



## S3 BGE Exam Revision

### S1 Revision

1. Convert the following measurements to centimetres:

a. 5m

b. 23.8m

c. 0.2m

2. If  $e = 2$ ,  $f = 4$  and  $g = 5$ , evaluate the following:

a.  $f - 2e + 5g$

b.  $(ef)^2 - 4g$

c.  $(g - e)^2 - 2f$

d.  $eg^2 - efg$

3. The table below represents the number of air stewards(S) on a British Airways flight required for a specific number of passengers (P).

S	3	4	5	6
P	64	84	104	124

a. Find a formula for the table above.

b. On a long haul flight, 14 air stewards are on the flight. What is the maximum number of passengers allowed on the flight?

4. Find the following:

a.  $3.98 \times 300$

b.  $8.36 \times 500$

c.  $5.47 \times 4000$

5. Find a formula for the following patterns:

a. 

A	2	3	4
T	7	10	13

b. 

B	5	6	7
F	36	43	50

6. Find the following:

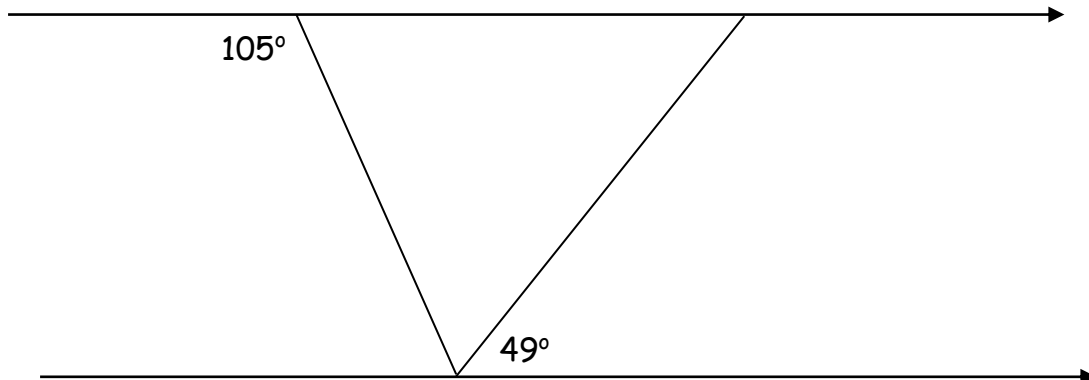
a. 25% of £416

b. 60% of £440

c. 30% of £610



7. Complete all angles in the diagrams below:



8. Simplify the following expressions:

a.  $2e \times 3e$

b.  $6r \times 3r$

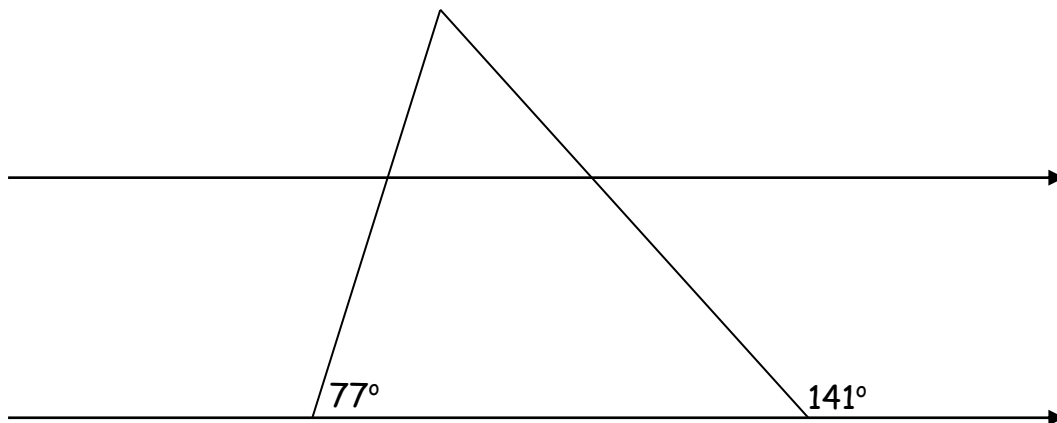
c.  $5w^2 \times 3w$

d.  $(5y)^2$

e.  $(2h)^3$

f.  $10p^2 - 3p \times 2p$

9. Complete all angles in the diagrams below:



10. Lottery winnings of £169 000 are shared in the ratio of 7 : 4 : 2 between a group of people. Calculate how much each person would receive.

