

ACHIEVEMENT QUESTIONS ON A TYPICAL NCEA PAPER. (B)

ALGEBRA

Question ONE

<p>(a) Simplify $(2a)^3(3a)^2$ $= 8a^3 \times 9a^2$ $= 72a^5$</p>	<p>(b) Simplify $(16x^8)^{\frac{1}{2}}$ $= 4x^4$</p>
--	---

Question TWO

<p>(a) Factorise $3x^2 + 2x - 8$ $(3x - 4)(x + 2)$</p>	<p>(b) Solve $3x^2 + 2x - 8 = 0$ $(3x - 4)(x + 2) = 0$ So $x = \frac{4}{3}$ and -2</p>
---	--

Question THREE

<p>(a) Solve for x: $\log_3 x = 2$ $3^2 = x$ $x = 9$</p>	<p>(b) Solve for x: $\log_x 36 = 2$ $x^2 = 36$ $x = 6$</p>
--	--

CALCULUS

Question ONE

<p>(a) If $f(x) = x^3 - 2x^2 + 4x + 5$ find the gradient of the tangent when $x = 1$ $\text{grad } f' = 3x^2 - 4x + 4$ Sub $x = 1$ $\text{grad} = 3 - 4 + 4 = 3$</p>	<p>(b) The gradient function $f'(x) = 6x^2 - 8x$ The graph passes through $(1, 4)$, find the equation for $f(x)$ $f = 2x^3 - 4x^2 + c$ Sub $(1, 4)$ $4 = 2 - 4 + c$ so $c = 6$ equ in $f(x) = 2x^3 - 4x^2 + 6$</p>
--	---

Question TWO

<p>(a) Find the x coordinate of the point on the graph $y = x^2 + 2x + 9$ where the gradient is equal to 3 $y' = 2x + 2 = 3$ $2x = 1$ $x = \frac{1}{2}$</p>	<p>(b) Find the x coordinate of the points on the graph $y = \frac{x^3}{3} - \frac{x^2}{2} - 12x + 5$ where the gradient is equal to 0 $y' = x^2 - x - 12 = 0$ $(x + 3)(x - 4) = 0$ $x = -3$ and $x = 4$</p>
---	---

Question THREE

<p>(a) The curve $y = f(x)$ goes through $(0, 0)$ and $f'(x) = 6 - 4x$. Find the y value if $x = \frac{1}{2}$ $f = 6x - 2x^2 + c$ Sub $(0, 0)$ $c = 0$ $f = 6x - 2x^2$ Sub $x = \frac{1}{2}$ $f = 3 - 2 \times \frac{1}{4} = 3 - \frac{1}{2} = 2\frac{1}{2}$</p>	<p>(b) If $R = 3t^2 + 4t$, find the rate of increase of R at $t = 4$ seconds. $\frac{dR}{dt} = 6t + 4$ Sub $t = 4$, rate = $24 + 4 = 28$</p>
--	--