1 Find the coordinates of the points of intersection of the line $y = 17 - x$ and the curve $y = -x^2 + 5x + 24$. [4]

2 (i) Express $3x^2 - 12x + 7$ in the form $a(x-h)^2 + k$, where a, h and k are rational numbers. [3]

(ii) Solve $3x^2 - 12x + 7 = 0$, express your answers in the form $a + b\sqrt{15}$, where a and b are rational numbers. [2]

(iii) Hence, sketch the graph $y = 3x^2 - 12x + 7$, indicate clearly the turning point, x and y-intercepts. [3]

3 Express $\left(2-\sqrt{5}\right)^2 - \dfrac{8}{3-\sqrt{5}}$ in the form $p + q\sqrt{5}$, where p and q are integers. [3]

4 (a) Solve the equation $10\left(2^x\right) - 4^x = 16$. [3]

(b) Solve the equation $\sqrt{9+3x^2} = 3-2x$. [3]

5 Solve, for x and y, the simultaneous equations:

$$9^x(27)^y = 1,$$

$$8^y \div \left(\sqrt{2}\right)^x = 16\sqrt{2}.$$ [4]

6 The equation of a curve is $y = ax^2 + kx + 3a - k$, where a and k are constants.

(i) In the case where $a = 2$, find the range of values of k for which the curve lies completely above the x-axis. [4]

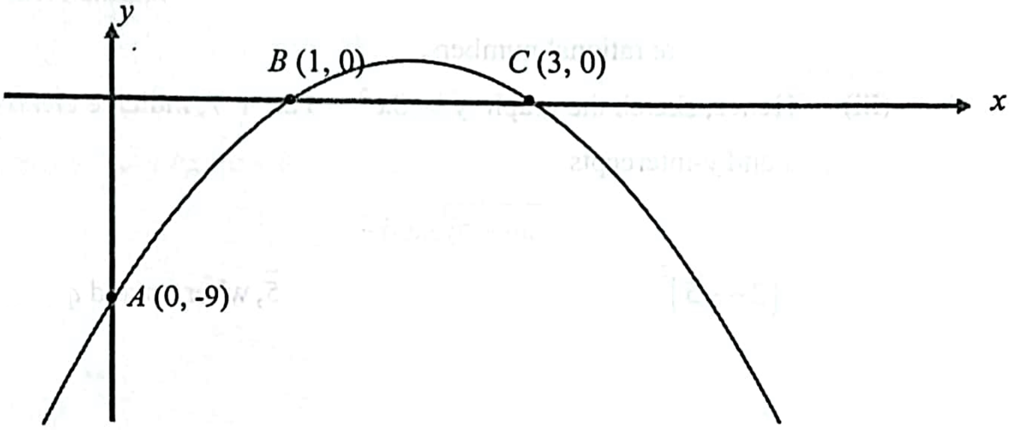
(ii) In the case where $a = k = 2$, find the values of m for which the line $y = mx - 4$ is a tangent to the curve. [4]

7 Solve the inequalities. Represent the solution sets on separate number lines.

(i) $3(2-3x) \geq 6x + 11$, [2]

(ii) $3\left(9x^2 - 5\right) < 3x - 1$. [3]

8 The sketch below shows part of a quadratic graph, $y = ax^2 + bx - 9$, where a and b are constants. Points A, B and C have coordinates $(0,-9)$, $(1,0)$ and $(3,0)$ respectively. Evaluate a and b. [2]



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