

100
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I. Determine if true or false for each of the following statements (5 points each)

- ~~F~~ The derivative of $y = 6 - e^{-x}$ is $y' = e^{-x}$
- ~~F~~ The derivative of $y = (\ln(x-4))^2$ is $y' = \frac{1}{2}(\ln(x-4))^2$
- ~~F~~ The derivative of $y = \frac{3x}{4x^2-5}$ is $y' = \frac{3}{8x}$
- ~~T~~ If $s(t)$ is the function of position of an object in motion, then $a(t) = s''(t)$ is equal to the function of the acceleration of the object.

II. Circle the right answer. (10 points each)

- (C) The derivative for $y = 2e^{x^2}$ is:
 A) $y' = 2e^{x^2}$ B) $y' = 2e^x$ C) $y' = \frac{6e^{x^2}}{x^2}$ D) $y' = 6x^2e^{x^2}$
- (A) The derivative for $y = \ln\sqrt{2x-4}$ is:
 A) $y' = \frac{1}{2x-4}$ B) $y' = \frac{1}{2}\ln(2x-4)^{1/2}$
 C) $y' = \frac{1}{2}\ln\frac{2}{\sqrt{2x-4}}$ D) $y' = \frac{1}{x-2}$
- (B) If the equation that gives the velocity of an object is $v(t) = 2t^3e^{6t}$, then the equation that gives the acceleration is:
 A) $a(t) = 6t^2e^{6t}$ B) $a(t) = 6t^2e^{6t}(2t+1)$
 C) $a(t) = 36t^2e^{6t}$ D) $a(t) = 12t^3e^{6t}$

III. Answer the following questions.

1) Find the SLOPE of the line tangent to $y = \frac{e^{3-2x}}{4}$ at $x = \frac{3}{2}$ (20 points)

$$y' = \frac{4(-2e^{3-2x})}{16x^4} = 0$$

$$y' = -\frac{2e^{3-2x}}{4}$$

$$y' = \frac{-2e^{3-2(3/2)}}{4} = m$$

$$u = e^{3-2x} \quad v = 4 \quad y = \frac{1}{4}$$

$$u' = -2e^{3-2x} \quad v' = 0$$

$$u = 2t^3 \quad v = e^{6t}$$

$$u' = 6t^2 \quad v' = 6e^{6t}$$

$$2t^3 \cdot 6e^{6t} + 6t^2 \cdot e^{6t}$$

$$6t^2 e^{6t} (2t+1)$$

$m = -\frac{1}{2}$

2) Find the derivative of $f(x) = \frac{(5x-1)^3}{x}$ (15 points)

$$f'(x) = \frac{x(15(5x-1)^2) - (5x-1)^3}{x^2}$$

$$u = (5x-1)^3 \quad v = x$$

$$u' = 3(5x-1)^2(5) \quad v' = 1$$

$$u' = 15(5x-1)^2$$

$$f'(x) = \frac{(5x-1)^2(15x - (5x-1))}{x^2}$$

$$f'(x) = \frac{(5x-1)^2(10x+1)}{x^2}$$

3) Find the derivative $g(x) = 7x^2 + \frac{1}{e^{3x}} + e^0 + \ln(5x^2+9)$ (15 points)

$$g'(x) = 14x - \frac{3}{e^{3x}} + 0 + \frac{10x}{5x^2+9}$$

$$u=1 \quad v=e^{3x}$$

$$u'=0 \quad v'=3e^{3x}$$

$$g'(x) = 14x - \frac{3}{e^{3x}} + \frac{10x}{5x^2+9}$$

$$\frac{0 - 3e^{3x}}{e^{6x}} = \frac{-3e^{3x}}{e^{6x}} = \frac{-3}{e^{3x}}$$

$$\ln(5x^2+9)$$

$$\frac{10x}{5x^2+9}$$