THE G C SCHOOL OF CAREERS

MATHEMATICS DEPARTMENT

SCHOOL YEAR 2021 – 2022

SAMPLE EXAMINATION PAPER

FORM 2

INFORMATION TO CANDIDATES

Answer ALL the questions in the space provided.

In calculations, you are advised to show all the steps in your working.

A Scientific Calculator may be used.

This paper has **20 questions**.

The total mark for this paper is **100**.

There are 16 pages in this question paper.

1. Factorise the following expressions **completely**:

(a) $3x^2y - 9ax + 21xy =$

Answer: _____

(2)

(b) $4x^2 - 64 =$

Answer: _____

(3)

2. Given that $A = 81 \times 10^{-8k}$

Express $A^{\frac{5}{4}}$ in standard form.

Answer: _____

(3)

3. The acceleration a of a train is found using the formula $a = \dfrac{v^2 - u^2}{2s}$.

(a)   Make s the subject of the formula.

Answer: _____

(2)

(b) Hence, find the value of s when $a = 63.8\,m/s^2$, $v = 20\,m/s$ and $u = 9\,m/s$.

Answer: _____

(2)

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4. Katy invests £200 000 in a savings account for 4 years.
The account pays compound interest at a rate of 1.5 % per annum.
Calculate the total amount of **interest** Katy will get at the end of the 4 years.

Answer: _____

(3)

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5. Simplify fully, giving your answer as a single fraction.
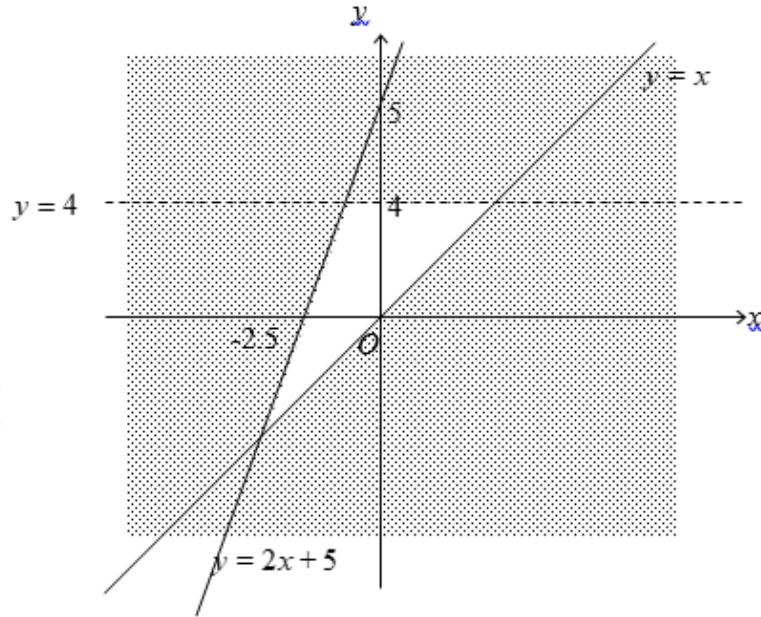
(a) $\dfrac{x^2 - 3x}{x^2 - 9} =$

Answer:_____

(3)

(b) $\dfrac{6x - 12y}{3x^3 y} \div \dfrac{7x^2 - 14xy}{27y^2} =$

Answer: _____

(4)

6. Write down inequalities to describe the **unshaded** region.

Answer(s): _____

(3)

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7. Here are the points that Carmelo scored in his last 11 basketball games:

    23   20   14   23   17   24   24   18   16   22   21

Find the interquartile range of these points.

Answer: _____

(4)

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8. Work out the following, giving your answers in standard form.
You must show all the steps in your workings.

