CHAPTER-2 (Differentiation)

Name_____

PLEASE SHOW YOUR WORK AS NEATLY AS POSSIBLE :

1) **Find the first and the second derivatives of the following functions :**

a) $f(x) = \frac{5\sin(x)}{3} - x$

b) $y = \frac{x}{2} - \frac{\sin(2x)}{4}$

2) **Find the derivative :**

a) $y = \sec^2(\Delta x)$ **b)** $y = \sin^2(\frac{x}{2})$

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

a) Find the derivative, f '(x).

b) Find the point on f where the slope of the tangent is $-\frac{1}{8}$.

4) **Find all points (x, f(x)) on the graph of Let f(x) =** $\frac{3x^2}{2}$ $\frac{x^3}{}$ **-+ 1 3**

a) **Find the derivative.**

b) **Find all points (x, f(x)) on the graph of f(x) with tangent lines parallel to the line 8x - 2y = 1**

5) **Given** $f(x) = x\sqrt{2^{7}} + 2$

a) **Find the derivative, f ' (x) .**

b) **Find the equation of the tangent line at x = 1**

6) **Given:** $f(x) = 1 - \cos(2x) + \cos^2 x$

a) **Find the derivative, f '(x) .**

b) **Determine the values of x in the interval [0 , 2Δ) at which the graph of f (x) has a horizontal tangent lines.**

7) **Given : $6x^2y - \Delta \cos y = 7\Delta$**

a) Find dy/dx

b) Find the equation of the normal line at the point (1 , Δ)

8) **A 17- ft ladder is leaning against the side of a house. The top of the ladder is sliding down the house at rate of 5 ft/sec.**

a) Determine how fast the bottom of the ladder is sliding away when the top of the ladder is 8 feet from the ground.

b) At what rate is the angle θ between the ladder and the ground is changing then.

9) **A cube's surface area increases at a rate of 72 in^2 /sec . At what rate is the cube's Volume changing when the side's length is 3 inches ?**

10) **A water tank has the shape of an inverted right circular cone. The container has a radius of 2 m and a height of 4 m . If water is being pumped into the tank at a rate of 2 m^3/sec. Find the rate at which water level is rising when the water is 3 m deep.**