The radius of the circle is 40 centimetres.



It takes one minute for the train to travel 8 times round the track.
How far does the train travel in one minute?

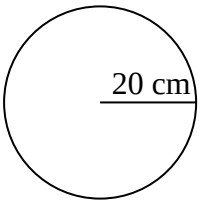
15. Alex uses a circular piece of wood to make a measuring wheel.
The wheel has a radius of 18 centimetres.
How many **complete metres** are measured by 15 rotations of the wheel?
[*Remember that 1 m = 100 cm.*]



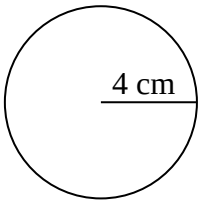
AREA OF A CIRCLE

$$A = \pi r^2$$

1. Calculate the area of a circle with **radius** 20 cm.

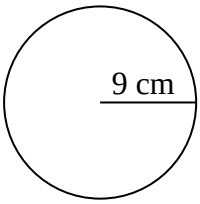


2.

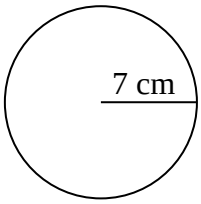


Calculate the area of a circle with **radius** 4 cm.

3. Calculate the area of a circle with **radius** 9 cm.



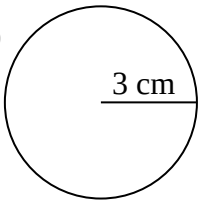
4.



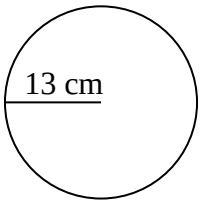
Calculate the area of a circle with **radius** 7 cm.

5. Calculate the area of each circle.

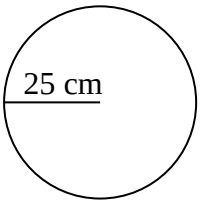
(a)



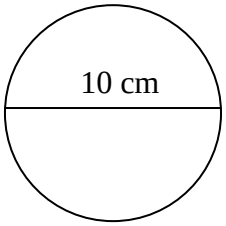
(b)



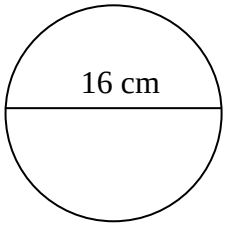
(c)



6. Calculate the area of a circle with **diameter** 10 cm (careful).

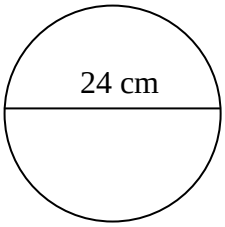


7.



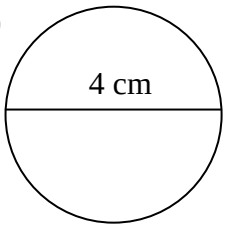
Calculate the area of a circle with **diameter** 16 cm.

8. Calculate the area of this circle.

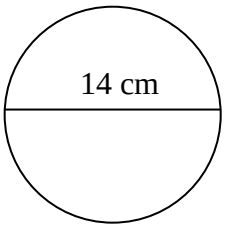


9. Calculate the area of each circle.

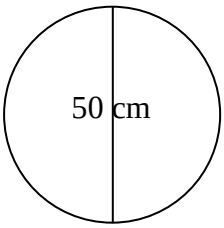
(a)



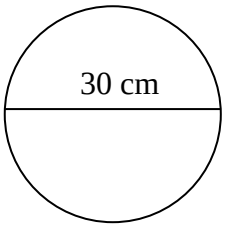
(b)



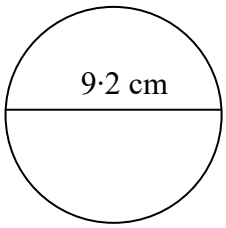
(c)



10. The **diameter** of an old vinyl record is 30 cm.
Calculate the area of the record.

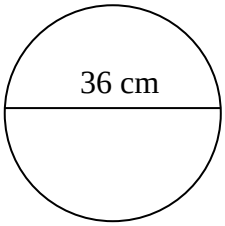


11.

