Step Up Maths Practice Paper GCSE (9–1) Mathematics Higher Paper 2

(Calculator) Time: 1 hour 30 minutes Total Marks: 80

ANSWER ALL QUESTIONS

1. (a) Expand and simplify 4(3y - 2) + 5(y + 3)

(b) Factorise fully $8x^2$ - 12x

(c) Make h the subject of the formula g = 4h - 9

(Total for Question 1 is 6 marks)

2. Michael is organizing a school fundraising event.
He spends

- £120 on venue rental
- £85 on refreshments
- £65 on decorations

Michael sells 72 tickets for the event.
Each ticket costs £5.50
Work out the percentage profit Michael makes for the school fund.

(Total for Question 2 is 4 marks)

3. Sarah invests £3750 in a savings account for 3 years.
The account pays compound interest at a rate of 2.8% per year.
Calculate how much Sarah has in this savings account at the end of the 3 years.

(Total for Question 3 is 2 marks)

4. Solve 4x + 13 = 37 - 2x

(Total for Question 4 is 3 marks)

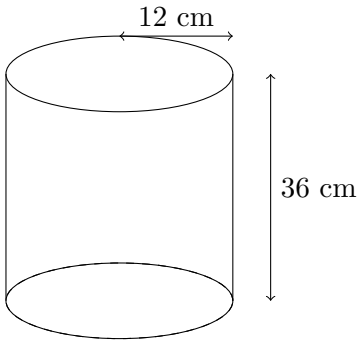
5. Alex, Ben and Charlie share some money in the ratio 2:5:3
Ben gets £150
Alex then gives some of his share to Ben and some of his share to Charlie.
The money that Alex, Ben and Charlie each have is now in the ratio 1:6:4
How much money did Alex give to Charlie?

(Total for Question 5 is 4 marks)

6. The bearing of point B from point A is 128°
Work out the bearing of point A from point B.

(Total for Question 6 is 2 marks)

7. The diagram shows an empty container in the shape of a cylinder.



The cylinder has radius 12 cm and height 36 cm.
Water flows into the container at a rate of 0.52 litres per minute.
Calculate the number of minutes it will take to completely fill the container.
Give your answer correct to the nearest minute.

(Total for Question 7 is 4 marks)

8. A number x is written correct to 3 significant figures.
The result is 4.82
Complete the error interval for x.

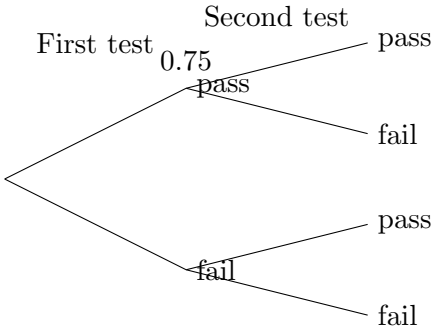
(Total for Question 8 is 2 marks)

9. Expand and simplify (x + 4)(x - 3)(x + 2)

(Total for Question 9 is 3 marks)

10. Emma has to complete two tests.
She can either pass or fail each test.
The probability that she will pass the first test is 0.75
If she passes the first test the probability she will pass the second test is 0.85
If she fails the first test the probability she will pass the second test is 0.65

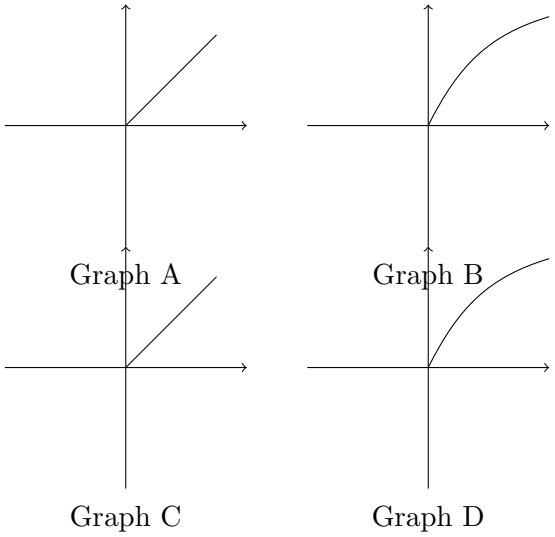
(a) Complete the probability tree diagram for this information.



(b) Work out the probability that Emma passes at least one of the tests.

(Total for Question 10 is 5 marks)

11.



The graphs of y against x represent four different types of proportionality.
Match each type of proportionality in the table to the correct graph.

Type of proportionality	Graph
$y \propto x^2$	
$y \propto x$	
$y \propto \frac{1}{x}$	
$y \propto \sqrt{x}$	

(Total for Question 11 is 2 marks)

12. A is the point with coordinates (5, 12)
B is the point with coordinates (-2, 18)
C is the point with coordinates (12, 24)
M is the midpoint of AB.
N is the midpoint of BC.
Work out the distance between M and N.
Give your answer correct to 1 decimal place.

