Name: _____

MAT 2270: Section 3.5 – Derivatives of Trig Functions WS

Find the derivative of the following functions.

1. $y = \frac{8}{x} + 3\sec(x)$

2. $y = \frac{\sin(x)}{1+\cos(x)}$

3. Find the equation of the tangent line to $y = (1 + x)\cos(x)\ at\ x = 0$.

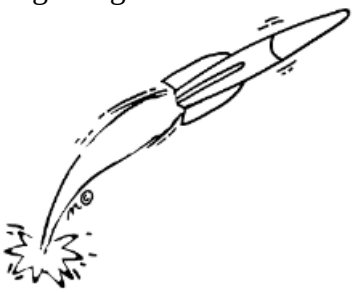
4. Find <u>all</u> points where the graph of $f(x) = \sin x$ has a horizontal tangent line.

5. A mass on a spring vibrates horizontally on a smooth level surface. Its equation of motion is $x(t) = 8\sin t$, where t is in seconds and x in centimeters.

a. Find the velocity and acceleration at time t.

b. Find the position, velocity, and acceleration of the mass at time $t = \frac{2\pi}{3}$. In what direction is it moving at that time?

6. A model rocket is launched vertically upward from ground level with an initial velocity of 114 ft/sec. The position of the rocket can be modeled by: $s(t) = -16t^2 + 114t$. . Answer the following using the correct units.



a. Find the **velocity** and **speed** of the rocket at $t = 5$ seconds.

b. Is the rocket speeding up or slowing down at $t = 5$? Explain how you know.

c. What is the maximum height the rocket will rise?

d. What is the speed of the rocket when it hits the ground?