Sec 3 E-Math WA1 Mock Exam Paper 2025

Time Allowed: 1 hour 30 minutes

Total marks: 60

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 curved surface area of two solid spheres are: in the ratio 16 : 25. Given that the mass of the smaller sphere is 40g, find the mass of the larger sphere.

EM/S3/SA2/2022/ACSB/Q5

Answer: .....[2]

2. When written as the products of their prime factors,

p is $2^2 \times 3^3$

q is $2^4 \times 3^2 \times 5^2$

r is $2^2 \times 3^2 \times 7$

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Find

(a) the value of the square root of q,

Answer: .....[1]

(b) the lowest common multiple of q and r,

Answer: .....[1]

(c) the highest common factor of p, q and r.

Answer: .....[1]

3. The difference of the two roots of the equation $3x^2 + 9x - k = 0$ is 13, where k is a constant. Find the value of k.

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Answer: .....[3]

4. Nurul took 2.5 hours to travel at a constant speed from Town A to B. On her journey back she increased her constant speed by 4 km/h and took 15 minutes less.
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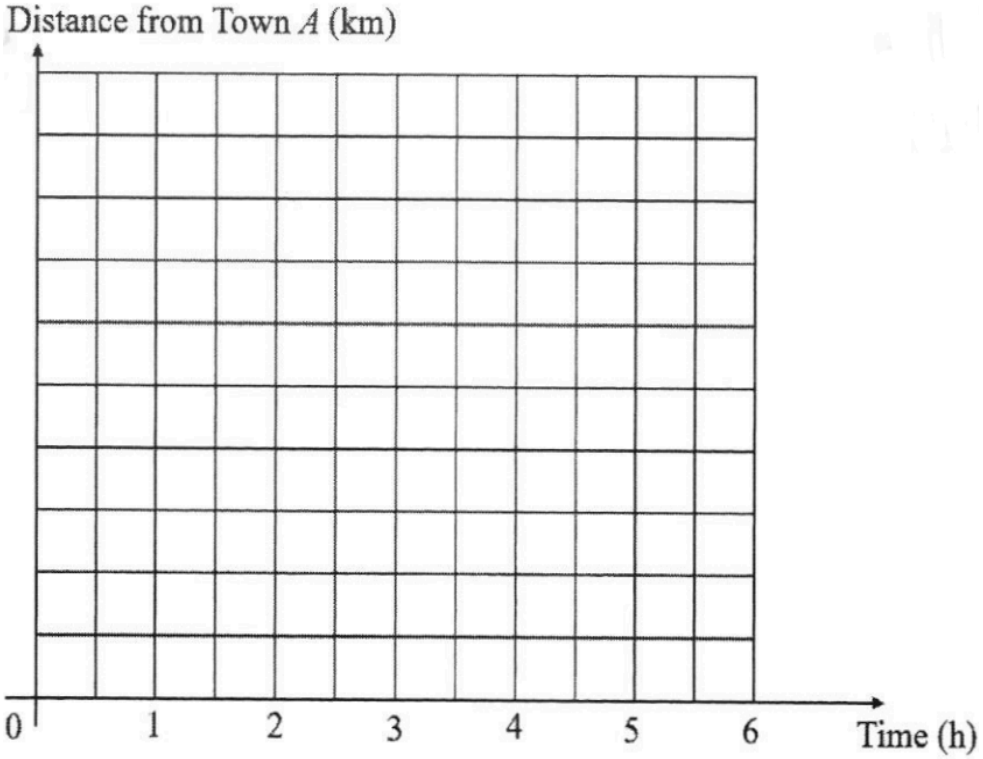
(a) Show that her travelling speed from Town A to B is 36 km/h. [2]

(b) Find the average speed for her whole journey from Town A to B and back to Town A, assuming she did not stop during her journey.

Answer: .....[2]

(c) On the grid below, draw the distance-time graph of her whole journey from Town A to B and back to Town A. [2]



5. ABCD is a parallelogram. Point A lies on the y-axis and the coordinates of D is (6 , -1). AC is a horizontal line and gradient of BC = $-\frac{4}{3}$.

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(a) Find the coordinates of A.

Answer: .....[2]

(b) Find the length of BC.

Answer: .....[2]

(c) Given that the gradient of AB is 0.8, find the coordinates of C.

Answer: .....[2]

(d) Find the area of the parallelogram.

