NUNAVUT MATH 31 · UNIT 2 · 25 QUESTIONS

Derivatives — Practice Test

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

1 **If $f(x) = 5x^4 - 3x^2 + 7$, then $f'(x)$ is**

- **A** $20x^3 - 6x + 7$
- **B** $20x^3 - 6x$
- **C** $4x^3 - 2x$
- **D** $20x^4 - 6x^2$

Understand It with Pulse | Flag a mistake

2 **The derivative of a function f at x = 2, written using the limit definition, is**

A $\lim_{h \to 0} \frac{f(2 + h)}{h}$

B $\lim_{h \to 0} \frac{f(2) - f(2 + h)}{h}$

C $\lim_{x \to 2} (f(x) - f(2))$

D $\lim_{h \to 0} \frac{f(2 + h) - f(2)}{h}$

Understand It with Pulse | Flag a mistake

3 **The graph of f and the tangent line at P are shown. The slope of the tangent line to the graph of f at P is**

A 2

B -2

C -3

D 6

Understand It with Pulse | Flag a mistake

4 **If $f(x) = 3x^2 - 5x + 1$, then the value of $f'(2)$ is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

5 **If $f(x) = (2x + 1)^3$, then $f'(x)$ is**

A $3(2x + 1)^2$

B $2(2x + 1)^2$

C $6(2x + 1)^2$

D $6(2x + 1)^3$

Understand It with Pulse | Flag a mistake

6 **If $f(x) = (x^2 + 1)(3x - 2)$, then $f'(x)$ is**

- **A** $9x^2 - 4x + 3$
- **B** $6x^2 - 4x + 3$
- **C** $9x^2 - 4x - 2$
- **D** $9x^2 + 4x - 3$

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7 **If $f(x) = \frac{x + 1}{x - 1}$, then $f'(x)$ is**

- **A** $\frac{2}{(x - 1)^2}$
- **B** $\frac{2}{(x + 1)^2}$
- **C** $\frac{-2x}{(x - 1)^2}$
- **D** $\frac{-2}{(x - 1)^2}$

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8 $\frac{d}{dx}[\sin(3x)]$ is

A cos(3x)

B 3cos(3x)

C -3cos(3x)

D 3sin(3x)

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9 The graph of f and the tangent line at P are shown. The slope of the tangent line to the graph of f at P, expressed as a decimal, is ____

ANSWER _____

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10 **If $f(x) = x^4 - 2x^3$, then $f''(x)$ is**

- **A** $4x^3 - 6x^2$
- **B** $24x - 12$
- **C** $12x^2 - 12x$
- **D** $12x^2 - 6x$

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11 **For the relation $x^2 + y^2 = 25$, $\frac{dy}{dx}$ is**

- **A** $-\frac{x}{y}$
- **B** $\frac{x}{y}$
- **C** $-\frac{y}{x}$
- **D** $\frac{y}{x}$

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12 $\frac{d}{dx}[\ln(3x)]$ is

A $\frac{3}{x}$

B $\frac{1}{3x}$

C $\ln 3$

D $\frac{1}{x}$

Understand It with Pulse | Flag a mistake

13 The graph of f and the tangent line at P are shown. The tangent line to the graph of f at P has a y-intercept of _____

ANSWER _____

Understand It with Pulse | Flag a mistake

14 $\frac{d}{dx}[\tan x]$ is

- A sec x tan x
- B $\sec^2 x$
- C $-\sec^2 x$
- D $\csc^2 x$

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15 If $f(x) = e^{x^2}$, then f'(x) is

- A e^{x2}
- B $2e^{x2}$
- C $2x\ e^{x2}$
- D $x\ e^{x2}$

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16 $\frac{d}{dx}[\log_2 x]$ is

A $\frac{1}{x \ln 2}$

B $\frac{1}{x}$

C $\frac{\ln 2}{x}$

D $\frac{2}{x}$

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17 For the relation $x^2 + xy = 10$, the value of $\frac{dy}{dx}$ at the point (1, 9) is ____

ANSWER

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18 If g(x) = f(2x), then g'(3) is equal to

- A f'(6)
- B 2f'(3)
- C f'(3)
- D 2f'(6)

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19 $\frac{d}{dx}[\cos^2 x]$ is

- A 2sin x cos x
- B -2sin x cos x
- C $2\cos^2 x$
- D -2cos x

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20 If $f(x) = x^5$, then the value of $f'''(2)$ is _____

ANSWER

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21 If $f(x) = \frac{\sin x}{x}$, then $f'(x)$ is

A $\frac{\cos x}{x}$

B $\frac{x \sin x + \cos x}{x^2}$

C $\frac{x \cos x - \sin x}{x^2}$

D $\frac{\sin x - x \cos x}{x^2}$

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22 **The graph of f', the derivative of f, is shown. The function f is increasing on the interval**

A (-1, 2)

B (-∞, -1) and (2, ∞)

C (2, ∞) only

D (-∞, -1) only

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23 **The graph of f is shown, with P and Q marked at the points where the tangent line is horizontal. The sum of the x-coordinates of P and Q is _____**

ANSWER

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24 $\frac{d}{dx}[5^{3x}]$ is

A $5^{3x} \ln 5$

B $3 \cdot 5^{3x}$

C 5^{3x}

D $3 \ln 5 \cdot 5^{3x}$

Understand It with Pulse | Flag a mistake

25 The graph of f and the normal line at P are shown. The slope of the normal line to the graph of f at P, expressed as a decimal, is ____

ANSWER _____

Understand It with Pulse | Flag a mistake

ANSWER KEY

1. B
2. D
3. A
4. 7
5. C
6. A
7. D
8. B
9. 0.25
10. C
11. A
12. D
13. -3
14. B
15. C
16. A
17. -11
18. D
19. B
20. 240
21. C
22. B
23. 2
24. D
25. -0.5

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