

SAT PREP

Assignment : AP CALCULUS (Differentiation)

1. If $f(x) = \sin^4 x$, then $f'(\frac{\pi}{3}) =$
- a) $-\frac{\sqrt{3}}{4}$ b) $9\sqrt{3}$ c) $\frac{27}{4}$ d) $\frac{\sqrt{3}}{4}$ e) $\frac{3\sqrt{3}}{4}$
2. Given $f(x) = \frac{x}{\tan x}$, find $f'(\frac{\pi}{2})$.
- a) $\frac{1}{2}$ b) $\frac{\pi}{2}$ c) $\frac{\pi}{2} - 1$ d) 4 e) undefined
3. Differentiate: $f(x) = x^2 + 2 \tan x$
- a) $2x + 2 \tan x$ b) $2x + \sec^2 x$ c) $2 + \sec^2 x$ d) $2x + 2 \sec^2 x$ e) $2x + 2 \cot x$
4. Find the derivative, $\frac{dy}{dx}$, of $y = \frac{3x}{x^2 + 1}$.
- a) $\frac{3}{1+x^2}$ b) $\frac{3}{2x}$ c) $\frac{3x^2 - 3}{(1+x^2)^3}$ d) $\frac{3(1-x^2)}{(1+x^2)^2}$ e) $\frac{6x+x^2}{(x^2+1)^2}$
5. Find the derivative, $\frac{dy}{dx}$, of $f(x) = \frac{x^2 - 1}{x^2 + 1}$.
- a) $\frac{4x}{(x^2 + 1)^2}$ b) 1 c) $-\frac{4x}{(x^2 + 1)^2}$ d) $\frac{4x^2}{(x^2 + 1)^2}$ e) $\frac{-4x^2 - 4x}{(x^2 + 1)^2}$
6. If $f(x) = (x^3 + 4x^2 - 12x + 8)(3x^2 - 9x + 7)$, then find $f'(1)$.
- a) -4 b) 4 c) -3 d) 3 e) 7
7. Find the slope of a line tangent to the graph of $f(x) = \frac{x+3}{x+2}$ at the point $(1, \frac{4}{3})$.
- a) $-\frac{5}{9}$ b) $-\frac{1}{9}$ c) $\frac{1}{9}$ d) $\frac{5}{9}$ e) $\frac{3}{2}$

8. Find an equation of the tangent line to the curve $f(x) = x^2 - 10$ passing through the point (5, 1).

- a) $y - 1 = -10(x - 5)$ b) $y + 5 = -10(x + 1)$ c) $y + 1 = 10(x + 5)$
d) $y - 1 = 10(x - 5)$ e) $y - 5 = 10(x - 1)$

9. Find the slope of the tangent to the graph $f(x) = \frac{\sin x}{\cos 2x}$ where $x = \frac{\pi}{6}$.

- a) $\frac{\sqrt{3}}{2}$ b) $\frac{2\sqrt{3}}{3}$ c) 3 d) $\sqrt{3}$ e) $3\sqrt{3}$

10. Find $f'(x)$ for $f(x) = (2x^2 + 5)^7$.

- a) $7(4x)^6$ b) $(4x)^7$ c) $28x(2x^2 + 5)^6$ d) $7(2x^2 + 5)^6$ e) $28x^7$

11. Find $\frac{dy}{dx}$ for $y = x^3\sqrt{2x+1}$

- a) $\frac{x^2(7x+3)}{\sqrt{2x+1}}$ b) $\frac{3x^2}{2\sqrt{2x+1}}$ c) $\frac{8x^3+3x^2}{2\sqrt{2x^4+x^3}}$ d) $\frac{8x+3}{\sqrt{2x+1}}$ e) $\frac{6x^3+3}{\sqrt{2x+1}}$

12. If $y = (3x^2 + 5)^5(x + 2)^4$, then $\frac{dy}{dx} =$

- a) $2(x + 2)^3(3x^2 + 5)^4$ b) $2(21x^2 + 30x + 10)(x + 2)^3(3x^2 + 5)^4$
c) $(x + 2)^3(3x^2 + 5)(21x^2 + 30x + 10)$ d) $24(x + 2)^3(3x^2 + 5)^4(21x^2 + 30x + 10)$
e) $12(x + 2)^3(3x^2 + 5)^4(21x + 30)$

13. Find the derivative of $y = \cos x^3$.

- a) $3x^2 \sin x^3$ b) $3 \cos x^3$ c) $-3x^2 \sin x^3$ d) $3 \sin x^3 \cos^2 x^3$ e) $3x \cos x^2$

14. Find $f'(x)$ given $f(x) = \sin^3(4x)$.

- a) $4 \cos^3(4x)$ b) $3 \sin^2 4x \cos(4x)$ c) $\cos^3 4x$
d) $12 \sin^2 4x \cos(4x)$ e) $12 \cos^2(4x)$