

# GCSE MATHEMATICS

## INTERMEDIATE PAPER

## CALCULATOR

## NO. 1

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GCSE MATHEMATICS : INTERMEDIATE TIER (Calculator) – 2 Hours

**Answer all 26 Questions. Show all working.**

1. a) Calculate the value of:  $\sqrt{29} + (1.8^2 - 1.63)$  writing down all the figures on your calculator display.

Answer: .....(2 marks)

b) Give the answer to part a) to 2 decimal places.

Answer: .....(1 mark)

2. If a road on a map is 8cm long and the map scale is 1:2000, work out the actual length of the road in metres.

Answer: .....(2 marks)

3. Lisa was going on holiday to Portugal and needed to change £275 into Euros. The exchange rate was £1 = 1.43 Euros.

a) How many Euros did she receive?

Answer: .....(2 marks)

At the end of the holiday she had 85 Euros remaining. She changed them back into £. The exchange rate was the same.

b) How much did she get?

Answer: .....(2 marks)

4. In the table below, put ticks under the two expressions that simplify to  $3p$ .

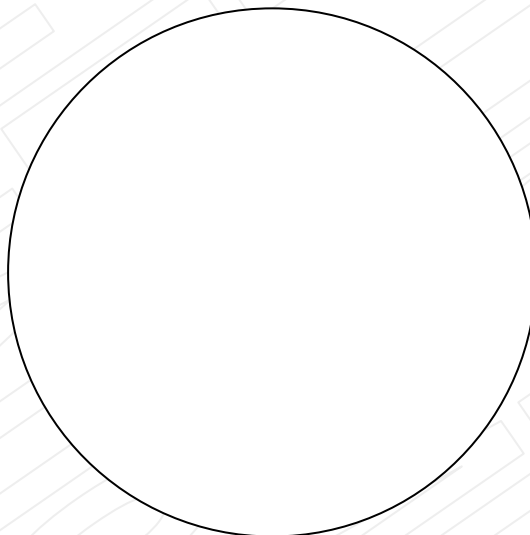
$3(p + 1)$	$p + 2p$	$3p \times p$	$1 \times 3p$	$3 + p$

(2 marks)

5. The table below shows the results of one Saturday afternoons football matches in the English league.

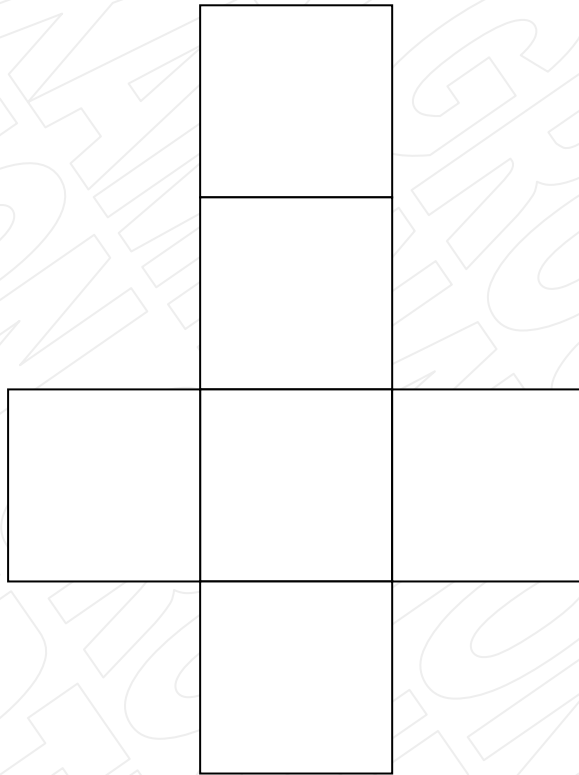
<b>Result</b>	<b>Frequency</b>	<b>Angle (<math>^{\circ}</math>)</b>
Home win	20	
Draw	10	
Away win	15	

Complete the table and construct a pie chart from this information, in the space below.



(4 marks)

6. a) Draw a sketch of the three dimensional shape that could be produced from the net shown below.



(2 marks)

b) On your sketch shade in one plane of symmetry.

