

Math 124 Quiz #5 Solutions

1. (a) Using the quotient rule and the chain rule:

$$f'(x) = \frac{7x \cdot (-\sin x) - (\cos x - 1)(7)}{(7x)^2}$$

- (b) Using the chain rule on each term:

$$\frac{dy}{dx} = 8e^{-x}(-1) + 2^{\tan x} \cdot \ln 2 \cdot \sec^2 x$$

2. (a) The velocity at time t is given by $v = \frac{ds}{dt} = f'(t) = 5(\cos(\pi t)) \cdot \pi = 5\pi \cos(\pi t)$.

So, the velocity at 2 seconds is $f'(2) = 5\pi \cos(2\pi) = 5\pi$ inches/second.

The acceleration at time t is given by $a = \frac{dv}{dt} = f''(t) = -5\pi \sin(\pi t) \cdot \pi = -5\pi^2 \sin(\pi t)$.

So, the acceleration at 2 seconds is $f''(2) = -5\pi^2 \sin(2\pi) = 0$ inches/second².

- (b) The maximum velocity is 5π inches/second since the maximum value of $\sin(2\pi)$ is 1.