NORTHWEST TERRITORIES CALCULUS 12 (MCALC12) · UNIT B · 25 QUESTIONS

Differentiation Rules — 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 **The definition of f'(x) is**

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

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

C $\lim_{x \to 0} \frac{f(x + h) - f(x)}{x}$

D $\lim_{h \to \infty} \frac{f(x + h) - f(x)}{h}$

Understand It with Pulse | Flag a mistake

2 $\frac{d}{dx} x^7$ is

- A $7x^6$
- B $7x^7$
- C x^6
- D $6x^7$

Understand It with Pulse | Flag a mistake

3 $\frac{d}{dx} \frac{1}{x^2}$ is

- A $\frac{2}{x^3}$
- B $-\frac{2}{x^3}$
- C $\frac{1}{2x}$
- D $-\frac{1}{x^3}$

Understand It with Pulse | Flag a mistake

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

- A $12x^3 - 4x + 5$
- B $12x^3 - 2x + 5$
- C $3x^3 - 4x + 5$
- D $12x^4 - 4x^2 + 5$

Understand It with Pulse | Flag a mistake

5 $\frac{d}{dx}[x^2(3x + 1)]$ is

- A $9x^2 + 2x$
- B $6x^2 + 2x$
- C $9x^2 + 1$
- D $3x^2 + 2x$

Understand It with Pulse | Flag a mistake

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

ANSWER _____

Understand It with Pulse | Flag a mistake

7 $\frac{d}{dx}\frac{x}{x+1}$ **is**

A $\frac{1}{(x+1)^2}$

B $\frac{2x+1}{(x+1)^2}$

C $\frac{-1}{(x+1)^2}$

D $\frac{x}{(x+1)^2}$

Understand It with Pulse | Flag a mistake

8 If $f(x) = \frac{x^2 + 1}{x - 1}$, then $f'(2)$ is

- **A** 1
- **B** -1
- **C** 3
- **D** -3

Understand It with Pulse | Flag a mistake

9 $\frac{d}{dx}(2x + 3)^4$ is

- **A** $4(2x + 3)^3$
- **B** $8(2x + 3)^3$
- **C** $2(2x + 3)^3$
- **D** $8(2x + 3)^4$

Understand It with Pulse | Flag a mistake

10 $\frac{d}{dx}\sqrt{3x - 1}$ is

A $\frac{1}{2\sqrt{3x - 1}}$

B $\frac{3}{2\sqrt{3x - 1}}$

C $\frac{3}{\sqrt{3x - 1}}$

D $\frac{-3}{2\sqrt{3x - 1}}$

Understand It with Pulse | Flag a mistake

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

A 12

B 6

C 24

D 18

Understand It with Pulse | Flag a mistake

12 $\frac{d}{dx}$ sin 3x is

A cos 3x

B -cos 3x

C 3cos 3x

D -3cos 3x

Understand It with Pulse | Flag a mistake

13 $\frac{d}{dx}$ [x cos x] is

A cos x - x sin x

B cos x + x sin x

C -sin x

D x sin x - cos x

Understand It with Pulse | Flag a mistake

14 If $f(x) = \sin x$, then $f'(\frac{\pi}{3})$ is

A $\frac{\sqrt{3}}{2}$

B $\frac{1}{2}$

C $-\frac{1}{2}$

D $\frac{1}{\sqrt{3}}$

Understand It with Pulse | Flag a mistake

15 $\frac{d}{dx} e^{2x}$ is

A e^{2x}

B $2e^{2x}$

C e^{x}

D $\frac{1}{2}e^{2x}$

Understand It with Pulse | Flag a mistake

16 $\frac{d}{dx}[x\,e^x]$ is

A $e^x(x + 1)$

B $x\,e^x$

C $e^x(x - 1)$

D $2x\,e^x$

Understand It with Pulse | Flag a mistake

17 $\frac{d}{dx}\ln 5x$ is

A $\frac{5}{x}$

B $\frac{1}{5x}$

C $\frac{1}{x}$

D 5

Understand It with Pulse | Flag a mistake

18 $\frac{d}{dx} \ln(x^2 + 1)$ is

A $\frac{1}{x^2 + 1}$

B $\frac{2x}{x^2 + 1}$

C $\frac{x}{x^2 + 1}$

D $\frac{2}{x^2 + 1}$

Understand It with Pulse | Flag a mistake

19 For $x^2 + y^2 = 25$, the value of $\frac{dy}{dx}$ is

A $\frac{x}{y}$

B $-\frac{x}{y}$

C $-\frac{y}{x}$

D $\frac{y}{x}$

Understand It with Pulse | Flag a mistake

20 For $xy = 6$, the value of $\frac{dy}{dx}$ at (2, 3) is

- **A** $\frac{3}{2}$
- **B** $-\frac{3}{2}$
- **C** $\frac{2}{3}$
- **D** $-\frac{2}{3}$

Understand It with Pulse | Flag a mistake

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

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

Understand It with Pulse | Flag a mistake

22 If $f(x) = 2x^5$, then $f'''(x)$ is

- A $40x^3$
- B $120x^2$
- C $20x^4$
- D $10x^4$

Understand It with Pulse | Flag a mistake

23 For $f(x) = x^2$, the slope of the tangent line at the point (1, 1) is

- A 1
- B 2
- C 0
- D -2

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24 The equation of the tangent to $f(x) = x^3$ at $x = 2$ is

- **A** $y = 12x - 16$
- **B** $y = 12x + 8$
- **C** $y = 6x - 4$
- **D** $y = 12x - 8$

Understand It with Pulse | Flag a mistake

25 For $f(x) = x^3 - 3x$, the slope of the tangent line at the point $(1, -2)$ is

- **A** 3
- **B** -3
- **C** 0
- **D** 1

Understand It with Pulse | Flag a mistake

ANSWER KEY

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

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