W3 – Newton Quotient

MHF4U

Jensen

1) Find the equation of the derivative for each of the following functions. Also, find the instantaneous rate of change for the function when $x = 4$ and $x = -1$.

a) $f(x) = 3x - 8$

b) $y = 20x + x^2$

c) $y = 2x^3 + 4$

d) $f(x) = x^2 - 9x + 17$

e) $f(x) = \frac{x(x+1)}{2}$

f) $f(x) = \frac{1}{x}$

2) State whether the functions are increasing, decreasing, or neither when $x = 4$ for each function in #1. How do you know?

3)a) State the derivative of $f(x) = x^3$

b) Evaluate $f'(-6)$

c) Determine the equation of the tangent line at $x = 6$

Answer Key

1)a) $f'(x) = 3, f'(4) = 3, f'(-1) = 3$ **b)** $f'(x) = 20 + 2x, f'(4) = 28, f'(-1) = 18$

c) $f'(x) = 6x^2, f'(4) = 96, f'(-1) = 6$ **d)** $f'(x) = 2x - 9, f'(4) = -1, f'(-1) = -11$

e) $f'(x) = x + \frac{1}{2}, f'(4) = \frac{9}{2}, f'(-1) = -\frac{1}{2}$ **f)** $f'(x) = -\frac{1}{x^2}, f'(4) = -\frac{1}{16}, f'(-1) = -1$

2) a,b,c and e are increasing functions when $x = 4$ since the instantaneous rate of change is positive

d and f are decreasing when $x = 4$

3)a) $f'(x) = 3x^2$ **b)** 108 **c)** $y = 108x - 432$