(Total for Question 12 is 3 marks)

13. Prove algebraically that $0.0\dot{6}\dot{2}\dot{5}$ can be written as $\frac{125}{1998}$

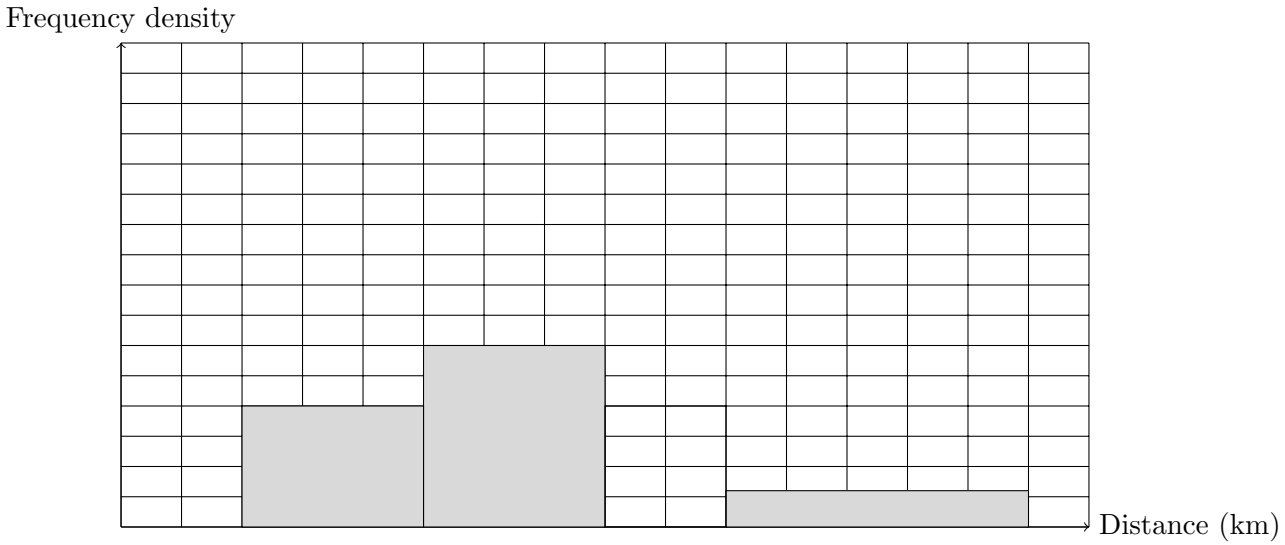
(Total for Question 13 is 3 marks)

14. y is proportional to x^3
$y = 2$ when $x = 1.5$
x is inversely proportional to w
$x = 3$ when $w = 0.4$
Find the value of y when $w = 1.2$

(Total for Question 14 is 5 marks)

15. The incomplete table and the incomplete histogram give information about the distances traveled by some students to school.

Distance (d km)	Frequency
$0 < d \leq 2$	
$2 < d \leq 5$	12
$5 < d \leq 8$	18
$8 < d \leq 10$	8
$10 < d \leq 15$	6



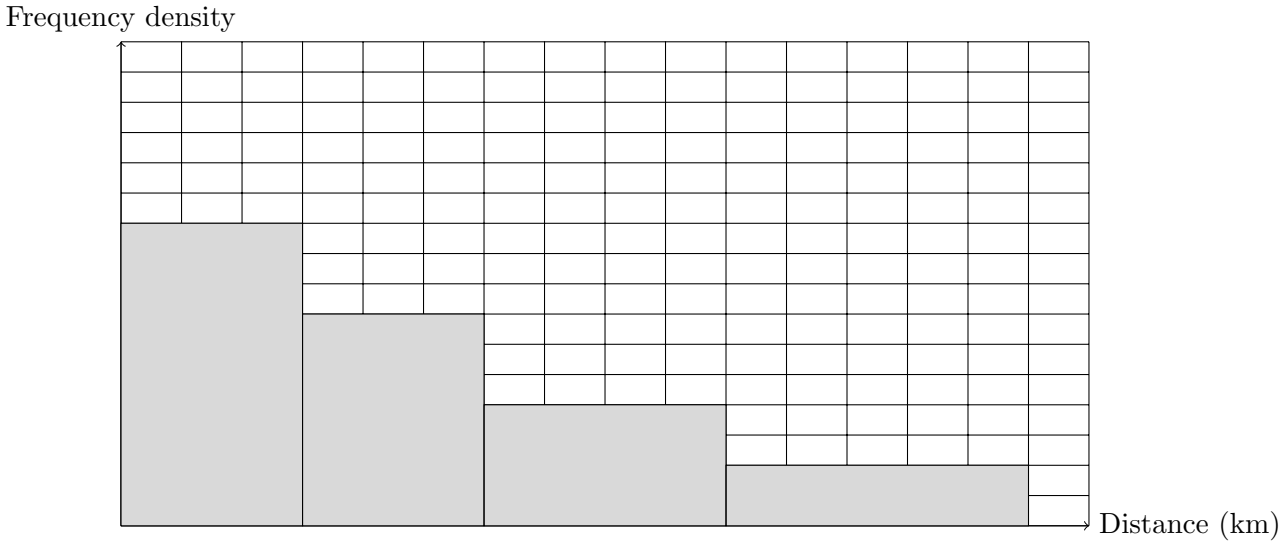
None of these students had a distance to school such that $d \leq 0$ or $d > 15$

(a) Use the histogram to complete the table.