In a school gym hall there were 14 boys and 21 girls.

- Write this as a ratio, giving your answer in its simplest form.
- If there are 200 boys in S1, how many girls are there?
- In a new year group of 575 pupils, the ratio was found to be the same. How many girls would there be?



11. Round the following numbers to 2 decimal places:

a. 14.387

b. 32.298

c. 105.8279

12. In a lottery syndicate, Paul gets the least amount. Kat gets double the amount Paul gets whilst Chris gets treble the amount Paul gets.

If they won £360,000 in total, how much would each person receive?

S2 Revision

1. Write the following numbers as product of prime factors:

a. 24

b. 81

c. 100

2. Multiply out the following brackets and simplify:

a.  $3(g - 3) + 2g + 7$

b.  $9 - 4(h - 6) + 2h$

c.  $5(d - 2) - 2(d + 1)$

d.  $6 - 2(w - 4) - 7(w - 5)$

3. Fully factorise the following:

a.  $6e - 8e^3$

b.  $12rs - 20s^3$

4. Find the following:

a.  $\frac{3}{4} + \frac{2}{5}$

b.  $1\frac{2}{3} \times \frac{7}{10}$

c.  $2\frac{2}{3} - \frac{4}{9}$

5. Solve the following equations:

a.  $3(g - 3) = 6(g + 5)$

b.  $6 - 3(j - 1) + 5(j + 3) = 10$

6. The following information below represents the ages of people on a bus:

29, 15, 8, 12, 8, 21, 34, 20, 11, 16, 28, 8, 5, 14

a. Display the information in an ordered stem and leaf diagram.

b. Find

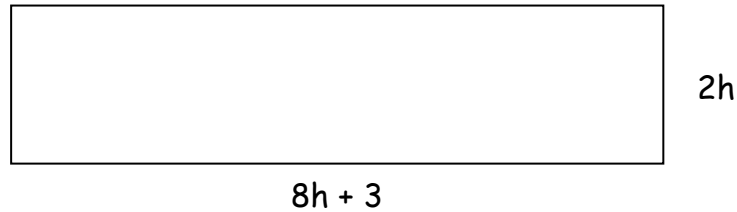
i. Range

ii. Mode

iii. Median



7. A rectangle can be seen below:



- Find a simplified expression for the area of the rectangle.
- Find a simplified expression for the perimeter of the rectangle.

The perimeter of the shape is 100m.

- Hence, find the value of  $h$ .

8. A new DVD player is in the summer sale at a price of £299.

On the price ticket it says that there is 35% off the normal price.

Find the original price of the DVD player.

9. Calculate the angles the following sections would represent in a pie chart:

<b>Favourite Sweet</b>	<b>Number of people</b>
Boost	14
Minstrels	27
Fruit Gums	19
Total	60

10. The following information below represents the ages of people on a bus:

29, 15, 8, 12, 8, 21, 34, 20, 11, 16, 28, 8, 5, 14

- Display the information in an ordered stem and leaf diagram.
- Find
  - Range
  - Mode
  - Median



11. A car is currently valued at £17,480.

If the car depreciates in value by 3.1% per annum, calculate the value of the car after 3 years.

12. Write the following numbers as scientific notation:

a. 76,800,000

b. 0.000005017

13. A house is worth £277,000.

If the value of the house appreciates by 2.15% per annum, calculate the new value of the house after 3 years giving your answer correct to **3 significant figures**.

14. A car was bought for £19,450 and later sold for £15,800. Calculate the profit loss as a % of the buying price.

15. A family has 5 members in total with a combined age of 96 years.

The family are going on holiday; however the travel agent cannot read the age of the youngest child to complete the booking form.

The agent knows that one of the siblings is 4 years older than the youngest sibling and the other sibling is 7 years older than the youngest sibling.

Both parents are 30 years older than their youngest child.

By creating an equation, find the age of the youngest child.

16. £13,200 is invested in an ISA with a fixed interest rate of 2.8% per annum.

Calculate the compound interest gained on the investment over 3 years.



17. To go on a school trip a group of 5 pupils have raised £4168 in total.

The pupils are unsure exactly how much each of them has raised individually.

Lynne raised a certain amount.

Ross raised £80 more than Lynne.

Roisin raised £138 less than Lynne.

Phil raised double the amount that Lynn raised.

Laura raised £482 more than Lynne raised.

- Build an equation which represents the above information.
- Hence, calculate the amount of money each person raised.

18. Find the following:

a.  $\frac{3}{4} - \frac{1}{7}$

b.  $1\frac{3}{7} - \frac{4}{5}$

c.  $\frac{5}{9} \times \frac{4}{3}$

d.  $2\frac{1}{2} - 1\frac{5}{6}$

e.  $\frac{4}{9} \div \frac{2}{3}$

f.  $\frac{3}{7} + \frac{1}{2} + \frac{5}{8}$

19. The formal homework marks (out of 30) for a class are displayed below:

11, 17, 23, 24, 25, 26, 27, 28, 28, 28, 28, 28, 28, 29, 29, 29, 29, 30, 30, 30,  
30, 30, 30, 30, 30, 30, 30, 30, 30, 30, 30

Write down the 5 figure summary for this data.

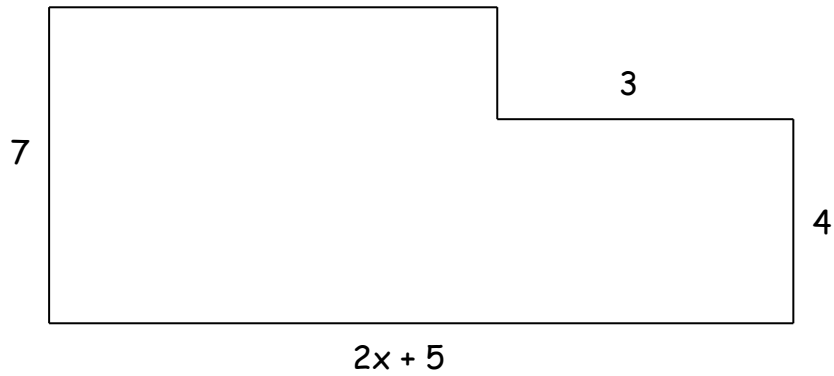
20. There are 4 boys and 14 girls in a classroom. A child is chosen at random and asked to roll a die, numbered 1 to 6.

- Which is more likely:
- The child is female?
  - The number rolled is a 3?

Explain your answer.



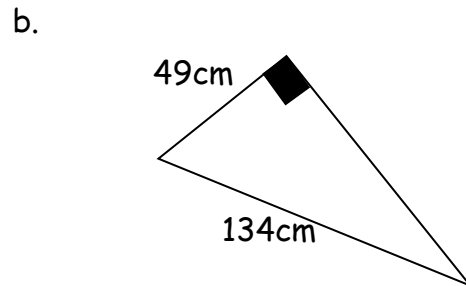
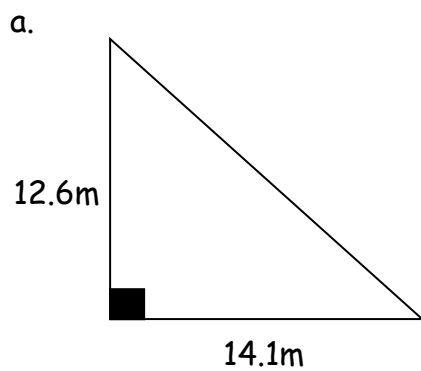
21. The total area of the shape below is  $148\text{m}^2$ .



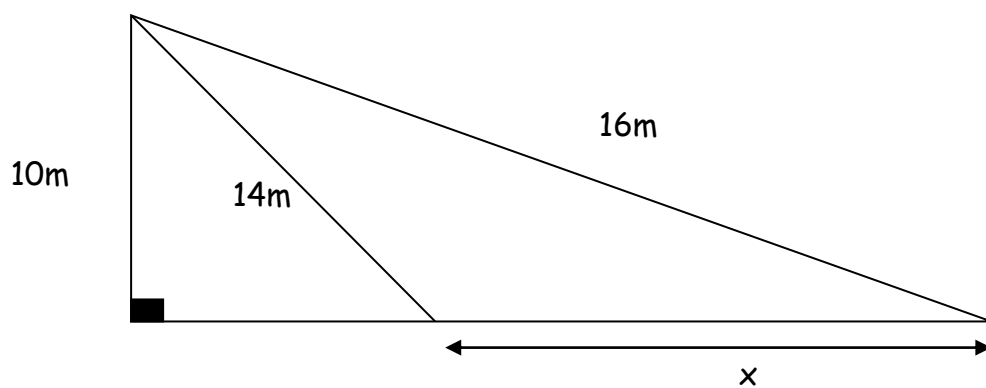
a. By forming an equation, find the value of  $x$ .

b. Hence, calculate the perimeter of the shape.

22. Calculate the value of the missing length in the triangles below:



23. Calculate the value of the length  $x$ .







24. Produce a 5 figure summary for the following set of data:

19, 11, 10, 6, 34, 28, 20, 19, 23, 27, 18, 17, 24, 26, 29, 30

25. The table below shows the results of a survey of a group's favourite sweet.

Sweet	Number	Angle
Wispa Gold	43	
Fruit Gums	52	
Boost	31	
Twix	24	

Calculate the size of angle which each section would represent in a pie chart.

26. Sector  $COB$  has an angle of  $63^\circ$  at the centre with a radius of 8.2cm.

Calculate the area of this sector.

27. A triangle has side lengths of 300m, 400m and 500m.

Is this triangle right-angled?



## S3 Revision

### Proportion

1. Andrew buys 9 packs of Maoam for £3.60. How much should he expect to pay for 7 packs?
2. Zaiba has a paper round and gets paid by the number of papers she delivers. She gets £8.40 for delivering 70 papers. How much would she get paid for delivering 100 papers?
3. It takes 5 girl guides 1 hour to pitch a large tent. How long would it have taken 8 girl guides working at the same rate?
4. If it takes 96 hours for 10 men to build the foundations for a new school, how many days would it take 4 men?
5. It takes Emma, Ross and Laura 7 hours to rake their yard.

Two of their friends join them the following week to help rake the lawn, how long will it now take. Give your answer in hours and minutes.

### Linear Relationships

1. Find the equation of the straight line which passes through the following points:
  - a. (0, 2) and (3, 7)
  - b. (-5, 1) and (0, -2)
2. Find both the gradient and y-intercept of the following straight lines:
  - a.  $5y - 3x = 4$
  - b.  $2y + 7x - 1 = 0$
  - c.  $9x - 4y + 3 = 0$
3. A straight line, passing through the point (0, 8), is parallel to the line  $y = -7x + 3$ .

Find the equation of this line.

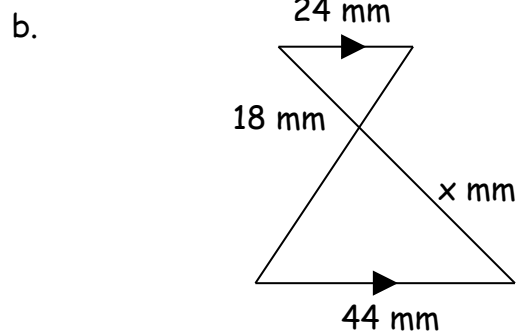
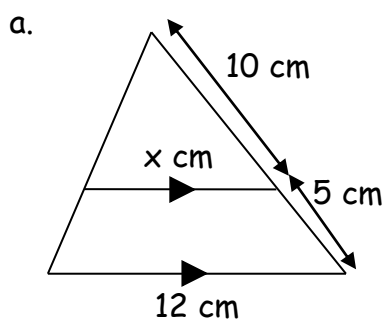


4. A straight line passes through the points  $(0, 3)$  and  $(7, -4)$ .

- Find the equation of the straight line.
- Hence, find the coordinate where the line will intersect with the line  $x = -3$ .

### Similarity

1. Calculate  $x$  in each of the following diagrams.



2. The floor spaces of two bedrooms in a tenement flat are mathematically similar.

The larger room is 4 metres wide and has an area of 10 square metres.

The smaller room is 3 metres wide.

What is the area of the smaller room?

3. A sheet of A5 paper has an area of  $310.8 \text{ cm}^2$ .

A mathematically similar sheet of paper has twice the length and twice the breadth of an A5 sheet of paper.

