

Lab worksheet for Thursday, 28 Jan 2021

Practice: Derivatives of Sine and Cosine

1. Let $f(x) = 3x^2 + 2\sin(x)$.

Find $f'(\pi)$.

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

Find $g'(\frac{3\pi}{4})$.

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

Find $h'(\frac{\pi}{3})$.

4. Let $h(t) = 4t^3 + 3t + 2\cos(t) - \sin(t)$.

Find $h'(0)$.

5. Let $f(x) = 12x^2 - 4x + 4\sin(x)$.

Find $f'(\frac{\pi}{2})$.

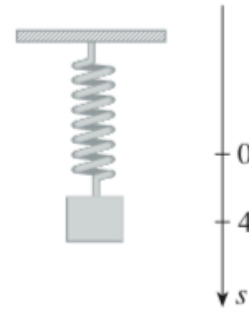
6.

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 $x = \pi$.

7.

In outer space, an object at the end of a vertical spring is stretched 4 cm beyond its rest position and released at time $t = 0$. The downward direction is positive. Its position s



at time t is $s(t) = 4\cos(t)$. Find the function

to calculate the velocity of the object. What is the greatest speed of the object and when does it achieve that speed?

8. Let $g(x) = \sin(x) - \cos(x) + x^2 - 1$.

Find $g'(\frac{-\pi}{2})$.

9. Let $f(x) = 3\sin(x) - 4\cos(x) + 2x^3 - 1$.

Find $f'(0)$.

10. Let $f(x) = 1 + 2x + 3x^2 + 4\sin(x) - 5\cos(x)$.

Find $f'(\frac{25\pi}{6})$.

11. Let $g(x) = 3\cos(x) + x^2 + 2\sin(x) + 4x^3$.

Find $g'(17\pi)$.

12. Let $f(x) = 5\sin(x) - 3\cos(x) + 2x^2$.

Find $f'(\frac{5\pi}{6})$.