

Chapter 11

Derivatives Drill 3

DERIVATIVES DRILL 3

- Find y' if $x^6 + y^6 = 6$.
 - $\frac{(6 - 6x^5)}{6y^5}$
 - $\frac{x^5}{y^5}$
 - $\frac{y^5}{x^5}$
 - $-\frac{x^5}{y^5}$
 - $-\frac{y^5}{x^5}$
- Given $h(x) = f(g(\sin x))$, what is h' in terms of f' and g' ?
 - $\cos x \times f'(g(\sin x)) \times g'(\sin x)$
 - $f'(g'(\cos x))$
 - $f(g'(\sin x)) \times f'(g(\sin x))$
 - $\cos x \times f(g'(\sin x)) \times f'(g(\sin x))$
 - $-\cos x \times f'(g(\sin x)) \times g'(\sin x)$
- If $f(x) = x^2 g(x)$, $g(3) = 2$, and $g'(3) = 1$, then what is $f'(3)$?
 - 30
 - 21
 - 3
 - 21
 - 30
- If $y = 4x - \tan x$, then $y' =$
 - $4 + \sec^2 x$
 - $4 - \sec x \tan x$
 - $4 - \sec^2 x$
 - $4 + \sec x \tan x$
 - $4 \sec^2 x$
- If $y = \cot(3x^2 + 5)$, then $y' =$
 - $-\csc^2(6x)$
 - $-6x \csc^2(3x^2 + 5)$
 - $6x \csc^2(3x^2 + 5)$
 - $-6x \csc(3x^2 + 5) \cot(3x^2 + 5)$
 - $6x \csc(3x^2 + 5) \cot(3x^2 + 5)$
- If $y = \csc(\cot x)$, then $y' =$
 - $-\csc(\csc^2 x) \cot(\csc^2 x)$
 - $-\csc^2 x \csc(\cot x) \cot(\cot x)$
 - $-\csc^2 x \cot^2(\cot x)$
 - $\csc^2 x \cot^2(\cot x)$
 - $\csc^2 x \csc(\cot x) \cot(\cot x)$
- If $y = \tan(\sec x)$, then $y' =$
 - $\sec^2(\sec x \tan x)$
 - $\sec x \tan x \sec^2(\sec x)$
 - $\sec(\sec x) \tan(\sec x)$
 - $-\sec x \tan x \sec^2(\sec x)$
 - $-\sec(\sec x) \tan(\sec x)$
- Let $r(x) = f(g(h(x)))$, where $h(1) = 2$, $g(2) = 3$, $h'(1) = 4$, $g'(2) = 5$, and $f'(3) = 6$. What is the value of $r'(1)$?
 - 1
 - 3
 - 20
 - 120
 - 720
- If $y = \cot(\csc x)$, then $y' =$
 - $\csc^2(\csc x \cot x)$
 - $-\csc^2(-\csc x \cot x)$
 - $\csc x \cot x \csc^2(\csc x)$
 - $-\csc x \cot x \csc^2(\csc x)$
 - $\csc^2(\csc x) \cot(\csc x)$

10. If $y = \sec(\tan x)$, then $y' =$

- (A) $\sec(\sec^2 x) \tan(\sec^2 x)$
- (B) $\tan^2(\sec^2 x) \sec(\tan x)$
- (C) $-\sec^2 x \sec(\tan x) \tan(\tan x)$
- (D) $\sec^2 x \sec(\tan x) \tan(\tan x)$
- (E) $-\sec(\sec^2 x) \tan(\sec^2 x)$

11. If $F(x) = f(3f(4f(x)))$, where $f(0) = 0$ and $f'(0) = 2$, then what is the value of $F'(0)$?

- (A) 96
- (B) 72
- (C) 24
- (D) 2
- (E) 0

12. If $x^3 + y^3 = 1$, then $y' =$

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

13. If $x^2 + xy - y^2 = 4$, then $y' =$

- (A) $\frac{(4-2x-y)}{(2y-x)}$
- (B) $\frac{(2x+y)}{(2x-y)}$
- (C) $\frac{(2y-x)}{(2x+y)}$
- (D) $\frac{(2x+y)}{(2y-x)}$
- (E) $\frac{(2x+y)}{(x-2y)}$

14. Find y' if $x^3 + y^3 = 6xy$.

- (A) $\frac{(3x^2 - 6y)}{(6x - 3y^2)}$
- (B) $\frac{(6y - 3x^2)}{(3y^2 - 6x)}$
- (C) $\frac{(3x^2 + 6y)}{(6x + 3y^2)}$
- (D) $\frac{3x^2}{2y^2}$
- (E) $\frac{2x^2}{3y^2}$

15. Find y' if $4\cos x \sin y = 1$.

- (A) $\cot x \cot y$
- (B) $\tan x \cot y$
- (C) $\cot x \tan y$
- (D) $1 - \cos x \sin y$
- (E) $\tan x \tan y$

16. If $x^3 + y^3 = xy$, then what is y' ?

- (A) $\frac{(3y^2 - x)}{(y - 3x^2)}$
- (B) $\frac{(y + 3x^2)}{(3y^2 + x)}$
- (C) $\frac{(y - 3x^2)}{(3y^2 - x)}$
- (D) $\frac{(3y^2 + x)}{(y + 3x^2)}$
- (E) $\frac{(y + 3x^2)}{(3y^2 - x)}$

17. Find y' if $x = \ln(x^2 + y^2)$.

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

18. $x^4 + y^4 = \pi^4$. Find $\frac{dy}{dx}$.