(a) $(9.8 \times 10^{15}) \div (1.4 \times 10^7) =$

Answer: _____

(2)

(b) $(9.4 \times 10^{-2}) + (5 \times 10^{-3}) =$
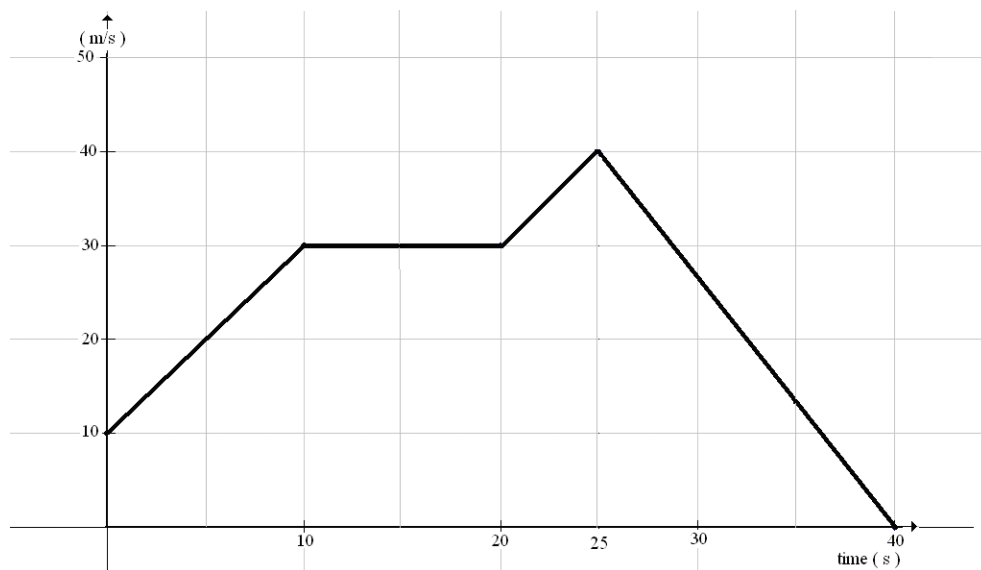
Answer: _____

(3)

9. Given that $P = \dfrac{a}{m-x}$

$x = 8$ correct to 1 significant figure
$a = 4.6$ correct to 2 significant figures
$m = 20$ correct to the nearest 10

Calculate the lower bound of P.

Answer: _____

(4)

10. The diagram shows the speed – time graph of a motor bike traveling.

Find:

(a) The initial speed of the motor bike.

Answer: _____

(1)

(b) The acceleration when $t = 12$ sec.

Answer: _____

(1)

(c) The deceleration.

Answer: _____

(2)

(d) The time t at which the car **at rest**.

Answer: _____

(1)

(e) The distance travelled in 25 seconds.

Answer: _____

(3)

11. T is directly proportional to the cube of r. $T = 21.76$ when $r = 4$

(i) Find a formula for T in terms of r.

Answer: _____

(3)

(ii) Work out the value of r when $T = 73.44$

Answer: _____

(2)

12.

(a) Solve the following pair of simultaneous equations.

$$3x + 2y = 7$$
$$2x - 3y = -4$$

Answer: $x = $ _____

$y = $ _____

(4)

13. A quiz has five questions.

The table shows the number of correct answers given by the people who took the quiz.

Number of correct answers	Number of pupils
0	5
1	10
2	13
3	21
4	49
5	1

(a) By showing your workings, calculate:

    i.   the mean number of correct answers, giving your answer correct to 2 decimal places.

Answer: _____

(3)

    ii.   the median number of correct answers.
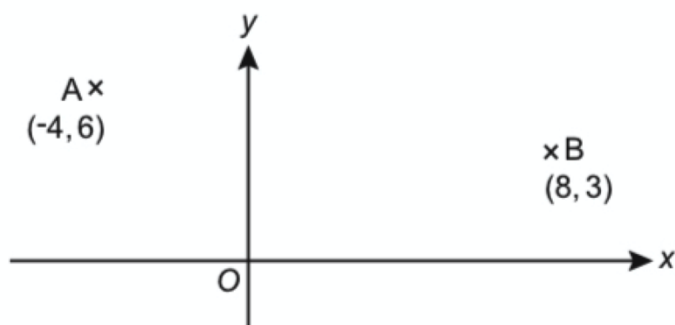
Answer: _____

(3)

(b) Find the modal number of correct answers.

