

GCSE MATHEMATICS

Name:

Practice Paper 1 Higher
Non-Calculator

Maximum marks: 80
Time allowed: 1 hour 30 minutes

These questions are from past papers covering topics and skills based on the advance information to help you prepare for the exams this summer.

Answer all questions in the spaces provided. You must **not** use a calculator.

- 1 Circle the decimal that is closest in value to $\frac{2}{3}$

0.6 0.66 0.667 0.67

(Total 1 mark)

- 2 Which of these is **not** used to prove that triangles are congruent?
Circle your answer.

SSS SAS AAA RHS

(Total 1 mark)

- 3 For a biased dice, $P6 = \frac{3}{5}$

Circle the probability of two sixes when the dice is rolled twice.

$\frac{6}{25}$ $\frac{6}{10}$ $\frac{9}{25}$ $\frac{9}{5}$

(Total 1 mark)

- 4 (a) Cards in a pack are red or blue in the ratio

$$\text{red : blue} = 2 : 3$$

What fraction of the cards are **red**?

Circle your answer.

$\frac{5}{6}$ $\frac{2}{3}$ $\frac{2}{5}$ $\frac{3}{5}$

(1)

(b) A different pack has 72 cards.

$\frac{5}{9}$ are yellow.

Work out the number of yellow cards.

Answer _____

(2)

(Total 3 marks)

5 Work out $8\frac{1}{2} \div 2\frac{2}{3}$

Give your answer as a mixed number.

Answer _____

(Total 4 marks)

6 (a) Solve $5x + 3 = 3(x + 2)$

Answer _____

(3)

(b) $2(x + 16) + 4(x - 5)$ simplifies to $a(x + b)$

Work out the values of a and b .

Answer $a =$ _____ , $b =$ _____

(3)

(Total 6 marks)

7 (a) Simplify $a^{20} \times a^5$

Answer _____

(1)

(b) Simplify $\frac{a^{20}}{a^5}$

Answer _____

(1)

(c) Simplify $(a^{20})^5$

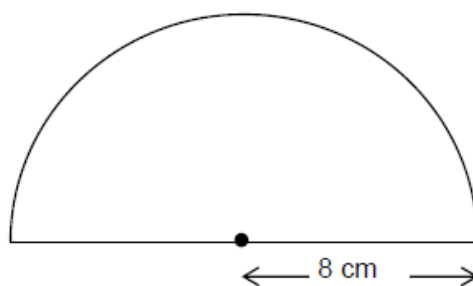
Answer _____

(1)

(Total 3 marks)

8 The diagram shows a semicircle of radius 8 cm

Not drawn accurately



Work out the area of the semicircle.

Give your answer in terms of π .

Answer _____ cm^2

(Total 2 marks)

- 9 (a) A human cell nucleus has a diameter of 0.000 001 metres.
Write this number in standard form.

Answer _____

(1)

- (b) There are up to 5×10^{13} cells in a human body.
Write 5×10^{13} as an ordinary number.

Answer _____

(1)

- (c) A patient has a disease.
She has 4^3 body cells affected on day 1.
The number of affected cells doubles every day.
On which day does the patient have 2^{10} affected cells?
You **must** show your working.

Day _____

(3)

(Total 5 marks)

- 10 Amy has x beads.
Billy has three more beads than Amy.
Carly has four times as many beads as Billy.

Circle the expression for the number of beads that Carly has.

$4x + 3$

$3x + 4$

$4(x + 3)$

$x + 12$

(Total 1 mark)

11 Use ruler and compasses for this question.

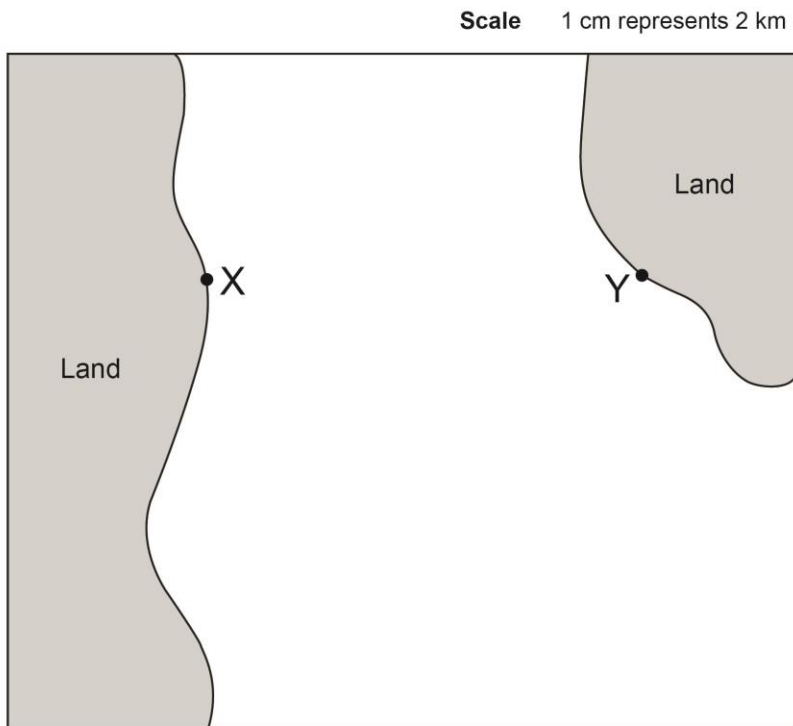
A ship is

- closer to port X than port Y
- less than 11 km from Y .

The map below shows the positions of X and Y .

On the map, show the region where the ship could be.

Label it R .



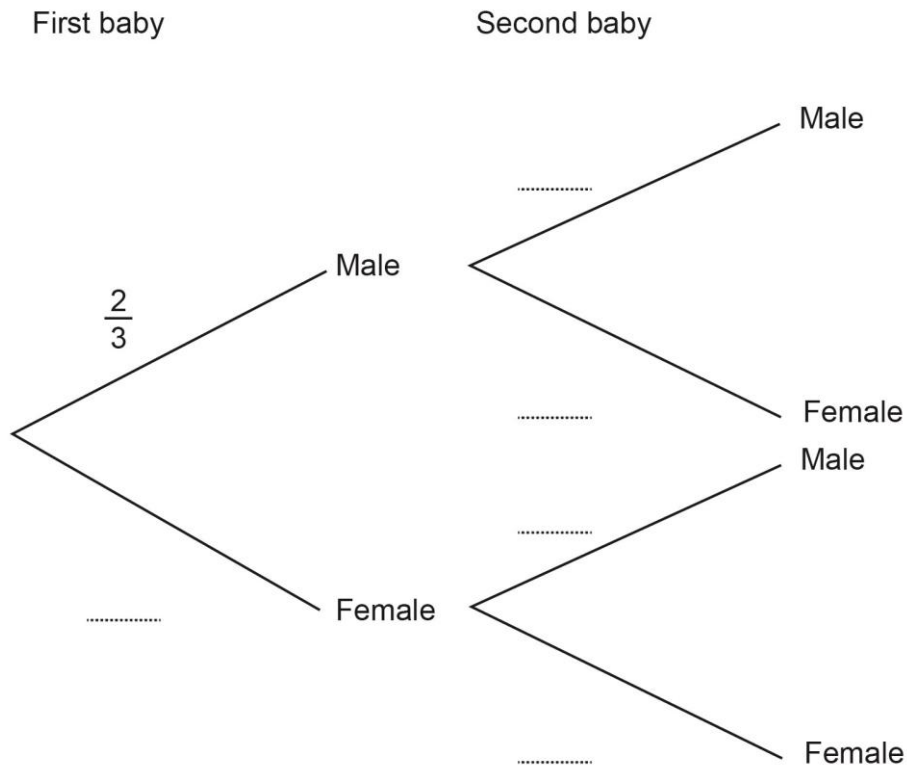
(Total 4 marks)

12 Some animals are **twice** as likely to have male babies as female babies.

- (a) Explain why the probability of a male baby is $\frac{2}{3}$.

