

HW 2.5

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$$x(t) = 8 \sin t$$

a

$$v(t) = x'(t) = 8 \cos t$$

$$a(t) = v'(t) = x''(t) = -8 \sin t$$

$$\textcircled{b} \quad x\left(\frac{2\pi}{3}\right) = 8 \frac{\sqrt{3}}{2} = 4\sqrt{3} \text{ cm}$$

$$\therefore v\left(\frac{2\pi}{3}\right) = 8\left(-\frac{1}{2}\right) = -4 \text{ cm/s} \rightarrow \text{NEG. V MEANS IT'S MOVIN'}$$

$$\therefore a\left(\frac{2\pi}{3}\right) = -8\left(\frac{\sqrt{3}}{2}\right) = -4\sqrt{3} \text{ cm/s}^2 \quad \text{LEFT!}$$

$$31) f(x) = \frac{\tan x - 1}{\sec x}$$

$$f'(x) = \frac{\sec x \cdot (\sec^2 x) - (\tan x - 1) \sec x \tan x}{\sec^2 x}$$

$$= \frac{\sec^2 x - \cancel{\sec x} \tan^2 x + \cancel{\sec x} \tan x}{\sec x}$$

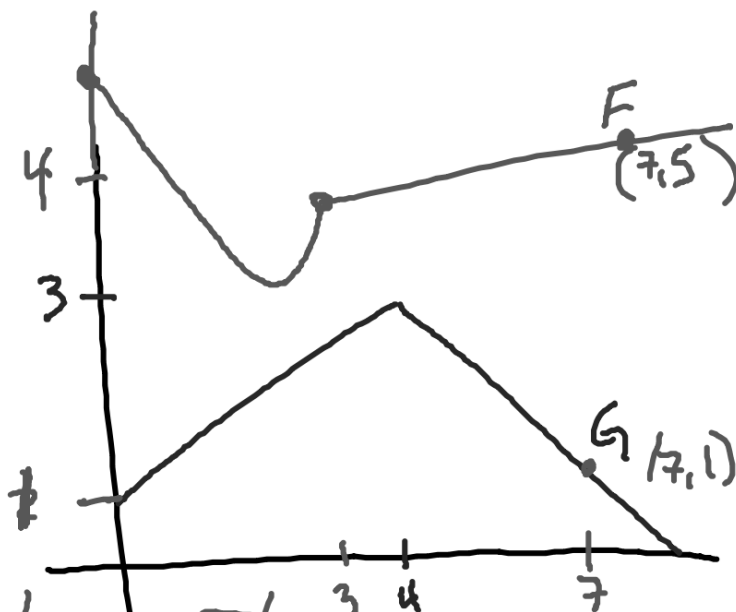
$$= \frac{\sec^2 x - \tan^2 x + \tan x}{\sec x}$$

$$= \frac{1 + \tan x}{\sec x}$$

48 on 2.4

$$P(x) = F(x) \cdot G(x)$$

$$Q(x) = \frac{F(x)}{G(x)}$$



$$\textcircled{a} P'(2) = F \cdot G' + G \cdot F' = 3 \cdot \frac{1}{2} + 2 \cdot 0$$

$$\textcircled{b} Q'(7) = \frac{G \cdot F' - F \cdot G'}{G^2} = \boxed{\frac{3}{2}}$$

$$\begin{aligned} &= \frac{1 \cdot \frac{1}{4} - 5 \cdot \left(-\frac{2}{3}\right)}{1} = \frac{1}{4} + \frac{10}{3} \\ &= \frac{3}{12} + \frac{40}{12} = \boxed{\frac{43}{12}} \end{aligned}$$