(b) Use the table to complete the histogram.

(Total for parts (a) and (b) is 3 marks)

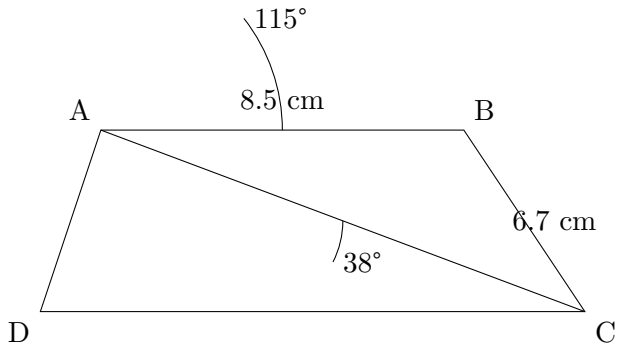
The histogram below gives information about the distances traveled by 56 students in another school.



(c) Work out an estimate for the median of the distances traveled by these 56 students to school.

(Total for Question 15 is 6 marks)

16. ABCD is a trapezium.



AD is parallel to BC.
Calculate the area of triangle ABC.
Give your answer correct to 1 decimal place.

(Total for Question 16 is 4 marks)

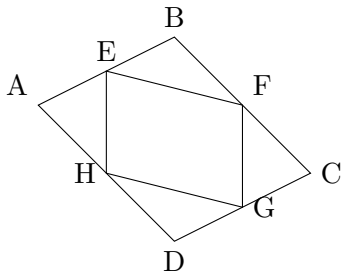
17. (a) Show that the equation $x^3 + 3x - 7 = 0$ has a solution between $x = 1$ and $x = 2$

(b) Show that the equation $x^3 + 3x - 7 = 0$ can be rearranged to give $x = \sqrt[3]{7 - 3x}$

(c) Starting with $x_0 = 1.5$
use the iteration formula $x_{n+1} = \sqrt[3]{7 - 3x_n}$ twice to find an estimate
for the solution of $x^3 + 3x - 7 = 0$
Give your answer correct to 4 decimal places.

(Total for Question 17 is 6 marks)

18.



ABCD is a quadrilateral.
E, F, G and H are the midpoints of AB, BC, CD and DA.
$\overrightarrow{AE} = \mathbf{a}$ $\overrightarrow{BF} = \mathbf{b}$ $\overrightarrow{CG} = \mathbf{c}$
Prove, using vectors, that EFGH is a parallelogram.

(Total for Question 18 is 4 marks)

19. The functions f and g are such that
$f(x) = (3x + 2)^2$ and $g(x) = 3x - 5$

(a) Find $gf(-1)$

(b) Find $g^{-1}(x)$

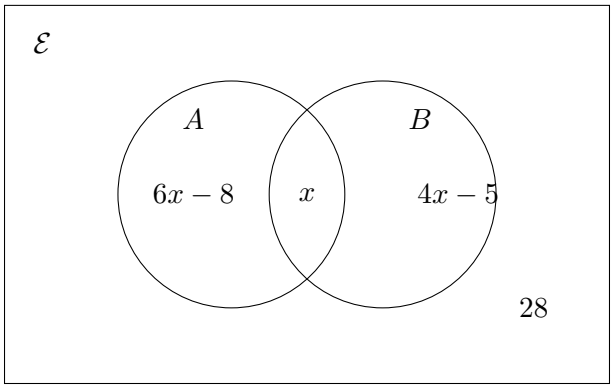
(Total for Question 19 is 4 marks)

20. Write $\frac{12}{5x-15} + \left[(x + 3) \div \frac{3x^2-6x-45}{2x+5}\right]$ in the form $\frac{ax+b}{cx+d}$ where a, b, c and d are integers.

(Total for Question 20 is 4 marks)

21. David has a collection of coins.
The Venn diagram gives information about the number of coins in his collection where

$\mathcal{E} = \{\text{all coins}\}$
$A = \{\text{silver coins}\}$
$B = \{\text{ancient coins}\}$



David is going to take at random a coin from his collection.
Given that the coin is ancient, the probability that the coin is silver is $\frac{3}{13}$
Work out the number of coins in David's collection.

(Total for Question 21 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS