SHARP

GRADE 12 WORKSHEET 6 CALCULUS

QUESTION 1

1.1 Find the derivative of $f(x) = \frac{4}{x^2}$ from first principles.

1.2 Find the following:

a. $D_x[2x^2 - 3x + 4]$

b. $\frac{dy}{dx}$ if $y = 2(x+2)^2 - 5$

c. $g'(x)$ if $g(x) = \frac{2x}{\sqrt{x}} - 3x^2$

d. $d_x\left(f\left(g(x)\right)\right)$ if $f(x) = 3x + 2$ and $g(x) = 2x^3$

e. $D_x\left[3x^2y - \frac{4x^3}{z}\right]$

QUESTION 2

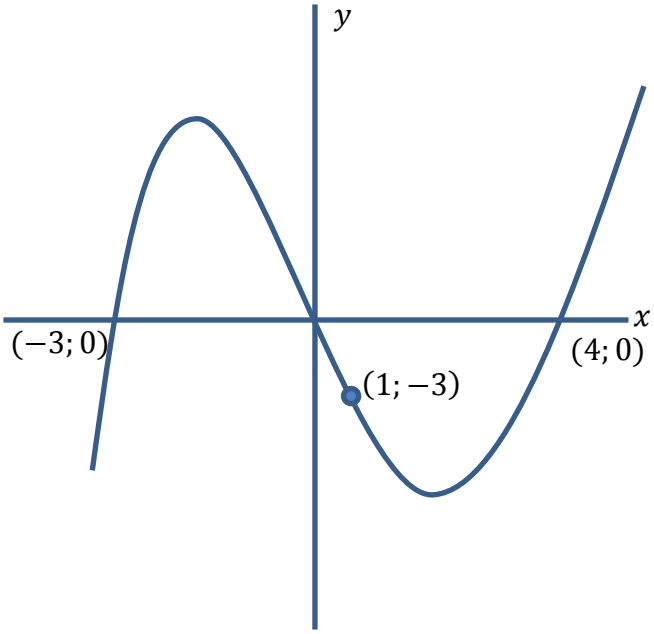
2.1 Find the equation of the tangent to $f(x) = 2x^2 - 8$ at $x = 1$.

2.2 If $g(x) = ax^2 - bx + 2$ and the equation of the tangent to $g(x)$ at $x = -1$ is $y = 5x - 7$, find the value of a and b.

2.3 $h(x) = ax + b$ is a tangent to the function $f(x) = x^3 - x^2 - x - 1$, at $x = 2$, find the value of a and b and the other point of intersection.

QUESTION 3

Given below, a sketch of the Derivative of $f(x)$.
(Sketch not drawn to scale)



3.1 What degree is the graph of $f(x)$?

3.2 Find the x – value(s) of the point(s) of inflection of $f(x)$.

3.3 if the graph of $f(x)$ has a y – intercept of 9, find the equation of $f(x)$.

QUESTION 4

The equation below shows the distance (d) and height (h) measured in metres of a Javelin thrown by a particular athlete: $h = -\frac{1}{50}d^2 + \frac{11}{20}d + 1\frac{3}{4}$. Answer the following questions based on this information:

a. At what height does the athlete release the Javelin?

b. At what distance does the Javelin reach its maximum height?

c. How far is the athlete throwing the Javelin?

d. What distance would the Javelin be traveling if the maximum height were to increase to 7 metres in a distance of 12 metres?

e. Based on question (d.), what advice would you give this athlete to improve on the distance he is throwing with the Javelin?

QUESTION 5

A farmer want's to fence the grazing area of his sheep, he has 2km of fencing available, if one side of the rectangular fence is an existing wooden fence, what should the dimensions of the fence be in order for the farmer to fence maximum grazing area?