Answer: .....[4]

6. (a) Complete the table for $y = 9x^3 + 5x^2 - 3x + 1$. Give your answer correct to 1 decimal place. [1]

x	-1	-0.75	-0.5	-0.25	0	0.25	0.5	0.75	1.0
y	0	2.3	2.6		1	0.7	1.9	5.4	12

(b) On a sheet of graph paper, draw the graph of $y = 9x^3 + 5x^2 - 3x + 1$ for $-1 \leq x \leq 1$. [3]

(c) Use your graph to find the solution of the equation $9x^3 + 5x^2 = 3x + 5$.

Answer: .....[2]

(d) Use your graph, find the x-coordinates of the points where the gradients are -3.

Answer: .....[3]

(e) (i) On the grid in part (b), draw the line $8x = 5y - 15$ for $-1 \leq x \leq 1$. [1]

(ii) The x-coordinates of the points of intersection of the line $8x = 5y - 15$ and the curve $y = 9x^3 + 5x^2 - 3x + 1$ give the solutions of the equation $45x^3 + 25x^2 - Ax - 2B = 0$. Find the values of A and B.

Answer: .....[3]

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7. (a) The table shows the choice of CCA for Secondary One students in a school.

	Sports	Clubs and Society	Performing Arts	Total
Males	70	26	72	168
Females	38	*a*	*c*	*d*
Total	108	*b*	141	316

(a) Find the values of a, b, c and d in the table.

Answer: .....[2]

(b) A pie chart is to be drawn showing the data for males.
Calculate the angle representing the males who choose Sports.

Answer: .....[1]

(c) In which group, males or females, did a greater percentage choose Performing Arts. Explain your answer.

.....

.....[2]

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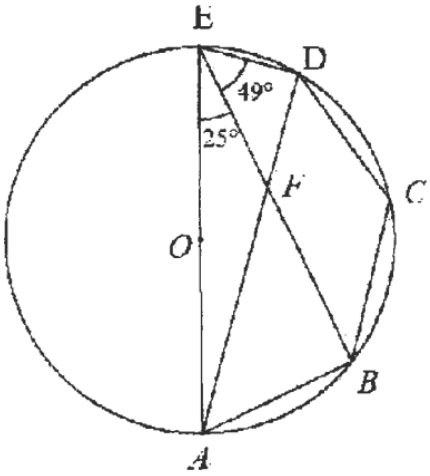
8.



(a) Show that triangle *ABF* is similar to triangle *EDF*. Give a reason for each statement you make. [2]

(b) Find angle *BCD*. Give a reason for each step of your answer. [2]

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9. Bag A contains 4 red discs, 5 blue discs and 8 yellow discs. Bag B contains 5 red discs and 8 blue discs. A disc is chosen at random from Bag A and placed into Bag B. A disc is then chosen at random from Bag B.

(a) Draw a tree diagram to show the possible outcomes and their probabilities. [2]

(b) (i) Find, as a fraction in its simplest form, the probability that both discs chosen are the same colour.

Answer: .....[2]

(ii) Find, as a fraction in its simplest form, the probability that one disc is red, and the other disc is blue. [2]

Answer: .....[2]

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(iii) Find, as a fraction in its simplest form, the probability that the disc chosen from bag A is not blue.

Answer: .....[1]

(iv) Find, as a fraction in its simplest form, the probability that at least one disc chosen is blue. [2]

Answer: .....[2]

10.

(a) Solve the inequality $\frac{2x+2}{7} \leq \frac{x+6}{4} < \frac{x-5}{2}$.

Answer: .....[2]

(b) Write down all the perfect squares that satisfy $\frac{2x+2}{7} \leq \frac{x+6}{4} < \frac{x-5}{2}$.

Answer: .....[1]

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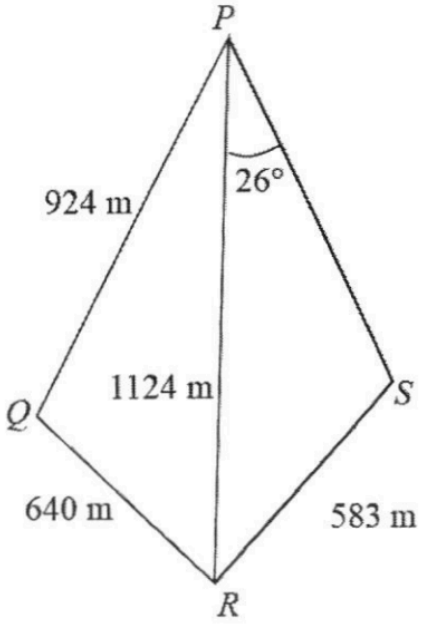
11.



P, Q, R ard S are four villages located on an island where Q is due north of R.
PQ = 924m, QR = 640m, PR = 1124m, RS = 583m.
Angle RPS = 26° and angle PSR is obtuse.

(a) Show that P is due east of Q. [3]

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End of Paper