

Lab Worksheet for August 31, 2021

Practice with Derivatives of Polynomials

1) Let $f(x) = x^2 + x - 234$

a) Find the derivative of $f(x)$.

b) Find $f'(5)$.

c) Find $f'(0)$.

2) Let $g(x) = 34x + 1/3$

a) Find the derivative of $f(x)$.

b) Find $f'(87)$.

c) Find $f'(-4)$.

3) Let $f(x) = 2$

a) Find the derivative of $f(x)$.

b) Find $f'(2)$.

c) Find $f'(-2)$.

4) Let $f(x) = \frac{1}{4}x^4 + \frac{1}{2}x^2$

a) Find the derivative of $f(x)$.

b) Find $f'(10)$.

c) Find $f'(3)$.

5) If a rock is thrown upward on the planet Mars with a velocity of 10 m/s, its height in meters t seconds later is given by $y=10t - 1.86t^2$.

Find the instantaneous velocity of the rock when $t=1$.

6) Let:

$$f(x) = 2x^3 - x + 24$$

$$g(x) = 6x^2 + 5$$

$$h(x) = x - 1269$$

a) Find $f'(x)$.

b) Find $g'(x)$.

c) Find $h'(x)$.

d) Find $g'(x) + h'(x)$.

e) Find $(f + g)'$

7) Consider parabola $y = -x^2 + 3x - 2$. Find the equation of the tangent line of this parabola at $x_0 = 2$.

8) Let $f(x) = x^3 - 3x^2 + 2$.

a) Find $f'(x)$.

b) Find all x so that $f'(x) > 0$.

c) Find all x so that $f'(x) < 0$.

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

a) Find $f'(x)$.

b) At which point or points is the tangent line to the graph of f horizontal?

c) At which points does the tangent line to f have a positive slope? At which points is the slope of the tangent line negative?

10) Find the derivative of the function:

a) $y = x^5 - 4x^3 - x^2 + \frac{1}{2}$.

b) $y = -9x^3 + 0.2x^2 - 0.14x + 5$.