

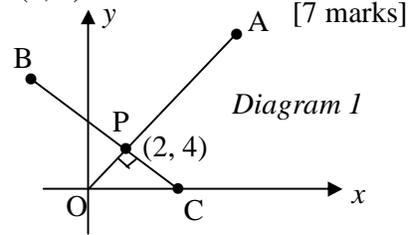
Section A [40 marks]

Answer **ALL** questions

1. Solve the following simultaneous equations $y - x = 3$ and $\frac{2}{x} - \frac{x}{y} = 1$ [7 marks]

2. The *diagram 1* shows a line OA cuts another straight line BC at $P(2, 4)$. Given that the line OA is perpendicular with the line BC . Find

- a) the equation of OA
- b) the equation of BC
- c) the coordinate of C , if C is on the x -axis



3. Given that $3\frac{1}{2}$ and -2 are roots of $2x^2 + mx - 2n - 4 = 0$. Find the value of m and of n . [6 marks]

4. Given that $y = \frac{6}{x^2}$, find the value of $\frac{dy}{dx}$ when $x = 3$. Hence, find the approximation of $\frac{6}{3.5^2}$ without the use of calculator. [8 marks]

5. The following figures show that the prices of five books sold from a shop are as follows RM5, RM9, RM12, RM17, and RM22. Find the mean and the standard deviation of the above data. [7 marks]

6. Solve the equation $\log_5(x+1) - \log_5(3x-1) = -1$ [5 marks]

Section B [40 marks]

Answer **four** questions from this section

7. Use graph paper to answer this question

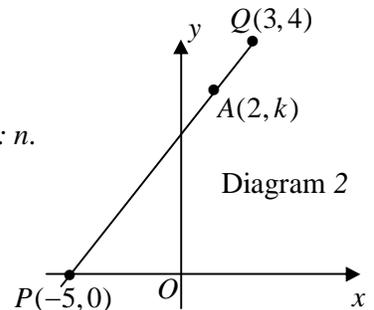
x	1.5	2.0	2.5	3.0	3.5	4.0
y	2.50	3.16	4.00	5.00	6.30	7.94

The table shows the values of two variables, x and y ,

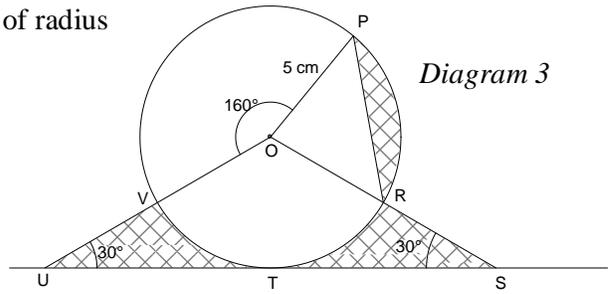
obtained from an experiment. It is known that x and y are related by the equation $y = ab^{\frac{x}{2}}$ where a and b are constants.

- a) Reduce the equation $y = ab^{\frac{x}{2}}$ to the linear form
- b) Using a scale of 2 cm to 0.5 units on the x -axis and 2 cm to 0.1 units on the $\log_{10} y$ -axis, plot $\log_{10} y$ against x . Hence draw the line of best fit.
- c) Based on your graph, answer the following questions:
 - i) Find the value of a and of b
 - ii) Find the value of y when $x = 1.2$

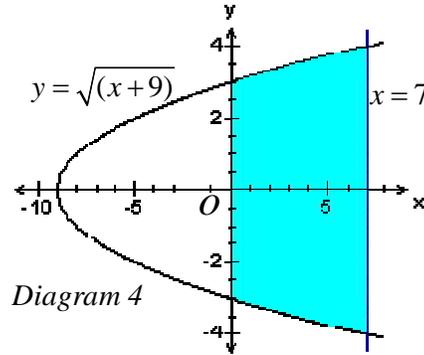
8. *Solution by scale drawing will not be accepted for this question*
 In *diagram 2*, the point $A(2, k)$ internally divides the line segment PQ which connects the points $P(-5, 0)$ and $Q(3, 4)$ in the ratio $m: n$. Find the values k and the ratio of $m: n$



9. In *diagram 3*, O is the centre of the circle $PRTV$, of radius 5 cm. Given that $\angle POV = 160^\circ$, $\angle OUS = \angle OSU = 30^\circ$, calculate the area of the shaded region



10. a) Evaluate $\int_0^1 (x-1)(\sqrt{x}-3)dx$ giving your answer in fraction form
- b) Find the area of the shaded region bounded by $y = \sqrt{(x+9)}$, the x -axis, the lines $x = 0$ and $x = 7$ as shown in *diagram 4*.



11. A man throws a ball vertically upwards. Its height h meter from the ground after t seconds is given by $h = 96t - 16t^2$. Find the greatest height the ball reaches. Find also, the deceleration before the ball hits the ground.

SECTION C [20 marks]

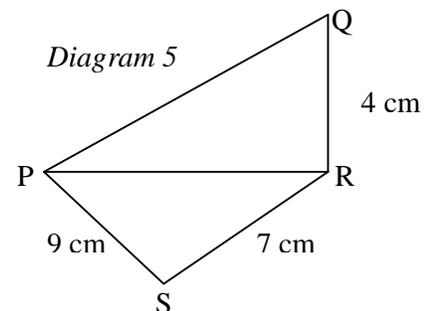
Answer **two** questions from this selection.

12. David's Music Centre offers piano and guitar courses. The total number of students cannot be more than 60. The ratio of the number of students of the guitar course to that of the piano course is at least **2:3**. The number of students of the guitar course can exceed the number of students of the piano by at most 30. The number of students who register for the piano and guitar courses are x and y respectively.
- Write down three inequalities, other than $x \geq 0$ and $y \geq 0$ which satisfy the above constraints.
 - Using a scale of 2 cm to 10 units on both axis, construct and shade the feasible region R which satisfies the above constraints.
 - Based on your graph, answer the following questions:
 - If the number of students who register for the piano course is equal to that of the guitar course, find the maximum number of students who register for each course.
 - If the fees for the piano and guitar courses are RM 120 and RM 80 per month respectively, find the maximum amount of fees that can be collected in a month.

13. *Diagram 5* shows that $\angle QPR = 10^\circ$, $\sin \angle PSR = \frac{3}{4}$ and

$\angle PSR$ is an obtuse. Calculate

- the length of PR giving your answers to two decimal places
 - $\angle PQR$
14. Given that $\lg 2 = 0.3010$, $\lg 3 = 0.4771$ and $\lg 5 = 0.6990$, without using calculator or log book evaluate
- $\lg 12.5$
 - $\lg 1.2$
 - $\lg \left(1\frac{1}{9}\right)$



15. A straight line L passes through the point $(3, -2)$ and is perpendicular to another straight line $4x + 2y = 1$. Find the equation for L and hence find the intercepts for x and y -axis respectively.

END OF QUESTION PAPER