Read Section 3.5. Work the embedded problems.

1. (Quick Review)

    (a) What's wrong with the solution below? The student's solution is in $\text{large}$ font. They were instructed to put a $\boxed{\text{box}}$ around their final answer.

    **Problem:** Find the derivative of $f(x) = 5\sin(x) - \frac{x}{3} + \frac{\pi^2}{3}$

$$= 5\sin(x) - \frac{1}{3}x + 0 = \boxed{-5\cos(x) - \frac{1}{3}}$$

    (b) If $f(x) = \cos(x)$, then $f'(x) =$

2. Write all the Pythagorean Trigonometric Identities

3. Rewrite each trigonometric function below in terms of sines and cosines, then use known derivative rules (product, quotient, sine, cosine, etc.) to find their derivatives.

    (a) $f(x) = \tan(x)$

    (b) $f(x) = \cot(x)$

    (c) $f(x) = \sec(x)$

(d) $f(x) = \csc(x)$

4. SUMMARY RULES:

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 $x$ is in centimeters.

(a) Find the velocity and acceleration at time $t$.

(b) Find the position, velocity, and acceleration of the mass at time $t = 2\pi/3$. In what direction is it moving at this time? Is it speeding up or slowing down?