(1)

- (b) One of these animals is expecting two babies.
Complete the tree diagram to show all possible outcomes.



(2)

- (c) A scientist wants to predict the likely outcomes for the sex of the babies.
Which is more likely, two of the same sex or one of each?
You **must** show your working.

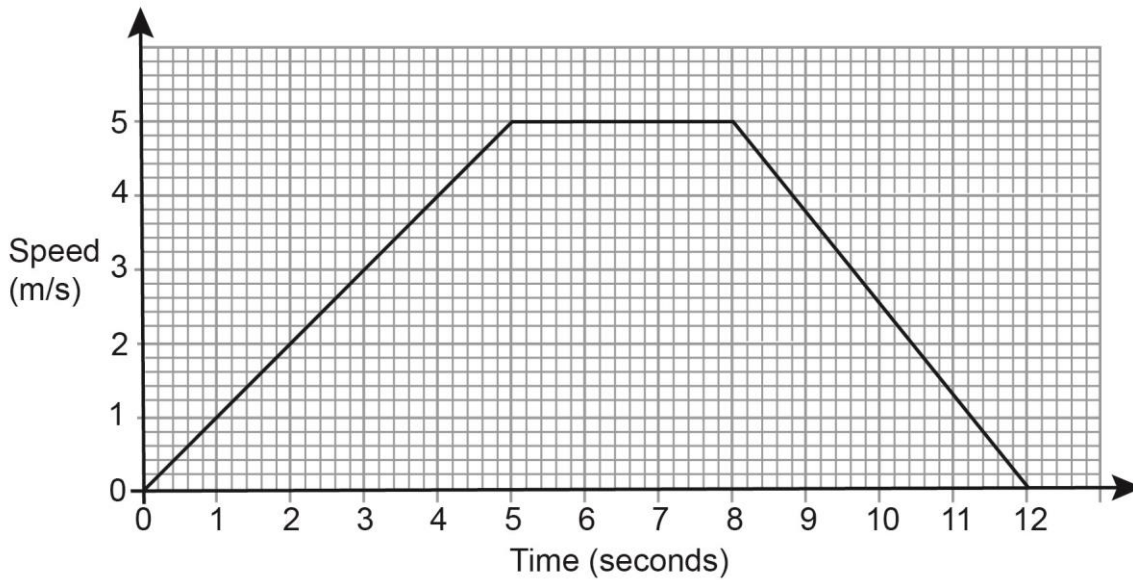
Answer _____

(4)

(Total 7 marks)

13 Meera runs for 12 seconds.

Her speed, in metres per second, is shown on the graph.



(a) For how many seconds does she run at a constant speed?

Answer _____ seconds

(1)

(b) Work out the total distance she runs.

Answer _____ metres

(3)

(c) Work out the gradient of the graph during the first 5 seconds.

Answer _____ m/s^2

(1)

(d) What does the gradient in part (c) represent?

Circle your answer.

time

speed

distance

acceleration

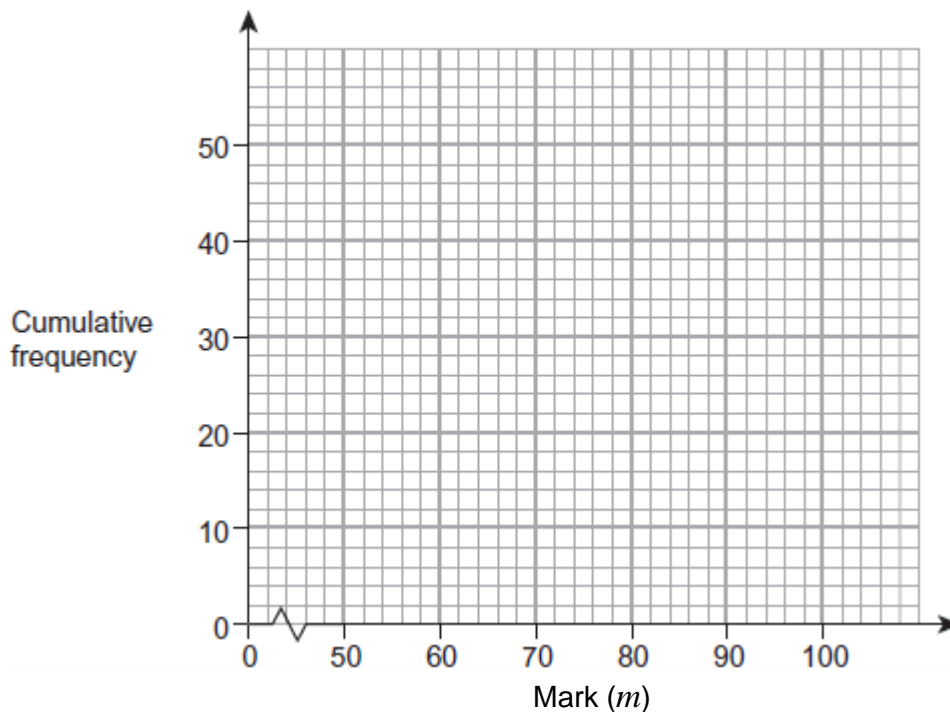
(1)

(Total 6 marks)

14 The table shows the marks of 50 students in a test.

Mark (m)	Number of students	
$50 < m \leq 60$	2	
$60 < m \leq 70$	3	
$70 < m \leq 80$	20	
$80 < m \leq 90$	16	
$90 < m \leq 100$	9	

(a) Draw a cumulative frequency diagram for the data.



(3)

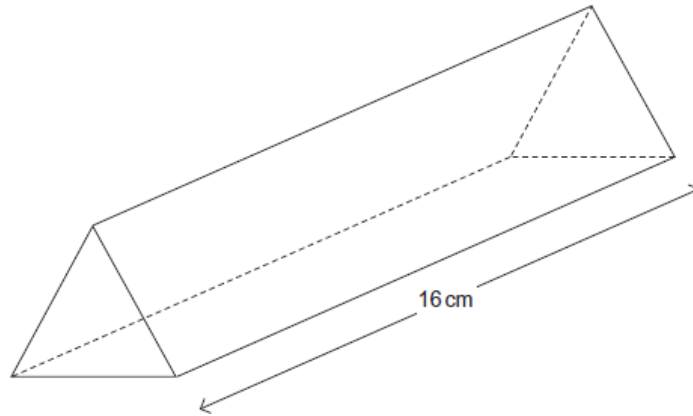
(b) Students who scored between 72 and 85 marks are chosen for extra lessons. Estimate the number of students chosen.

Answer _____

(3)

(Total 6 marks)

- 15 A company makes boxes out of card.
Each box is a triangular prism.
The total surface area of the box is 196 cm^2 .



The company want to make an extra large box that is

- similar to the one shown above
- of length 80 cm
- uses no more than 5000 cm^2 of card.

Show that it is possible to make this box.

