

Math 141 - Homework 5

Name: _____

Find the derivative of each function.

1. $f(x) = x + \sqrt{x}$

2. $y = x^4 + \frac{2}{x}$

3. $g(x) = 2x^2 \left(5x^3 + \frac{4}{x} \right)$

4. $z = \frac{x^3 + 3x^2 - 1}{3}$

5. $h(t) = (t^2 + 5) \sin t$

6. $f(x) = \frac{x^2}{x^2 + 4}$

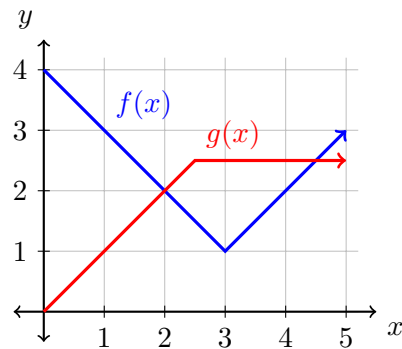
7. Let $f(x) = x^3 - 9x^2 + 15x - 1$.

(a) Find all values of x where the slope of the tangent line is 15.(b) Find the values of x where the tangent line is horizontal.

8. Find an equation for the tangent line to the function $y = x^2 - 5x + 2$ at the point $(6, 8)$.

9. Suppose that a particle moves with position $s(t) = t^3 - 9t^2 + 24t$.
- (a) Find formulas for the velocity $v(t)$ and acceleration $a(t)$ of the particle.
- (b) Find the time intervals where the velocity of the particle is positive.

10. Let $h(x) = f(x)g(x)$ where f and g are shown in the graph below. Find the values of the following derivatives.



- (a) $h'(1)$
- (b) $h'(4)$
11. A rock is tossed upwards with initial velocity 28 feet per second by a person standing on a building 60 feet above the ground. The height of the rock is $h(t) = -16t^2 + 28t + 60$.
- (a) What is the acceleration of gravity in this problem?
- (b) What is the velocity of the rock when it hits the ground at time $t = 3$ seconds?