

Sec 4 E–Math WA1 Mock Exam Paper 2025

Time Allowed: 1 hour 30 minutes

Total marks: 65

Instructions:

- Answer all questions.
- Show your workings clearly.
- Marks are indicated for each question.
- Give your best shot!

Additional materials:

- Calculator
- Graph paper

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1. The marked price of a 65–inch Ultra HD 4K TV is \$6000.
Mr Lim buys the TV on hire purchase scheme with down payment of 20% on the marked price.
He then pays monthly installments over 4 years at a simple interest rate of 1.37% per annum.
Calculate the total amount that Mr Lim pays for a television.
EM/S4/Prelim/2023/NHHS/Q4

Answer:[2]

2. $\xi = \{\text{integer } x : 0 < x \leq 20\}$
 $P = \{\text{perfect square}\}$
 $Q = \{\text{even number which solves } 3x > 11\}$
 $R = \{\text{multiple of } 4\}$
EM/S4/Prelim/2022/NHHS/Q17/P1

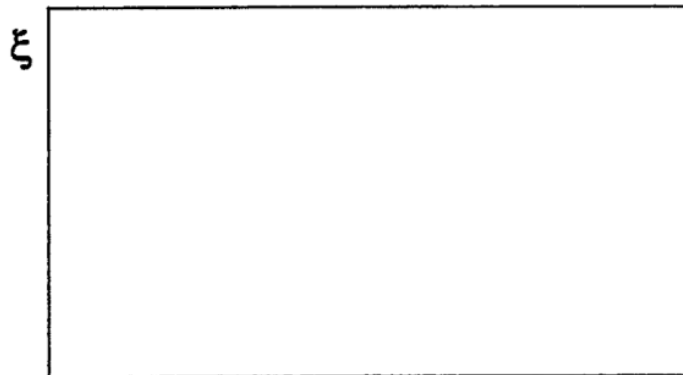
(a) (i) List all the elements in P .

Answer:[1]

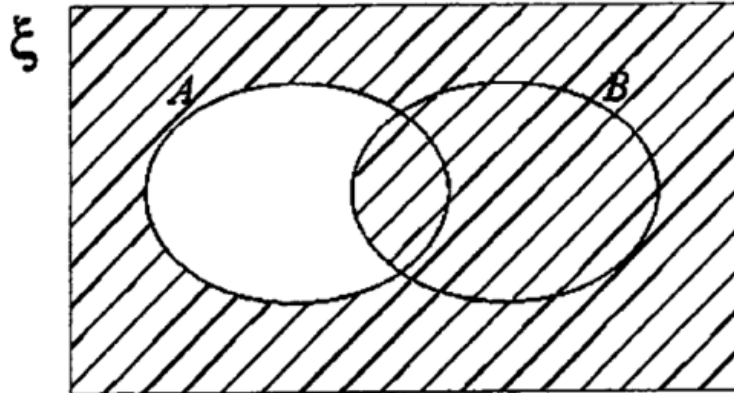
(ii) Find $n(P' \cap Q)$.

Answer:[1]

(iii) On the answer space provided, draw the Venn diagram to illustrate the relationship between sets P , Q and R . [2]



(b) Use set notation to describe the set shaded in the Venn diagram below.



Answer:[1]

3. The n^{th} term of a sequence 0, 3, 8, 15.... Is given by $n^2 - 1$.
EM/S4/Prelim/2023/TKSS/Q7

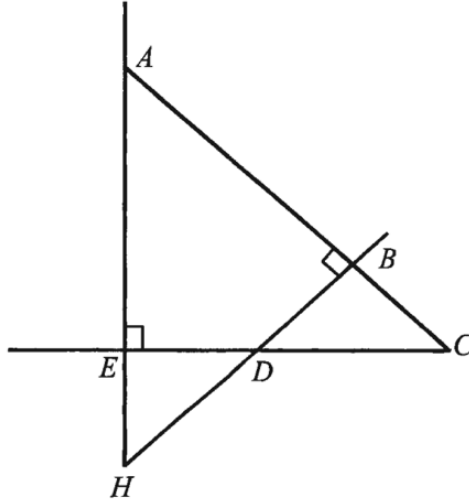
(a) One term in the sequence is 288. Find the value of n for this term.

