

Name: BOBILIO CAROLINA ID: 1015101073

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

1. T The derivative of $y = 6 - e^{-x}$ is $y' = e^{-x}$

2. F The derivative of $y = 6(x-4)^{1/3}$ is $\frac{2}{3}(x-4)^{-2/3}$

3. 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.

4. T If the velocity of the car is a function of time, then the derivative of this function with respect to time, describes the acceleration of the car.

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

1. (C) The derivative for $y = 2x^{1/3}$ is:

- A) $y' = 2x^{2/3}$
- B) $y' = 2x^{1/3}$
- C) $y' = \frac{2}{3}x^{-2/3}$
- D) $y' = 6x^{2/3}$

2. (B) 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) $y' = \frac{1}{x-2}$

3. (A) If the equation that gives the velocity of an object is $v(t) = 2t^2$, then the equation that gives the acceleration is:

- A) $a(t) = 6t^2 e^{2t+1}$
- B) $a(t) = 6t^2 e^{2t}$
- C) $a(t) = 36t^2 e^{2t}$
- D) $a(t) = 12t^2 e^{2t}$

$12t^2 = 12t^2 - 6t^2 + 6t^2 = 0 + 6t^2$

$(6t^2)(6t^2) = (6t^2)(6t^2)$

$6t^2 e^{2t+1} + 6t^2 e^{2t} = 6t^2 e^{2t+1}$

$C) 36t^2 e^{2t} = (1+2t) 2t^2 e^{2t}$

4. Find the derivative of the following function of x .

$\frac{3x^2 + 5x - 10}{\sqrt{x}}$

$\frac{d}{dx} \left(\frac{3x^2 + 5x - 10}{\sqrt{x}} \right)$

$\frac{2(3x^2 + 5x - 10) \cdot \frac{1}{2}x^{-1/2} + (6x + 5) \cdot \frac{1}{2}x^{-3/2}}{x}$

$\frac{3x^2 + 5x - 10}{x^2} - \frac{3x + 5}{2x^2}$

$\frac{6x^2 + 10x - 20 - 3x - 5}{2x^2}$

$\frac{6x^2 + 7x - 25}{2x^2}$

$\frac{6x^2}{2x^2} + \frac{7x}{2x^2} - \frac{25}{2x^2}$

$3 + \frac{7}{2x} - \frac{25}{2x^2}$

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5. Find the derivative of the following function of x .

$\frac{3x^2 + 5x - 10}{\sqrt{x}}$

$\frac{d}{dx} \left(\frac{3x^2 + 5x - 10}{\sqrt{x}} \right)$

$\frac{2(3x^2 + 5x - 10) \cdot \frac{1}{2}x^{-1/2} + (6x + 5) \cdot \frac{1}{2}x^{-3/2}}{x}$

$\frac{3x^2 + 5x - 10}{x^2} - \frac{3x + 5}{2x^2}$

$\frac{6x^2 + 10x - 20 - 3x - 5}{2x^2}$

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$\frac{6x^2}{2x^2} + \frac{7x}{2x^2} - \frac{25}{2x^2}$

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6. Find the derivative of the following function of x .

$\frac{c}{\sqrt{x}} - 6x^2 - \frac{10}{x^2}$

$\frac{d}{dx} \left(\frac{c}{\sqrt{x}} - 6x^2 - \frac{10}{x^2} \right)$

$-\frac{1}{2}c x^{-3/2} - 12x + 20x^{-3}$

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7. Find the derivative of the following function of x .

$\frac{c}{\sqrt{x}} - 6x^2 - \frac{10}{x^2}$

$\frac{d}{dx} \left(\frac{c}{\sqrt{x}} - 6x^2 - \frac{10}{x^2} \right)$

$-\frac{1}{2}c x^{-3/2} - 12x + 20x^{-3}$

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8. Find the derivative of the following function of x .

$\frac{c}{\sqrt{x}} - 6x^2 - \frac{10}{x^2}$

$\frac{d}{dx} \left(\frac{c}{\sqrt{x}} - 6x^2 - \frac{10}{x^2} \right)$

$-\frac{1}{2}c x^{-3/2} - 12x + 20x^{-3}$

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$\frac{c}{\sqrt{x}} - 6x^2 - \frac{10}{x^2}$

$\frac{d}{dx} \left(\frac{c}{\sqrt{x}} - 6x^2 - \frac{10}{x^2} \right)$

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10. Find the derivative of the following function of x .

$\frac{c}{\sqrt{x}} - 6x^2 - \frac{10}{x^2}$

$\frac{d}{dx} \left(\frac{c}{\sqrt{x}} - 6x^2 - \frac{10}{x^2} \right)$

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11. Find the derivative of the following function of x .

$\frac{c}{\sqrt{x}} - 6x^2 - \frac{10}{x^2}$

$\frac{d}{dx} \left(\frac{c}{\sqrt{x}} - 6x^2 - \frac{10}{x^2} \right)$

$-\frac{1}{2}c x^{-3/2} - 12x + 20x^{-3}$

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$-\frac{1}{2}c x^{-3/2$

Problem 10 (10 points)

Consider the function $f(x) = 3x^2 - 12x + 10$.