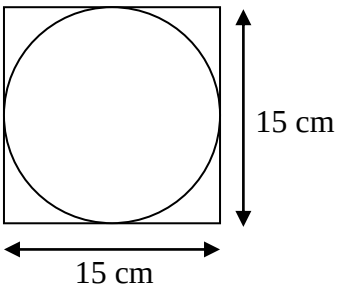


The top of a tin of bins has a **diameter** of 9·2 cm.
Calculate the area of the top of the tin.

12. A circular sign has a **diameter** of 36 cm.
Calculate the area of the sign.



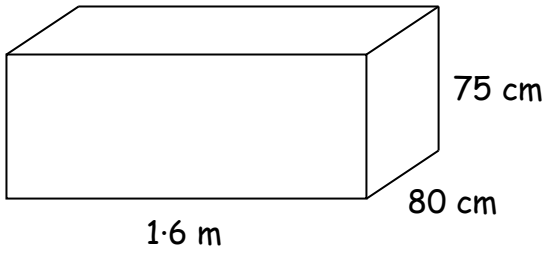
13. The diagram below shows a circle drawn inside a square.
The length of each side of the square is 15 cm.



(a) Write down the **radius** of the circle.
(b) Calculate the area of the circle.

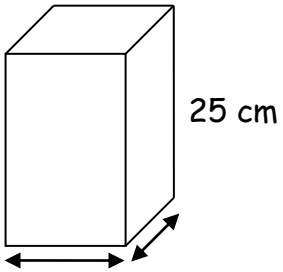
VOLUME

1. Use the formula $V = l \times b \times h$ to calculate the volume of this tank in **litres**. (Remember that 1 litre = 1000 cm^3.)

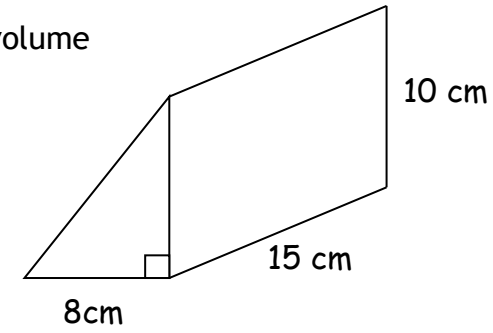


2. The carton shown opposite is in the shape of a cuboid with a **square base** and height 25 cm. The volume of the carton is 3600 cm^3.

Find the length of one side of the base.

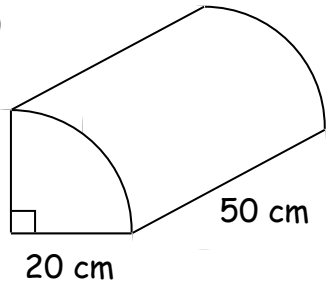


3. Use the formula $V = Al$ to calculate the volume of this triangular prism.

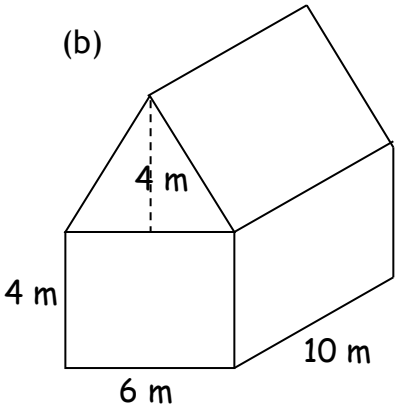


4. Use the formula $V = Al$ to calculate the volume of each prism below. (Calculate the area of the cross-section first.)

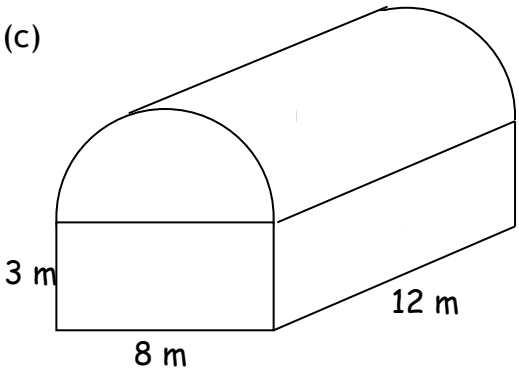
(a)



(b)



(c)



5. Use the formula $V = \pi r^2 h$ to calculate the volume of this cylinder.