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

ACHIEVED LEVEL

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| 1a ***If f(x) = 3x2 – 5x + 3 find the gradient at x = ½*** | 1b ***If*** ***dy = 3x2 + 6x + 2 find the***  ***dx***  ***equation for y given that when x = 1, y = 5*** |
| 2a ***Find the x coordinate where the gradient of y = 4x2 – 12x + 5 equals 2*** | 2b ***The pressure P in a tube at t secs is given by P = t3 + t2 + 5t.***  ***Find the rate of increase of pressure when t = 4 secs*** |
| 3a ***Find the x values when the gradient of y = 2x3 – 3x2 – 12x is zero.*** | 3b ***Find the equation of the curve that goes through (0, 0) and has a gradient of dy = x3 – x2 + x– 1***  ***dx*** |

MERIT LEVEL

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| 1c ***A flare is fired from a boat.***  ***The height of the flare is given by***  ***H = 80t – 5t2 + 3***  ***Find the maximum height of the flare.*** | 1d ***Find the coordinates of the max/min points on the curve***  ***y = x3 – 2x2 – 4x + 3 and distinguish between them.*** |
| 2c ***A stone is dropped into a pool of water and a circular ripple is formed.***  ***The area of the ripple is A = πr2***  ***Find the rate of increase in the area of the ripple, with respect to r, when the area is 64π m2*** | 2d ***The gradient of a parabola is given by dy = 2x – 10***  ***dx***  ***and 6 is the minimum value of the curve. Find the equation of the curve.*** |
| 3c ***Find the equation of the tangent to the curve y = 0.5x2 – 4x + 3 at x = 2*** | 3d wall  ***x x***  ***40 – 2x***  ***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.*** |