(Total 3 marks)

- 16 Prove algebraically that $2.7\bar{5}$ converts to the fraction $\frac{124}{45}$

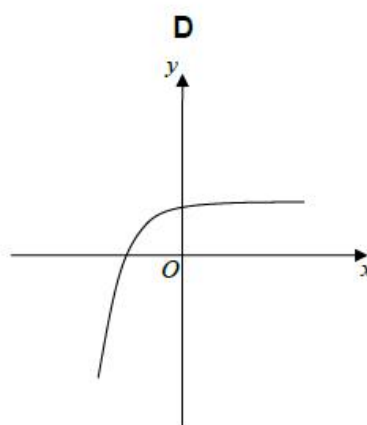
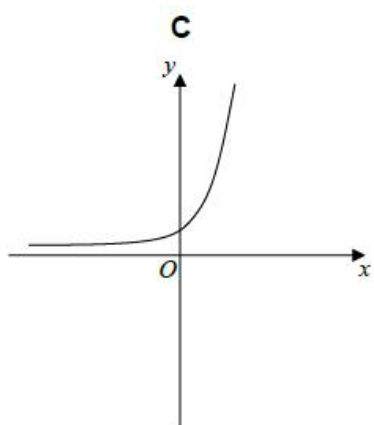
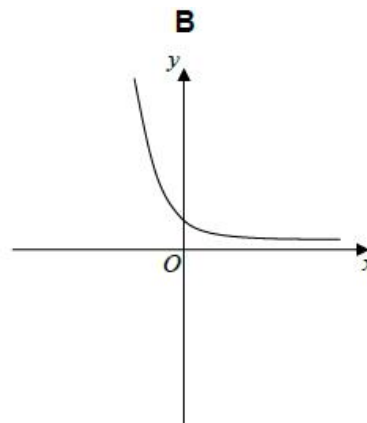
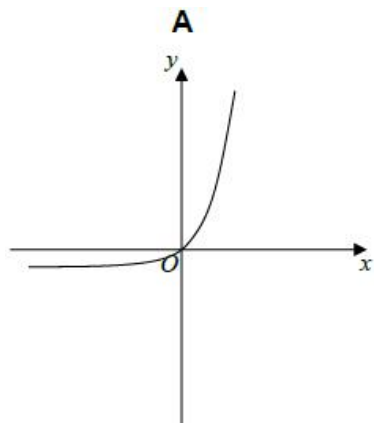
(Total 3 marks)

17 Make x the subject of the formula $\frac{a+2x}{a-x} = n$

Answer _____

(Total 4 marks)

18 One of these graphs is a sketch of $y = 3^{2x}$
Which one?
Circle the correct letter.



(Total 1 mark)

19 Factorise $3x^2 + 14x + 8$

Answer _____

(Total 2 marks)

20 You are given that $x^2 - 12x + a = (x - c)^2$

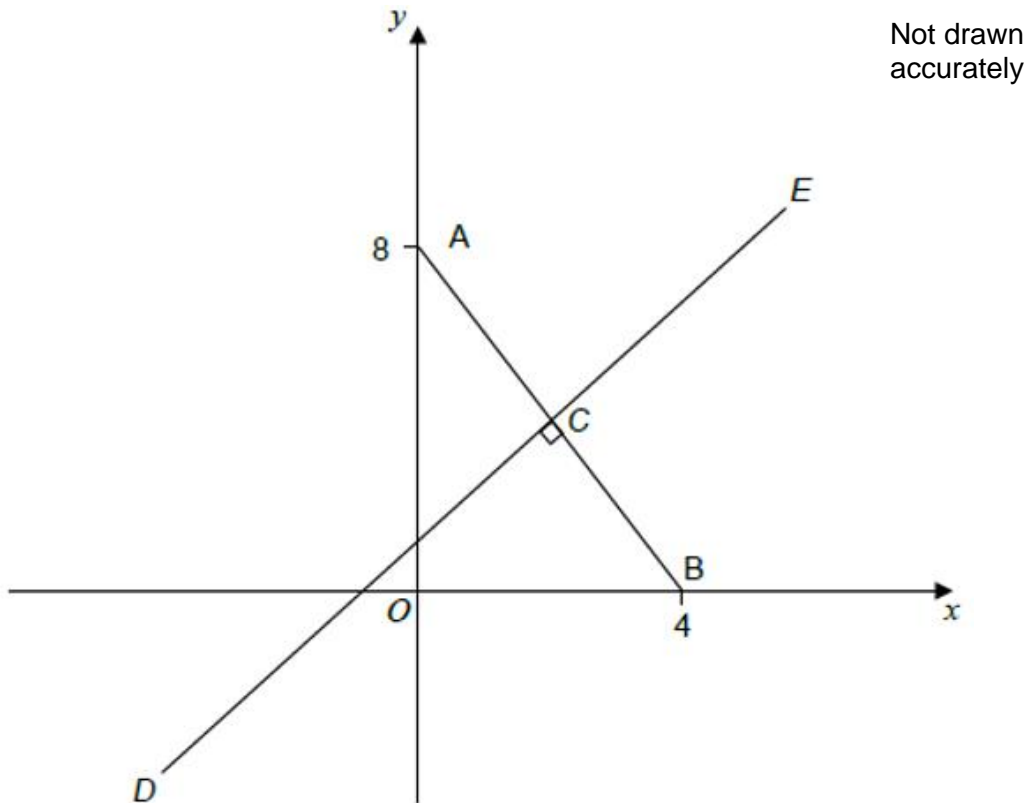
Work out the values of a and c .