Find the area of this larger sheet.

4. A water bottle has a base diameter of 8 cm and a volume of 340 ml.

Calculate the volume of a mathematically similar bottle which has a base diameter of 10 cm.



The two vases shown below are mathematically similar.



The larger vase has a volume of  $4373.18\text{cm}^3$ .  
Find the volume of the smaller vase.

### Speed, Distance and Time

1. Alice takes a quarter of an hour to drive 12km.  
What is her average speed?
2. Jack cycles 16 kilometres in half an hour.  
What is his average speed in km/h?
3. At 5 mph, how long does it take to travel 7 miles?  
Give your answer in hours and minutes.
4. Sally threw the javelin 48m in the school sports.  
The javelin was in the air for 3 seconds.  
What was its average speed in metres per second?
5. The bullet train from Beijing to Shanghai takes 3 hours and 20 minutes.  
The train has an average speed of 261 mph.  
How far is the journey?



### Equations 3

1. Solve:

a.  $\frac{7e+4}{3} = \frac{e-5}{2}$

b.  $\frac{w}{2} - \frac{w-3}{4} = \frac{5w}{3}$

2. Solve:

a.  $8(3e - 1) > 40$

b.  $17 - 5e \leq 3e + 25$

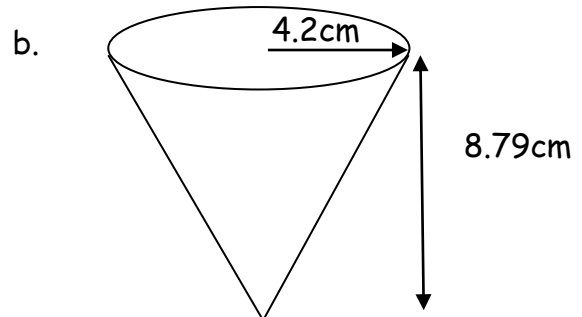
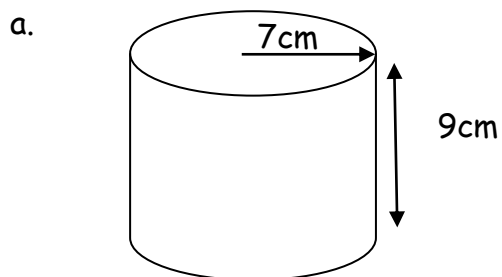
3. Solve:

a.  $\frac{4(2h-1)}{3} = \frac{2(3h-1)}{5}$

b.  $\frac{w}{5} - \frac{2w+3}{2} = \frac{3w}{5}$

### Volume

1. Calculate the volume of each shape below correct to **three significant figures**:



2. A cone has a total volume of  $52,300\text{cm}^3$ . If the radius of the cone is  $720\text{cm}$ , calculate the height of the cone.

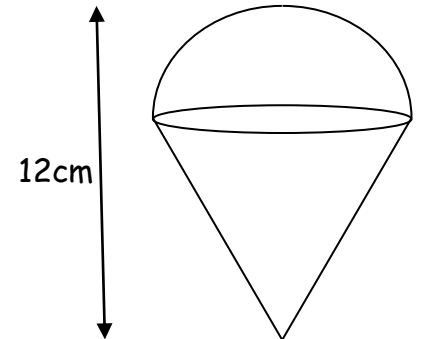
3. Calculate the diameter of a hemisphere which has a total volume of  $45,000\text{cm}^3$ .



4. Will's Ice Cream Van serve cones of Graham's vanilla ice cream as shown below:

- The height of the whole shape is 12cm
- The radius of the cone is 2.05cm.

a. Calculate the volume of ice cream in each cone.