- (A) $\frac{-x^3}{y^3}$
 (B) $\frac{-y^3}{x^3}$
 (C) $\frac{x^3}{y^3}$
 (D) $\frac{y^3}{x^3}$
 (E) $\frac{(\pi^3 - x^3)}{y^3}$

19. If $3x^2 \sin y = \tan x$, then $y' =$

- (A) $\frac{(\sec^2 x)}{(6x \cos y)}$
 (B) $\frac{(\sec^2 x - 6x \sin y)}{(3x^2 \cos y)}$
 (C) $\frac{(\sec^2 x + 6x \sin y)}{(3x^2 \cos y)}$
 (D) $\frac{-(\sec^2 x)}{(6x \cos y)}$
 (E) $6x \cos y - \sec^2 x$

20. Find the derivative of y , when $y = \frac{(x^3 - 2x^2)\sin^2 x}{(x^2 + 1)^3}$?

- (A) $y\left(\frac{3x-4}{x^2-2x} + 2\tan x + \frac{6x}{x^2+1}\right)$
 (B) $y\left(\frac{3x-4}{x^2-2x} + 2\cot x + \frac{6x}{x^2+1}\right)$
 (C) $y\left(\frac{3x-4}{x^2-2x} - 2\tan x - \frac{6x}{x^2+1}\right)$
 (D) $y\left(\frac{3x-4}{x^2-2x} + 2\tan x - \frac{6x}{x^2+1}\right)$
 (E) $y\left(\frac{3x-4}{x^2-2x} + 2\cot x - \frac{6x}{x^2+1}\right)$

21. $\frac{dy}{dx}$ of $y = \left(\frac{3x^2 + 6}{2x - 1}\right)^3 =$

- (A) $3\left(\frac{3x^2 + 6}{2x - 1}\right)^2 \left(\frac{(2x - 1)(6x) - 2(3x^2 + 6)}{(2x - 1)^2}\right)$
 (B) $3\left(\frac{3x^2 + 6}{2x - 1}\right)^2$
 (C) $\left(\frac{3x^2 + 6}{2x - 1}\right)^2 \left(\frac{(2x - 1)(6x) - 2(3x^2 + 6)}{(2x - 1)^2}\right)$
 (D) $3\left(\frac{3x^2 + 6}{2x - 1}\right)^2 \left(\frac{(2x - 1)(6x) + 2(3x^2 + 6)}{(2x - 1)^2}\right)$
 (E) $3\left(\frac{3x^2 + 6}{2x - 1}\right)^2 \left(\frac{(2x - 1)(6x) - 2(3x^2 + 6)}{(2x - 1)}\right)$

22. Find $\frac{dy}{dx}$ if $y^3 + 2y^2 = 4x - 12$.

(A) $\frac{4x}{3y^2 + 4y}$

(B) $\frac{4}{3y^2 + 4y}$

(C) $\frac{4}{y^3 + 2y^2}$

(D) $\frac{4x}{y^3 + 4y}$

(E) $\frac{4}{y^2 + y}$

23. Find $\frac{d^2y}{dx^2}$ if $y^3 + 2y^2 = 4x - 12$ and $y = 1$ at $x = 7$.

(A) $-\frac{111}{343}$

(B) $-\frac{33}{49}$

(C) $-\frac{4}{7}$

(D) $\frac{4}{7}$

(E) $\frac{33}{49}$

24. What is $\frac{dy}{dx}$ if $y = \log_3(4x^3 - 2x)$?

(A) $\frac{12x^2 - 2}{(2x^3 - x)\ln 3}$

(B) $\frac{6x^2 - 1}{(2x^3 - x)\ln 3}$

(C) $\frac{12x^2 - 1}{(4x^3 - 2x)\ln 3}$

(D) $\frac{6x^2 - 1}{(2x^3 - x)\ln 10}$

(E) $\frac{6x^2 - 1}{(2x^3 - 1)\ln 3}$

25. Find the derivative of the inverse of $y = x^4 - 3$ when $y = -2$.

(A) $\frac{1}{32}$

(B) $\frac{1}{4}$

(C) $\frac{1}{2}$

(D) 1

(E) $\frac{3}{2}$

26. Find $\frac{dy}{dx}$ for $4x^2 - 2x^2y + 2xy^2 - 3y^2 = x$ at $x = 1$.

(A) -4

(B) 0

(C) $-\frac{5}{4}$

(D) 1

(E) $-\frac{37}{4}$

27. If $f(x) = 2x^2 - 3x + 6$, find a derivative of $f^{-1}(x)$ at $y = 15$.

(A) $\frac{1}{9}$

(B) $-\frac{2}{9}$

(C) $\frac{2}{9}$

(D) 3

(E) $-\frac{3}{2}$

28. Find $\frac{dy}{dx}$ if $y = \frac{(3x^3 + 2)^2}{x - 2}$.

(A) $\frac{y(18x^2)}{3x^3 + 2}$

(B) $y\left(\frac{1}{x-2}\right)$

(C) $y\left(\frac{18x^2}{3x^3 + 2} + \frac{1}{x-2}\right)$

(D) $y\left(\frac{18x^2}{3x^3 + 2} - \frac{1}{x-2}\right)$

(E) $\left(\frac{18x^2}{3x^3 + 2} + \frac{1}{x-2}\right)$