

Name Solutions

You have 13 minutes for this quiz – no calculators allowed.

1. (3 points) Find the derivative of the function  $g(x) = \frac{x^4 + 5 \tan x}{3x^2}$

$$g'(x) = \frac{(x^4 + 5 \tan x)'(3x^2) - (x^4 + 5 \tan x)(3x^2)'}{(3x^2)^2}$$

$$= \frac{(4x^3 + 5 \sec^2 x)(3x^2) - (x^4 + 5 \tan x)(6x)}{9x^4}$$

2. (4 points) Find the  $x$ -coordinate for one of the points on the graph of the following function where the slope of the tangent line is equal to 2.

$$y = 8 \cos x + 6x + 13$$

$$\frac{dy}{dx} = -8 \sin x + 6$$

$$2 = -8 \sin x + 6$$

$$\sin x = \frac{1}{2}$$

one such  $x$ -value is  $x = \frac{\pi}{6}$

3. (3 points) Find the second derivative  $f''(t)$  of the following function.

$$f(t) = t^5 e^t$$

$$\begin{aligned} f'(t) &= (t^5)'(e^t) + (t^5)(e^t)' \\ &= 5t^4 e^t + t^5 e^t \end{aligned}$$

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$$\begin{aligned} f''(t) &= (5t^4)'(e^t) + (5t^4)(e^t)' \\ &\quad + (t^5)'(e^t) + (t^5)(e^t)' \\ &= 20t^3 e^t + 5t^4 e^2 \\ &\quad + 5t^4 e^t + t^5 e^t \end{aligned}$$


$$= 20t^3 e^t + 10t^4 e^t + t^5 e^t$$
