Name _____ Date _____

Differentiation: Lesson **5** Exercises (7.5 Exercises)
The Product & Quotient Rules

Find the derivative of each function.

1. $f(x) = \frac{1}{3}(2x^3 - 4)$
2. $f(x) = (x^2 - 2x + 1)(x^3 - 1)$
3. $f(x) = (x^3 - 3x)(2x^2 + 3x + 5)$
4. $f(x) = \dfrac{x + 1}{x - 1}$

7. $y = \dfrac{x^2 + 2x}{x}$

9. $y = \dfrac{7}{3x^3}$

10. $y = \dfrac{4}{5x^2}$

11. $y = \dfrac{3x^2 - 5}{7}$

12. $y = \dfrac{x^2 - 4}{x + 2}$

13. $f(x) = \dfrac{3x - 2}{2x - 3}$

14. $f(x) = \dfrac{x^3 + 3x + 2}{x^2 - 1}$

21. $h(t) = \dfrac{t + 1}{t^2 + 2t + 2}$

Basic Rules of Derivatives and Derivatives as Rates of Change Review

1. $f(x) = 7x^2 - 4x + 1$

2. $f(x) = x^5 - x^4 + x^3 + x^2$

3. $f(x) = \dfrac{1}{x^3}$

4. $y = \dfrac{2}{5x^{10}}$

5. $y = \dfrac{2x^3 + x^2 - 5x}{x^2}$

6. $f(x) = \dfrac{6x^2 + 3x - 5}{x}$

7. $f(x) = \sqrt[5]{x}$

8. $f(x) = \dfrac{4}{x^2} - \dfrac{2}{x^4}$

9. Find the equation (in slope-intercept form) of the tangent line to the graph of $f(x) = 2x^3 - x^2 - 3x$ at the point $(1, -2)$.

10. The height h of a ball thrown straight up with an initial speed of 96 ft/sec from ground level is $h = -16t^2 + 96t$, where t is the elapsed time that the ball is in the air.
a) When does the ball strike the ground?

b) What is the instantaneous speed of the ball when it strikes the ground?

c) What is the instantaneous speed of the ball at $t = 2$?

d) When is the instantaneous speed of the ball equal to zero?