BRITISH COLUMBIA 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 $12x^3 - 6x$

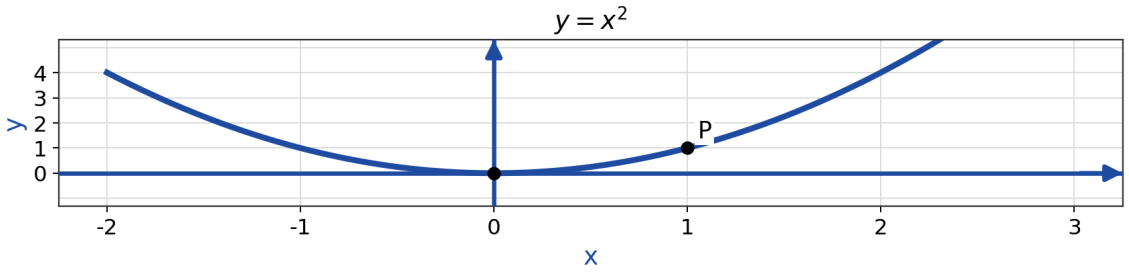
Understand It with Pulse | Flag a mistake

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 **The graph shows $f(x) = x^2$ with point P at (1, 1). The slope of the tangent line at P is**



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

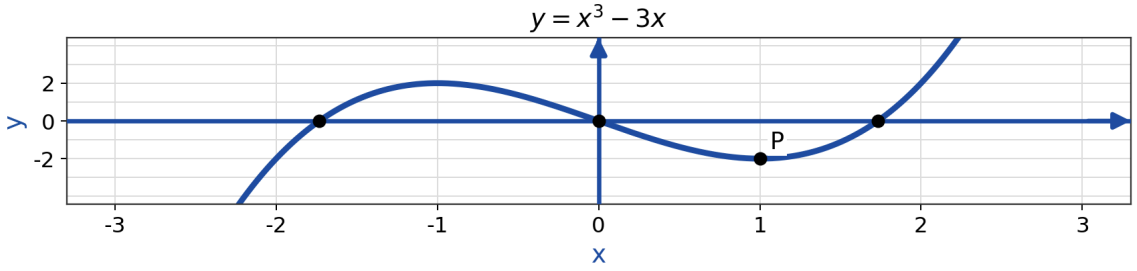
Understand It with Pulse | Flag a mistake

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 **The graph shows $f(x) = x^3 - 3x$ with point P at (1, -2). The slope of the tangent line at P 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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