Answer:[2]

(b) Find an expression, in terms of n , for the n th term of another sequence if the first four terms are -5, -2, 3, 10.

Answer:[1]

4. In the diagram below, $\angle AEC$ and $\angle ABH$ are right angles.
AH = 29 units, EH = 9 units and AB = 20 units.
EM/S4/Prelim/2023/TKSS/Q15



- (a) Show that triangle AEC is congruent to triangle ABH. [3]

- (b) Find BC.

Answer:[1]

5. $ab^2 + c = \frac{2c + b}{a}$

Rearrange the formula to make c the subject.

EM/S4/Prelim/2023/ZHSS/Q16/P1

Answer:[3]

6. The variable x and y are connected by the equation.

$$y = \frac{x^2}{5} + \frac{6}{x}$$

The table below shows some values of x and the corresponding values of y correct to 1 decimal place.

EM/S4/Prelim/2023/ZHSS/Q4/P2

(a) Complete the table. [1]

x	1	1.5	2	3	4	5	6
y	6.2	4.5	3.8	3.8	4.7	6.2	

(b) On the grid (using a graph paper), draw the graph of $y = \frac{x^2}{5} + \frac{6}{x}$ for $1 \leq x \leq 6$. [3]

- (c) Use your graph to find the value(s) of x in the range of $1 \leq x \leq 6$ for which $\frac{x^2}{5} + \frac{6}{x} - 4 = 0$.

Answer:[2]

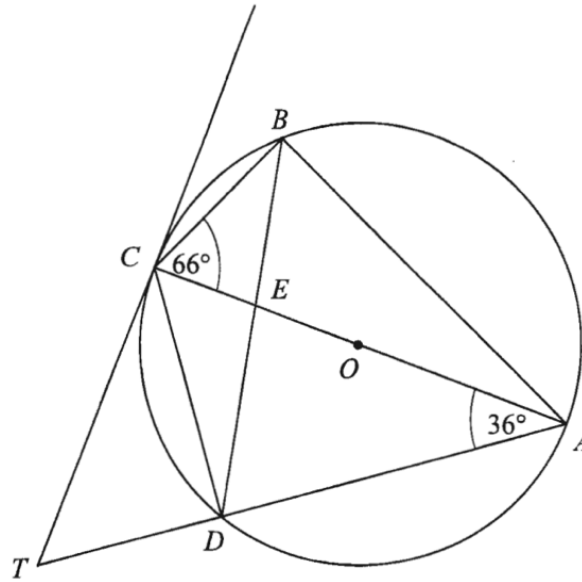
- (d) By drawing a tangent, find the gradient of the curve at point $(4, 4.7)$.

Answer:[2]

- (e) By drawing the graph $y = \frac{1}{2}x + 4$ on the grid, find the equation in the form $2x^3 + ax^2 + bx + c = 0$, which is satisfied by the x -coordinates of the points at which the two graphs intersect.

Answer:[4]

7. In the diagram, A, B, C and D are points on the circle with centre O.
 The lines AC and BD intersect at E.
 The tangent to the circle at C meets AD produced at T.
 $\angle ACB = 66^\circ$, $\angle CAD = 36^\circ$ and $AC = 10$ cm.
 EM/S4/Prelim/2023/ZHSS/Q6/P2



(a) Find the angle DCT.

Answer:[2]

(b) Show that the triangles BCE and ADE are similar.
 Give a reason for each statement you make. [2]

(c) Calculate DE.

Answer:[4]

(d) Calculate the length of the minor arc BC.

Answer:[3]

8. Plane A travels at an average speed of x km/h for 3 hours 20 minutes and then at an average speed of y km/h for 1 hour 10 minutes.

The plane travels a total distance of 3700 km.

EM/S4/Prelim/2022/NHHS/Q6/P2

- (a) Write down an equation in x and y to represent this information and show that it simplifies to $20x + 7y = 22200$.