(2 marks)

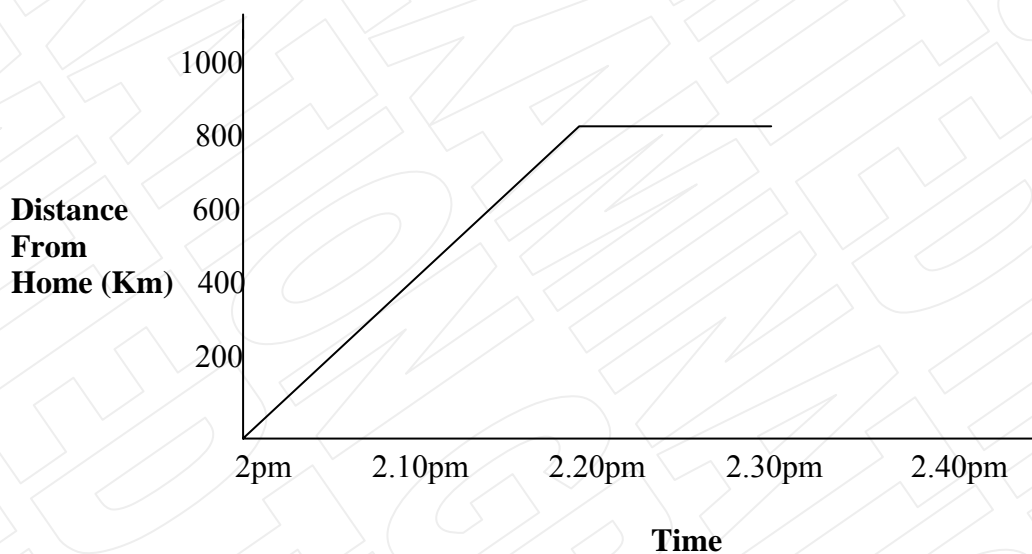
c) In the space below, construct an equilateral triangle, using compasses and a ruler. Show your construction lines.

(2 marks)

7. Dan picks a number which he subtracts 13 from, before dividing by 4 to get a result of 6. What number did Dan pick?

Answer: .....(2 marks)

8. The distance-time graph shown below represents Ella's journey from home to her local shops.



a) How far had she travelled after 10 minutes?

Answer: .....(1 mark)

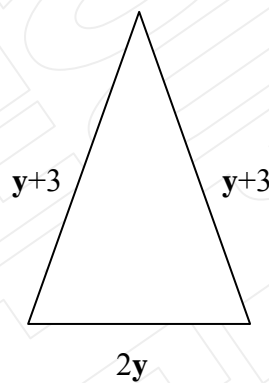
b) How long did she spend at the shops?

Answer: .....(1 mark)

c) If she walks back home twice as fast as the journey to the shops, then complete the graph to show her journey home.

(2 marks)

9. The triangle below is isosceles, with side lengths expressed in terms of  $y$  as shown.



a) Write down an expression in its simplest form for the perimeter of the triangle, in terms of  $y$ .

Answer: .....(2 marks)

b) If the perimeter of the triangle is 14cm, find the length of its base.

Answer: .....(3 marks)

**10.** Lydia has some DVD's which are either cartoons, films or educational. If the probability of her choosing a cartoon DVD is 0.3 and the probability of her choosing a film is 0.2 then what is the probability of her choosing an educational DVD ?

Answer: .....(2 marks)

**11.** The area of one circle is  $24\text{cm}^2$  and the area of another circle is  $6\text{cm}^2$

a) Write down the ratio of the area of the large circle to the area of the small circle, in its simplest form.

Answer: .....(1 mark)

b) Work out the radius of the large circle. Give your answer to three significant figures.

