

5a PARALLEL CALCULUS QUESTIONS FROM NCEA EXAMS.**ACHIEVED LEVEL**

1a <i>If $f(x) = 3x^2 - 5x + 3$ find the gradient at $x = \frac{1}{2}$</i>	1b <i>If $\frac{dy}{dx} = 3x^2 + 6x + 2$ find the equation for y given that when $x = 1$, $y = 5$</i>
2a <i>Find the x coordinate where the gradient of $y = 4x^2 - 12x + 5$ equals 2</i>	2b <i>The pressure P in a tube at t secs is given by $P = t^3 + t^2 + 5t$. Find the rate of increase of pressure when $t = 4$ secs</i>
3a <i>Find the x values when the gradient of $y = 2x^3 - 3x^2 - 12x$ is zero.</i>	3b <i>Find the equation of the curve that goes through $(0, 0)$ and has a gradient of $\frac{dy}{dx} = x^3 - x^2 + x - 1$</i>

MERIT LEVEL

<p>1c A flare is fired from a boat. The height of the flare is given by $H = 80t - 5t^2 + 3$ Find the maximum height of the flare.</p>	<p>1d Find the coordinates of the max/min points on the curve $y = x^3 - 2x^2 - 4x + 3$ and distinguish between them.</p>
<p>2c A stone is dropped into a pool of water and a circular ripple is formed. The area of the ripple is $A = \pi r^2$ Find the rate of increase in the area of the ripple, with respect to r, when the area is $64\pi \text{ m}^2$</p>	<p>2d The gradient of a parabola is given by $\frac{dy}{dx} = 2x - 10$ and 6 is the minimum value of the curve. Find the equation of the curve.</p>
<p>3c Find the equation of the tangent to the curve $y = 0.5x^2 - 4x + 3$ at $x = 2$</p>	<div data-bbox="842 1438 1407 1601" data-label="Diagram"> </div> <p>A rectangular enclosure is made from 40 metres of fence using a wall as one side. Use calculus to find the maximum area of the enclosure.</p>