Answer: _____

(1)

14. Point A has coordinates $(-4, 6)$ and point B has coordinates $(8, 3)$.

(a) Find the equation of line joining the points AB.

Answer: _____

(4)

(b) Point P has coordinates $(0, -2)$.

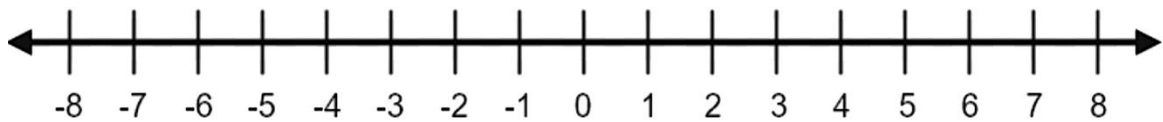Write down the equation of the line that is parallel to the line AB and passes through P.

Answer: _____

(1)

15.

(a) Solve the following inequality and show your answer on the number line.

$$\frac{10(1-2x)}{3} \le 4x + 7 < 6(x+3)$$

Answer: _____

(5)

(b) Write down the smallest prime number that satisfies the inequality in part **(a)**.
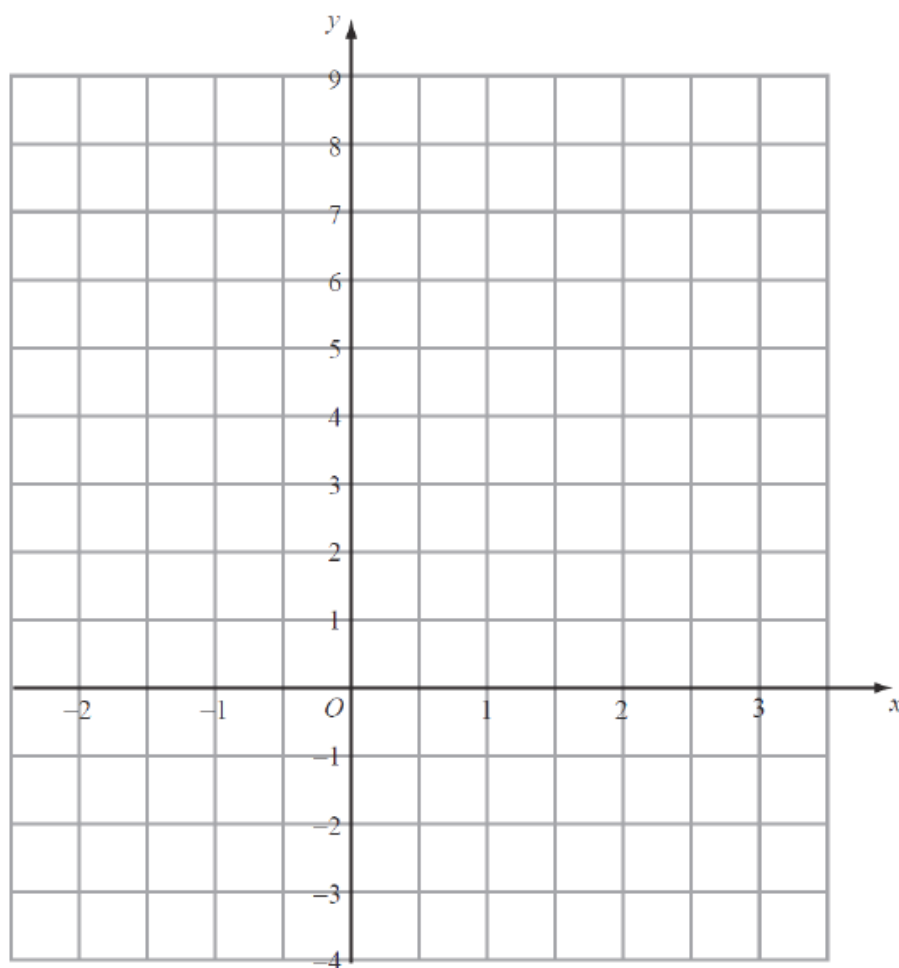
Answer: _____

(1)

16.