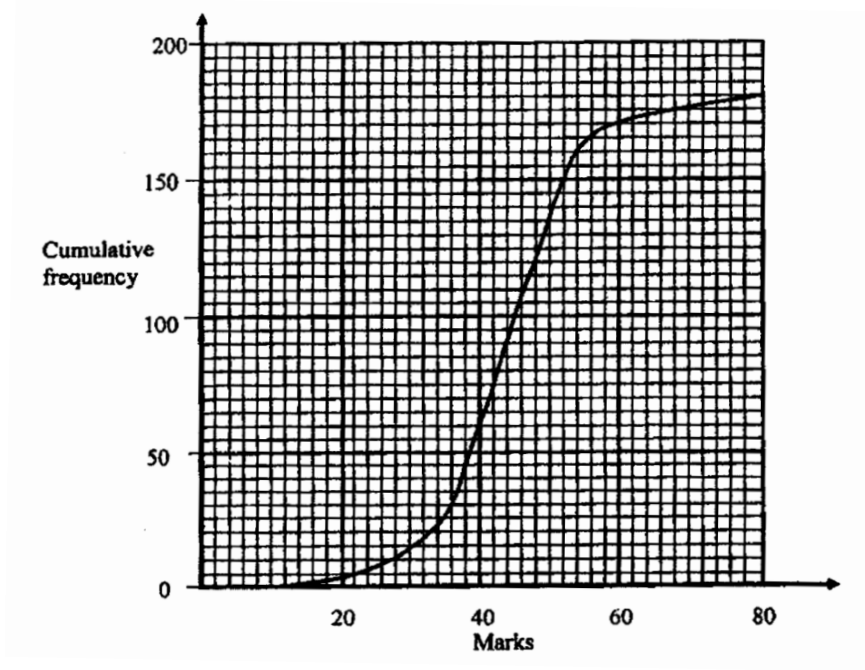
Plane B travels at an average speed of x km/h for 2 hours 30 minutes and then at an average speed of y km/h for 1 hour 50 minutes. It travels 350 km less than Plane A.

- (b) Write down an equation in x and y to represent this information. [1]

- (c) Solve these two equations to find the value of x and the value of y .

Answer:[3]

9. The cumulative frequency curve shows the distribution of marks scored by 180 students in a Mathematics examination in 2021. The maximum possible mark is 80.
EM/S4/Prelim/2022/CGS/Q18/P1



- (a) $\frac{5}{6}$ of the students scored more than n marks in this exam.
Find n .

Answer:[2]

- (b) To obtain the final mark of each student, the teacher divided the mark on the cumulative frequency curve by 2 and added the result by 15.
Find the number of students who had the final mark of 37 or less.

Answer:[2]

(c) The marks scored by another group of 180 students in the same mathematics examination has the same median but a larger standard deviation.
Describe how the cumulative frequency curve for the new group of students will differ from that of the first group of students.

.....[1]

(d) Two of the students are chosen at random.
Find the probability that one of the students scored less than or equal to 60 marks while the other student scored more than 60 marks.

Answer:[2]

10. EM/S4/Prelim/2021/CDSS/Q4/P1

(a) Show that $y = 5 - x^2 - 4x$ has a maximum point $(-2, 9)$. [3]

(b) Sketch the graph of $y = 5 - x^2 - 4x$ on the axes below. Indicate clearly the values where the graph crosses the axes and the maximum point on the graph. [3]

(c) Hence, explain the why the equation $x^2 + 4x + 5 = 0$ does not have any solutions.

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.....[2]

11. EM/S4/Prelim/2021/CDSS/Q19/P1

(a) The air resistance, R newtons, is directly proportional to the square of the speed, V m/s, of an object when it is falling.

The air resistance is 24 newtons at a certain speed.

Find the air resistance when the speed is increased by 50%.

Answer:[3]

(a) 16 workers can tile 2 rooms in 60 hours.

How many workers are needed if 5 rooms are to be tiled in 72 hours? [2]

Answer:[2]

End of Paper