

Lab Worksheet for September 2, 2021

Practice with Derivatives of Sine and Cosine

1) $f(x) = \cos(x)$

a) Find $f'(x)$.

b) Find $f'(\pi)$.

2) $f(x) = \sin(x)$

a) Find $f'(x)$.

b) Find $f'(2\pi)$.

3) $f(x) = -\cos(x) + \sin(x)$

a) Find $f'(x)$.

b) Find $f'(\pi/2)$.

4) $f(x) = 345 + \cos(x) - 2\sin(x) + 2x$

a) Find $f'(x)$.

b) Find $f'(\pi/2)$.

5) $f(x) = 5x^2 + x^3 - 10x$

a) Find $f'(x)$.

b) Find $f'(5)$.

6) $f(x) = -\cos(x)$

$g(x) = -\sin(x)$

a) Find $f'(x)$.

b) Find $g'(x)$.

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

d) Find $f'(0) - g'(0)$.

7) What is the slope of the tangent line to the graph of $f(x) = -\sin(x)$ at $x = \pi/4$?

8) What is the limit of $f(x) = \sin(x) / x$, as x approaches zero?

9) Compute the derivatives of the following functions.

a) $f(x) = 3x^2 + \sin(x)$

b) $g(x) = -\cos(x) + 3x^2 + 9x - 18$

c) $h(x) = 3\sin(x) + 4\cos(x) + 4x$

d) $f(x) = 470x^{20} - 250x^{13} + \sin(x)$

10)

a) For what values of x does the graph of $f(x) = x + 2\sin(x)$ have a horizontal tangent?

b) Find the tangent line to $y = \sin(x) + \cos(x)$ at $x = \pi$.