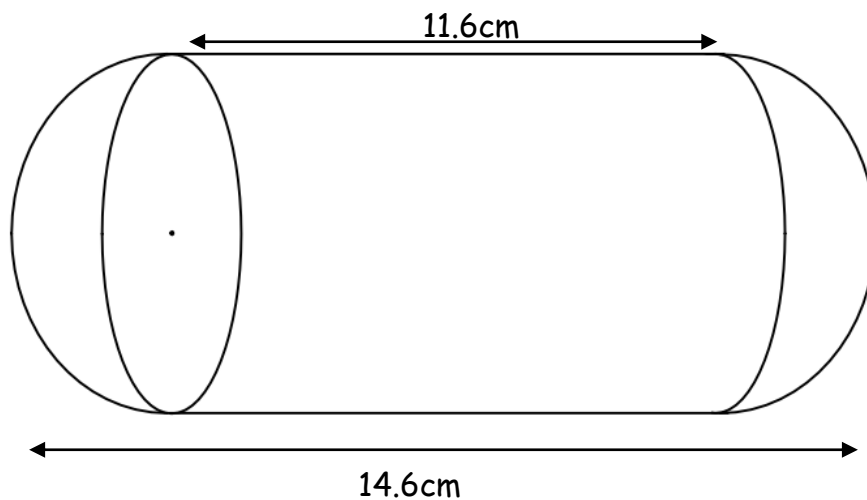


A tub of Graham's vanilla ice cream is the shape of a cuboid with dimensions 7cm x 9cm x 12cm.

b. How many cones can Will make from each tub?



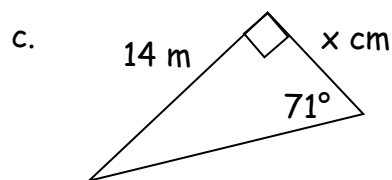
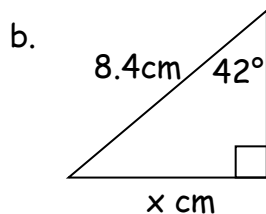
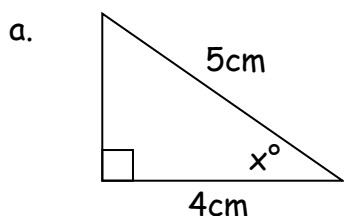
5. Calculate the volume of the shape shown below, which consists of a cylinder with a hemisphere on either end.





### Right-angled Trigonometry

1. Find the value of  $x$  in each of the right angled triangles shown below.

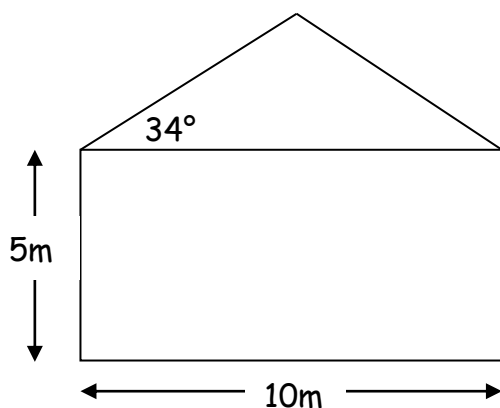


2. A ladder is 8m long.

The top rests against the wall of a house and the foot rests on level ground 1.2m from the wall.

Calculate the angle between the ladder and the house.

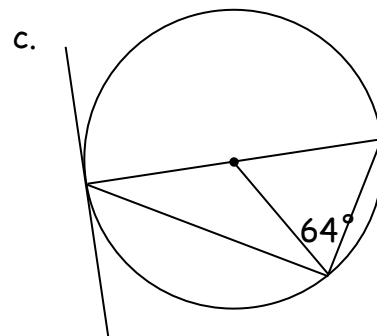
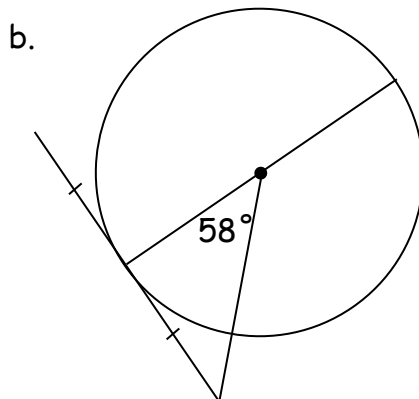
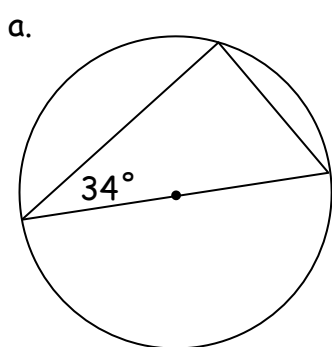
3. The cross section of a house is shown in the diagram below.



Given that the cross section consists of an isosceles triangle and a rectangle, find the height of the house.