$a =$ _____

$c =$ _____

(Total 3 marks)

- 21 ACB is a straight line.
 A is the point $(0, 8)$, and B is the point $(4, 0)$
 C is the midpoint of AB .
Line DCE is perpendicular to line ACB .



Work out the equation of line DCE .

Answer _____

(Total 5 marks)

22 $w = \frac{3}{5\sqrt{x}}$

Circle the expression for w^2

$\frac{6}{10x^2}$

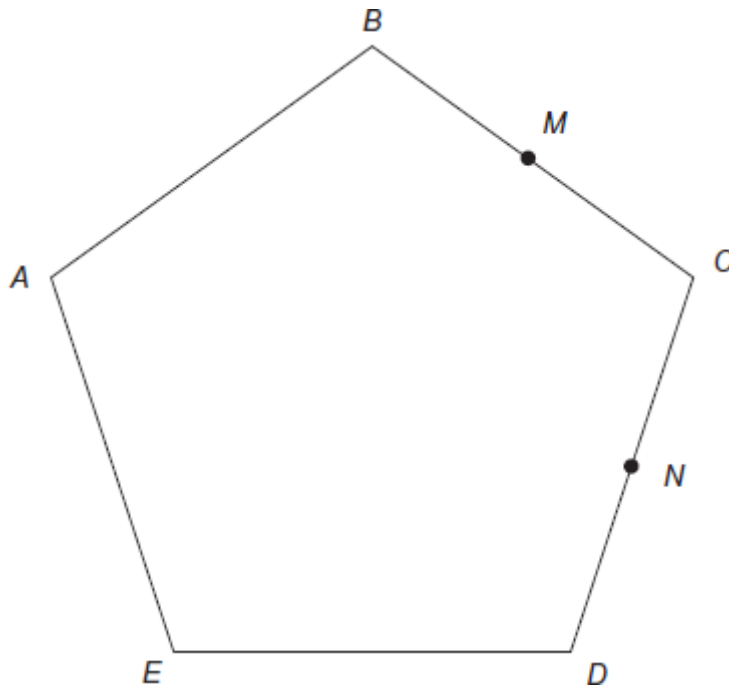
$\frac{9}{25x^2}$

$\frac{6}{10x}$

$\frac{9}{25x}$

(Total 1 mark)

- 23 $ABCDE$ is a pentagon.
 M is the midpoint of BC .
 N is the midpoint of CD .



$\vec{BC} = x$

$\vec{CD} = y$

- (a) Show that MN is parallel to BD .

(3)

- (b) Write down the ratio $BD : MN$ in its simplest form.

Answer _____ : _____

(1)

(Total 4 marks)