(a) Complete the table of values for $y = 2x + 2$.

x	-2	-1	0	1	2	3
y	-2				6	

(2)

(b) On the grid below, draw the graph of $y = 2x + 2$.
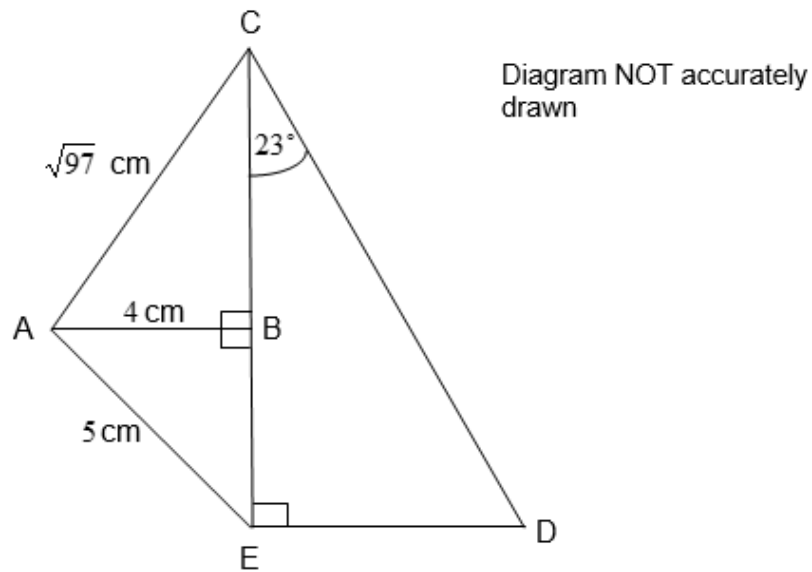

(2)

(c) Use your graph to find the value of x when $y = 7$.

Answer: _____

(1)

17.

On the diagram given below, AC= $\sqrt{97}$ cm, AB= 4 cm, AE= 5 cm.

Angle ECD = $23°$.

C

$\sqrt{97}$ cm

$23°$

Diagram NOT accurately drawn

4 cm

A

B

5 cm

E

D

By showing all the steps in your workings, calculate the length of CD.
Give your answer correct to 2 significant figures.

Answer: _____

(5)