Answer: .....(2 marks)

**12.** Change  $4\text{m}^2$  into  $\text{cm}^2$ .

Answer: .....(2 marks)

**13.** If two train tickets from London to Brighton cost £16.50, how much would five tickets cost?

Answer: .....(3 marks)

14. Dave buys 8 new computers for his office. They cost £395 each plus 17½% VAT. What is the total amount he has to pay?

Answer: .....(4 marks)

15. Anna drove 132 miles in 2 hours 45 minutes. What was her average speed in Kilometres per hour?

Answer: .....(3 marks)

16. a) Rearrange this expression to make **p** the subject of the formula.

$$3q = 4r - 2p$$

Answer: .....(2 marks)

b) Solve this expression for **y** .

$$\frac{4}{2 - y} = \frac{3}{y + 5}$$

Answer: .....(3 marks)

17. The solution to the equation  $3x^2 + 5x = 17$  lies between 1 and 2. Find the value of  $x$  to 1 decimal place using the trial and improvement method.

Answer: .....(4 marks)

18. a) A bag of 27 sweets was shared out between three children in the ratio  $4 : 3 : 2$   
How many sweets were in the smallest share ?

Answer: .....(3 marks)

b) The sweet manufacturer decides to sell the bags of sweets with  $33\frac{1}{3}\%$  extra free. How many sweets will now be in a bag ?

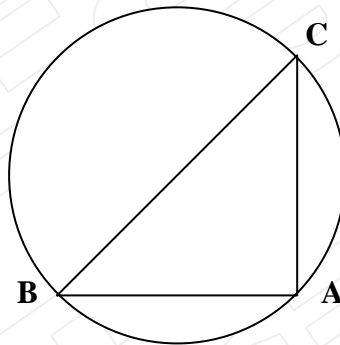
Answer: .....(2 marks)

- c) How many sweets are there in the largest share if the three children share out the new bag in the same ratio as in part a) ?

Answer: .....(2 marks)

19. The diagram below shows a triangle drawn within a circle, so that the three vertices of the triangle, **A**, **B** and **C** all lie on the circumference of the circle. Side **BC** of the triangle is a diameter of the circle, length 10cm. Side **AC** has length 8cm.

*This is a sketch.  
Not accurately drawn*



- a) What is the size of angle **BAC** and why ?

Answer: .....  
.....  
..... (2 marks)

b) Find the length of side **AB**.

Answer: ..... (2 marks)

c) Find the area of the circle, giving your answer correct to 3 significant figures.

Answer: .....(2 marks)

**20.** The table below shows information about the marks that 80 children scored in a History test, out of a maximum of 50 marks.

<b>Marks, m</b>	<b>Frequency, f</b>		
$0 < m \leq 10$	7		
$10 < m \leq 20$	18		
$20 < m \leq 30$	26		
$30 < m \leq 40$	20		
$40 < m \leq 50$	9		

a) Estimate the mean test mark, giving your answer to 1 decimal place.

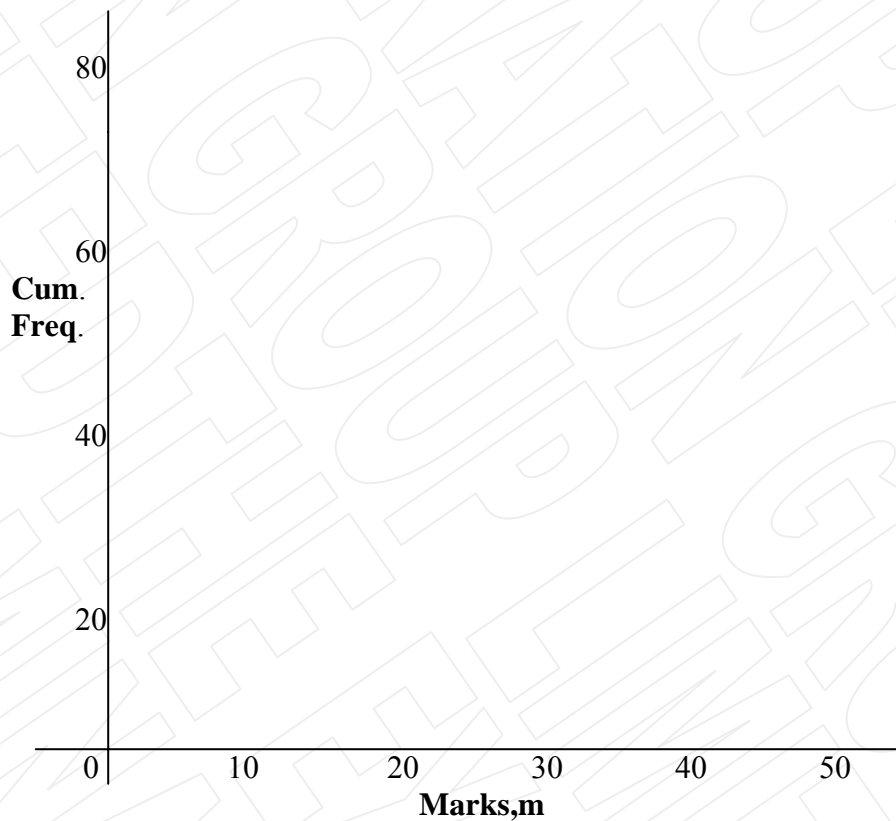
Answer: .....(4 marks)

