



Name: _____ () Class: _____ Date: _____
Revision Paper 1

Term 1

Topics: Algebraic Manipulations/ Surds & Indices / Quadratic Expressions & Functions

- Answer all questions.
- Omission of essential working will result in loss of marks.
- The number of marks for each question or part question is shown in [].
- The use of calculators is allowed.

- 1 The line $x + y = 3$ meets the curve $x^2 - 2x + 2y^2 = 3$ at two distinct points. Find the coordinates of these two points. [4]
(3,0) (5/3, 4/3)
- 2 Find the possible values of k for which the line $y = kx - 1$ does not intersect the curve $y = x^2 + 3$. [3]
 $-4 < k < 4$
- 3 Using a suitable substitution, solve the equation $4^{x-1} + 16^x = 66$. [4]
 $x = 3/2$
- 4 Sketch the graph of $y = 4x^2 - 24x + 20$, indicating clearly the coordinates of the turning point, x and y intercepts. [4]
 $4(x-3)^2 - 16$
- 5 Factorise $x^4 - 3x^3 + 2x^2$ completely. [2]
 $x^2(x-1)(x-2)$
- 6 The area of a rectangle $ABCD$ is given by $(1 + 3\sqrt{2})\text{m}^2$, and the length of side AB is $(2 + \sqrt{8})\text{m}$. Find, without using a calculator, the length of side BC in the form of $(a + b\sqrt{2})\text{m}$, where a and b are real numbers. [3]
 $5/2 - \sqrt{2}$
- ✗ Simplify into a single fraction $\frac{x^3 + 8y^3}{x^2 - 4y^2} - \frac{16xy^2 - 4x^3}{(4y - 2x)^2}$. [3]

- 8 Given that $\frac{\sqrt{3}-1}{2\sqrt{3}+3} + \sqrt{48} - \frac{4}{\sqrt{3}}$ can be expressed in the form of $a + b\sqrt{3}$, find the value of a and of b . [4]
- $3 + \sqrt{3}$

- 9 Show that $4x^2 - 12x + 10$ is always positive for all real values of x . [3]

- 10 Show that the roots of $x^2 + (p-2)x = 2p$ are real. [3]

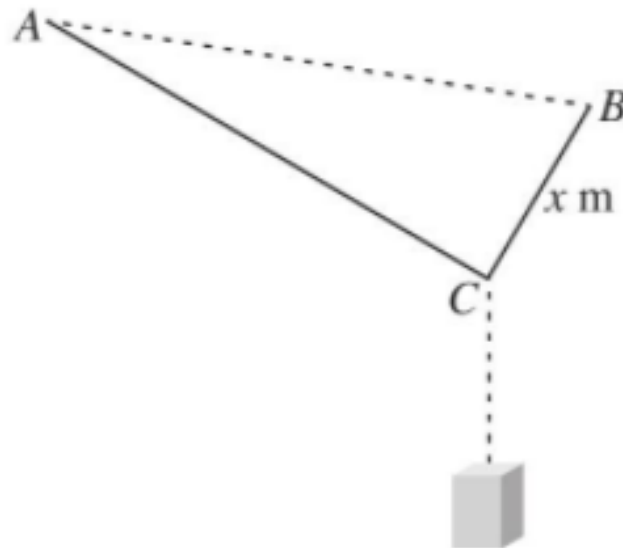
- 11 Solve the equation $\sqrt{25x-50} - \sqrt{x-2} = 12$. [3]

$x=11$

- 12 In an experiment, the ends of a string of length 8 m are attached to two points A and B . A weight is fixed to point C on the string. The two parts of the string, AC and BC , are both straight. The length of BC is x m.

- (i) Given that $AB = 7$ m and $\angle ACB = 90^\circ$, form an equation in x and show that it reduces to $2x^2 - 16x + 15 = 0$. [2]

- (ii) Given that AC is longer than BC , find the value of x . $x=1.084$ [2]



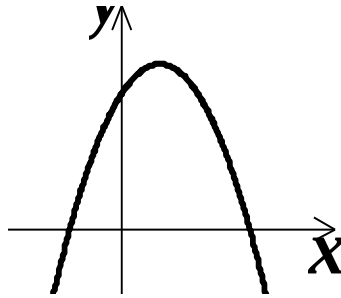
- 13 Find the solution set of each of the following inequalities:

- (i) $x^2 > 3x + 18$ $x < -3$ or $x > 6$ [2]

- (ii) $(x+2)^2 < 9$ $-5 < x < 1$ [2]

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The given diagram shows a quadratic curve with a y-intercept of 48 which crosses the x-axis at $x = -4$ and $x = 6$.



- (i) **State** the equation of the line of symmetry for the curve. $x=1$ [1]
- (ii) Find the equation of the parabola in the form $y = ax^2 + bx + c$ where $a \neq 0$. [3]
- $y = -2x^2 + 4x + 48$