- 1. Find the vertex of the parabola. $(2, -2)$
- 2. Find the x-intercepts of the parabola. $x = 1, x = 3$
- 3. Find the y-intercept of the parabola. $y = 10$

4. The following table shows the values of $f(x)$ for $x = 0, 1, 2, 3, 4$.

x	0	1	2	3	4
$f(x)$	10	3	-2	3	10

5. The function $f(x)$ is not continuous at $x = 1$. Find the values of a and b such that $f(x)$ is continuous at $x = 1$.

$f(x) = \begin{cases} 3x^2 - 12x + 10 & x \neq 1 \\ a + b(x-1) & x = 1 \end{cases}$

6. The function $f(x)$ is not differentiable at $x = 1$. Find the values of a and b such that $f(x)$ is differentiable at $x = 1$.

$f(x) = \begin{cases} 3x^2 - 12x + 10 & x < 1 \\ a + b(x-1) & x \geq 1 \end{cases}$

7. The function $f(x)$ is not continuous at $x = 1$. Find the values of a and b such that $f(x)$ is continuous at $x = 1$.

$f(x) = \begin{cases} 3x^2 - 12x + 10 & x < 1 \\ a + b(x-1) & x \geq 1 \end{cases}$

8. Find the values of a and b such that the function $f(x) = a + b(x-1)$ is continuous and differentiable at $x = 1$.

$f(x) = \begin{cases} 3x^2 - 12x + 10 & x < 1 \\ a + b(x-1) & x \geq 1 \end{cases}$

9. The function $f(x)$ is not continuous at $x = 1$. Find the values of a and b such that $f(x)$ is continuous at $x = 1$.

$f(x) = \begin{cases} 3x^2 - 12x + 10 & x < 1 \\ a + b(x-1) & x \geq 1 \end{cases}$

10. The function $f(x)$ is not differentiable at $x = 1$. Find the values of a and b such that $f(x)$ is differentiable at $x = 1$.

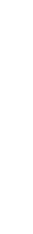
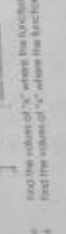
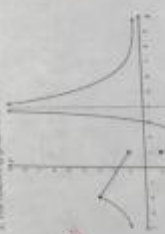
$f(x) = \begin{cases} 3x^2 - 12x + 10 & x < 1 \\ a + b(x-1) & x \geq 1 \end{cases}$

11. The function $f(x)$ is not continuous at $x = 1$. Find the values of a and b such that $f(x)$ is continuous at $x = 1$.

$f(x) = \begin{cases} 3x^2 - 12x + 10 & x < 1 \\ a + b(x-1) & x \geq 1 \end{cases}$

12. The function $f(x)$ is not differentiable at $x = 1$. Find the values of a and b such that $f(x)$ is differentiable at $x = 1$.

$f(x) = \begin{cases} 3x^2 - 12x + 10 & x < 1 \\ a + b(x-1) & x \geq 1 \end{cases}$



Name: Roberto Gonzalez Flores Mat. AGUSTON 73

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

1. T The derivative of $y = e^{-x}$ is $y' = e^{-x}$.
2. F The derivative of $y = \ln(x-4)^{1/3}$ is $y' = \frac{1}{3(x-4)^{2/3}}$.
3. T If $f(x)$ 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.

4. T If the velocity of the car is a function of time, then the derivative of this function with respect to time, describes the acceleration of the car.

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

1. C The derivative for $y = 2x^3$ is:
 A) $y' = 2x^2$ B) $y' = 2x^3$ C) $y' = 6x^2$ D) $y' = 6x^3$

2. B 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) $y' = \frac{1}{x-2}$

3. A If the equation that gives the velocity of an object is $v(t) = 2t^2$, then the equation that gives the acceleration is:

- A) $a(t) = 6t^2 e^{2t}$ B) $a(t) = 6t^2 e^t$
 C) $a(t) = 36t^2 e^{2t}$ D) $a(t) = 12t^2 e^t$

12t

$$1 = 2t^2 = 6t^2 + 6t^2 = 2 + 2t^2$$

$$v = 6e^{2t}$$

$$v = 6e^{2t}$$

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

$$C) 36e^{2t} + 12e^{2t} = 48e^{2t}$$

11. answer the following questions.

1) Find the SLOPE of the line tangent to $y = \frac{e^{3x}}{6}$ at $x = \frac{3}{2}$ (20 points)

$$\frac{d}{dx} \frac{e^{3x}}{6} = \frac{(-2e^{3x})(-6)}{6} = 13e^{3x} = 13e^{3 \cdot \frac{3}{2}} = 13e^{\frac{9}{2}}$$

$$\frac{-2e^{3x}}{6} = -\frac{e}{3} = -\frac{1}{3}$$

2) Find the derivative of $f(x) = \frac{(2x-1)^4}{x}$ (15 points)

$$f'(x) = \frac{5(2x-1)^4(2)}{x^2} = \frac{10(2x-1)^4}{x^2}$$

$$v = 10(2x-1)^4 \quad \frac{d}{dx} 10(2x-1)^4 = 10(2x-1)^3 \cdot 2 = 20(2x-1)^3$$

3) Find the derivative $g(x) = 3x^2 + \frac{1}{e^{2x}} + \ln(4x^2 + 3) + e^x$ (15 points)

$$g'(x) = 6x - \frac{2}{e^{2x}} + \frac{8x}{4x^2+3} + e^x$$

BONUS

#1:

#2: left eye