b) Fill in the spaces in the cumulative frequency table below.

Marks, $m$	Cumulative frequency
$0 < m \leq 10$	
$10 < m \leq 20$	
$20 < m \leq 30$	
$30 < m \leq 40$	
$40 < m \leq 50$	

(1 mark)

c) On the grid below, draw a cumulative frequency graph for the test marks.



(2 marks)

d) Using the graph, estimate the number of children scoring over 50% for the test.

Answer: .....(2 marks)

21. Simplify the following expressions.

a)  $d^3 \times d^2$

Answer: .....(1 mark)

b)  $4pq^3 \times 2p^2q$

Answer: .....(2 marks)

c)  $\frac{(3 - y)^2}{3 - y}$

Answer: .....(1 mark)

22. A lap-top computer is reduced in a sale by 15%, and is now priced at £510. What was the price before the sale?

Answer: .....(3 marks)

23. Solve the following pair of simultaneous equations for  $x$  and  $y$  .

$$2x + 4y = 6$$

$$x - 3y = 8$$

Answer: .....(3 marks)

24. Find the answer to  $(6.1 \times 10^2) \times (2.8 \times 10^3)$  giving your answer in standard form correct to 2 decimal places.

Answer: .....(2 marks)

25. A town **P** is 17km due South of town **Q** and 8km due East of town **R**.



*This is a sketch.  
Not accurately drawn.*

a) Find the size of angle **PQR**, correct to 3 significant figures.

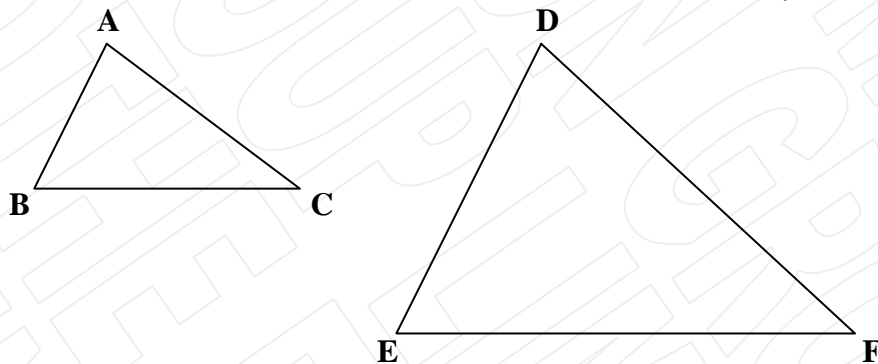
Answer:.....(3 marks)

b) Calculate the bearing of town **R** from town **Q**.

Answer: .....(1 mark)

**26.** Triangles **ABC** and **DEF** shown below are mathematically similar. Angle **ABC** = Angle **DEF** and Angle **BCA** = Angle **EFD**. Side lengths **AB** = 3cm, **BC** = 5cm, **DE** = 7.5cm and **DF** = 20 cm.

*These are sketches.  
Not accurately drawn.*



a) Work out side length **EF**.

Answer: .....(2 marks)

b) Work out side length **AC**.

Answer: .....(2 marks)

**END OF EXAMINATION : TOTAL 100 MARKS**

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