

Quiz Review Report

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Subject: Calculus

Score: 0 / 10

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1. Evaluate the limit: $\lim_{x \rightarrow 2} (x^2 + 3x - 10) / (x - 2)$

- A) 7
- B) 0
- C) Undefined
- D) 1

Your Answer: C

Correct Answer: 7

Explanation:

Factor the numerator as $(x-2)(x+5)$. Cancel $(x-2)$ and evaluate the limit of $(x+5)$ as x approaches 2.

2. Find the derivative of $f(x) = \sin(2x) * \cos(x)$

- A) $2\cos(2x)\cos(x) - \sin(2x)\sin(x)$
- B) $\cos(2x)\cos(x) - \sin(2x)\sin(x)$
- C) $2\cos(2x)\cos(x) + \sin(2x)\sin(x)$
- D) $-2\cos(2x)\cos(x) - \sin(2x)\sin(x)$

Your Answer: B

Correct Answer: $2\cos(2x)\cos(x) - \sin(2x)\sin(x)$

Explanation:

Use the product rule: $(uv)' = u'v + uv'$. $u = \sin(2x)$, $v = \cos(x)$. $u' = 2\cos(2x)$, $v' = -\sin(x)$.

3. What is the integral of $\int x * e^{(x^2)} dx$?

- A) $e^{(x^2)} + C$
- B) $0.5 * e^{(x^2)} + C$
- C) $2 * e^{(x^2)} + C$
- D) $x^2 * e^{(x^2)} + C$

Your Answer: A

Correct Answer: $0.5 * e^{(x^2)} + C$

Explanation:

Use u-substitution. Let $u = x^2$, then $du = 2x \, dx$. The integral becomes $0.5 \int e^u \, du = 0.5 * e^u + C = 0.5 * e^{(x^2)} + C$.

4. Find the critical points of the function $f(x) = x^3 - 6x^2 + 5$

- A) $x = 0, x = 4$
- B) $x = 2, x = 3$
- C) $x = -2, x = -3$
- D) $x = 1, x = 5$

Your Answer: C

Correct Answer: $x = 0, x = 4$

Explanation:

Find the derivative $f'(x) = 3x^2 - 12x$. Set $f'(x) = 0$ and solve for x : $3x(x-4) = 0$, so $x = 0$ or $x = 4$.

5. Determine if the series $\sum_{n=1}^{\infty} 1/n^2$ converges or diverges.

- A) Converges
- B) Diverges
- C) Cannot be determined
- D) Oscillates

Your Answer: B

Correct Answer: Converges

Explanation:

This is a p-series with $p = 2$. A p-series converges if $p > 1$ and diverges if $p \leq 1$. Since $2 > 1$, the series converges.

6. What is the area between the curve $y = x^2$ and the x-axis from $x = 0$ to $x = 2$?

- A) $8/3$
- B) 4
- C) 2
- D) $16/3$

Your Answer: A

Correct Answer: $8/3$

Explanation:

Integrate x^2 from 0 to 2: $\int_0^2 x^2 \, dx = [x^3/3] \text{ from } 0 \text{ to } 2 = (8/3) - 0 = 8/3$.

7. Find the equation of the tangent line to the curve $y = x^3 - 2x + 1$ at

the point (1, 0).

- A) $y = x - 1$
- B) $y = x + 1$
- C) $y = -x + 1$
- D) $y = -x - 1$

Your Answer: C

Correct Answer: $y = x - 1$

Explanation:

Find the derivative $y' = 3x^2 - 2$. Evaluate y' at $x = 1$: $y'(1) = 3(1)^2 - 2 = 1$. The tangent line has slope 1 and passes through (1, 0). Using point-slope form: $y - 0 = 1(x - 1) \Rightarrow y = x - 1$.

8. Find the second derivative of $f(x) = x^4 - 3x^2 + 2x - 5$

- A) $12x^2 - 6$
- B) $4x^3 - 6x + 2$
- C) $12x^2 - 6x$
- D) $4x^3 - 6$

Your Answer: B

Correct Answer: $12x^2 - 6$

Explanation:

First derivative: $f'(x) = 4x^3 - 6x + 2$. Second derivative: $f''(x) = 12x^2 - 6$.

9. Evaluate the definite integral: $\int_0^{\pi/2} \cos(x) dx$

- A) 0
- B) 1
- C) -1
- D) $\pi/2$

Your Answer: A

Correct Answer: 1

Explanation:

The integral of $\cos(x)$ is $\sin(x)$. Evaluate $\sin(x)$ from 0 to $\pi/2$: $\sin(\pi/2) - \sin(0) = 1 - 0 = 1$.

10. Determine whether the function $f(x) = x^3 + \sin(x)$ is even, odd, or neither.

- A) Even
- B) Odd
- C) Neither
- D) Both

Your Answer: C

Correct Answer: Odd

Explanation:

A function is even if $f(-x) = f(x)$ and odd if $f(-x) = -f(x)$. $f(-x) = (-x)^3 + \sin(-x) = -x^3 - \sin(x) = -(x^3 + \sin(x)) = -f(x)$. Therefore, the function is odd.