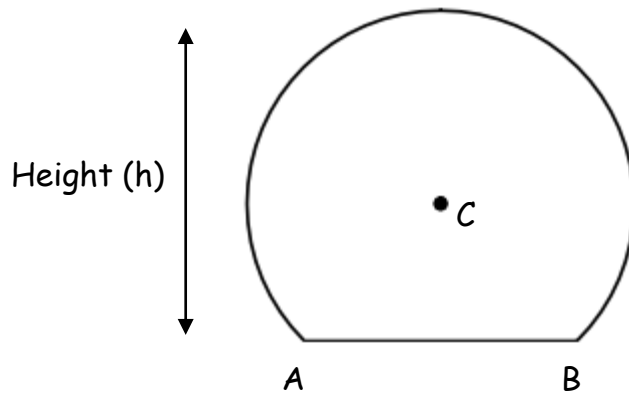
### Circle Geometry

1. Find the size of all the missing angles in each diagram below.





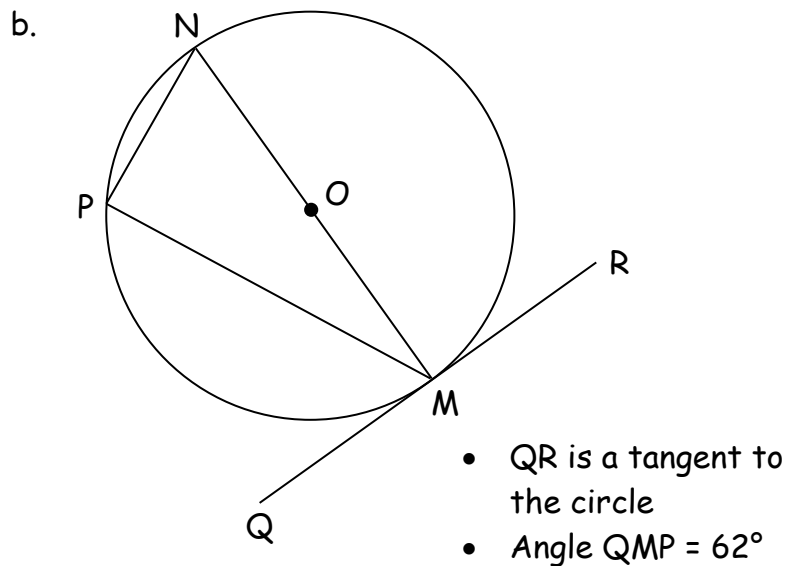
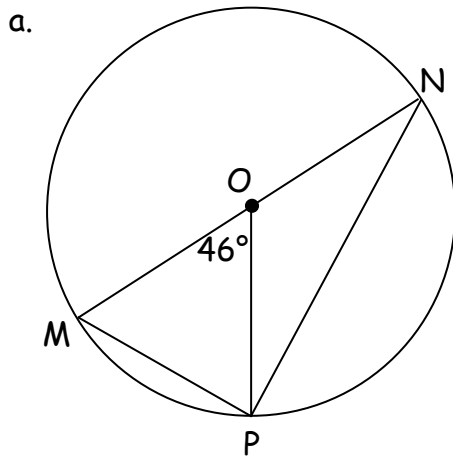
2. A new tunnel for a fast link train has been designed with the cross section being shown below.



a. The radius of the circle is found to be 19.2m. The width of the train track measures 14.3m, calculate the height of the tunnel.

b. Angle ACB measures  $289^\circ$ . Calculate total perimeter of the outside of the tunnel.

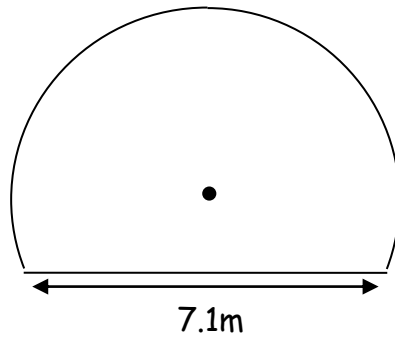
3. Find the size of the angle MNP in each circle shown below.







4. The train tunnel shown below has a radius of 3.75m.  
The width of the train track at the bottom of the tunnel is 7.1m.



Find the height of the tunnel.