18. The diagram below shows the positions of three islands, A, B and C.
   B is 150 Km due West of A.
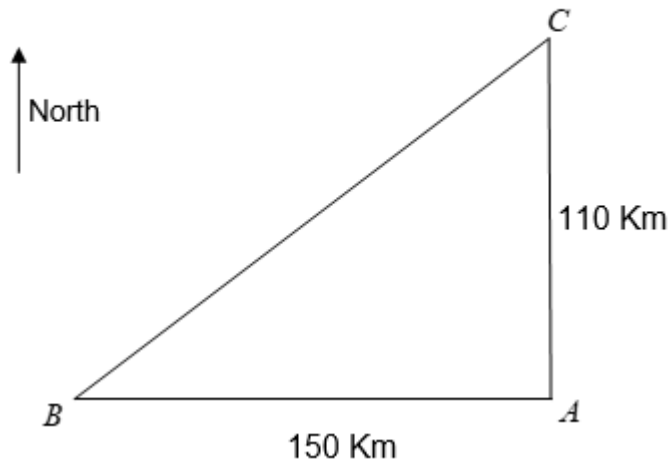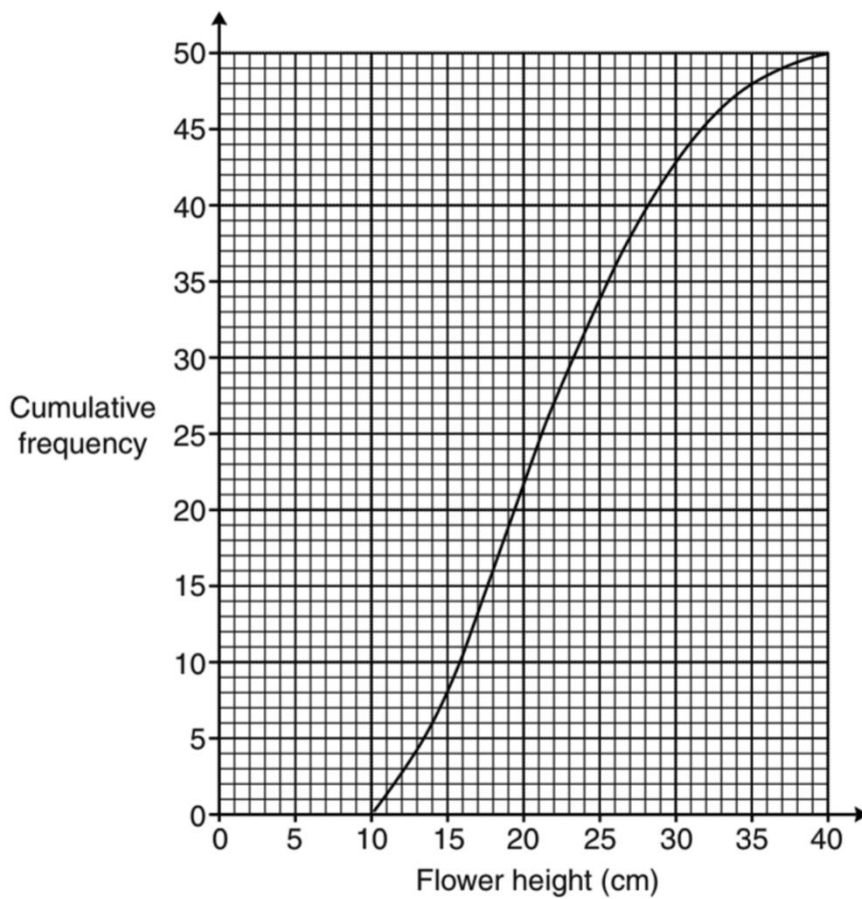 C is 110 Km due North of A.

Diagram NOT accurately drawn.

A boat sets out from B directly to C. By showing all your steps, calculate the bearing of B from C, giving your answer correct to 3 significant figures.

Answer: _____

(4)

19. The cumulative frequency diagram represents the results for **variety B**.

Use the cumulative frequency diagram to answer the following for **variety B.**

(i) Find an estimate for the median flower height.
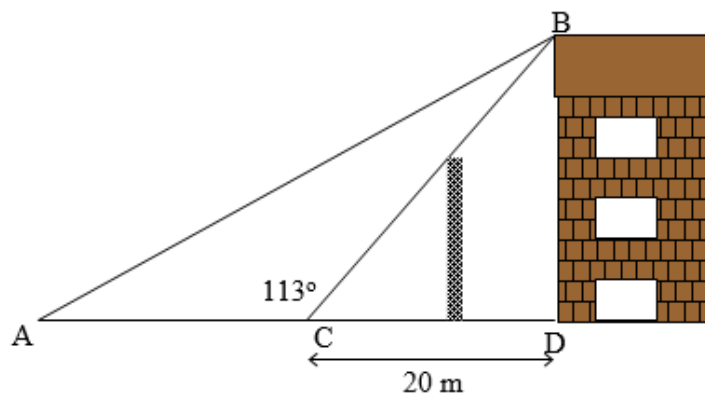
Answer: _____

(2)

(iii) Find an estimate of the interquartile range of the flower heights.

Answer: _____

(3)

20. An old building is unsafe, so it is protected by a fence. Julia made the measurements shown on the diagram below:

(a) Calculate the height of the building, BD, giving your answer correct to 1 decimal place.

Answer: _____

(4)

A camera at the top of the tower makes an angle of depression of 37º when it spots the girl at point A.

(b) Mark this angle on the diagram.

(1)

(c) Hence, calculate the distance of A from C, giving your answer correct to 1 decimal place.

Answer: _____

(3)

THE END