

AB Review for Test #1 on Derivatives

Name _____

1. $f(x) = 5$

2. $f(x) = -2x$

3. $f(x) = -2x + 2$

4. $f(x) = -2x^2 - 54$

5. $f(x) = 2x^4 + x^3 - x^2 + 4$

6. $f(x) = \frac{x^3+2}{3}$

7. $f(x) = \frac{1}{3x^2}$

8. $f(x) = \frac{x+1}{x}$

9. $f(x) = (5x^2 - 3)(x^2 + x + 4)$

10. $f(x) = \frac{5}{x^5}$

11. $f(x) = \frac{5}{x^5} + \frac{3}{x^2}$

12. $f(x) = \sqrt{x}$

13. $f(x) = \frac{1}{\sqrt{x}}$

14. $f(x) = \frac{1}{x\sqrt{x}}$

15. $f(x) = \sqrt[3]{x^2} + \sqrt{x}$

16. $f(x) = 2\sin x - 3\cos x$

17. $f(x) = 3e - 4e^x + 5^x$

18. $y = (3x-1)(2x+4)$

19. $g(z) = \frac{z^2+1}{z^3-5}$

20. $h(y) = \frac{1}{y^3+2y+1}$

21. Let $f(x) = g(x)h(x)$, $g(10) = -4$, $h(10) = 560$, $g'(10) = 0$, and $h'(10) = 35$.

Find $f'(10)$.

22. Let $y(x) = \frac{z(x)}{1+x^2}$, $z(-3) = 6$, and $z'(-3) = 15$.

Find $y'(-3)$.

23. $f(x) = (x^3 - 5x)^4$

24. $y = \cos(x^3)$

25. $y = \cos^3 x$

26. $y = (2x^2 - 6x + 1)^{-8}$

27. $y = \sqrt{x^2 - 7x}$

28. $y = \frac{1}{(x^2 - 2x - 5)^4}$

29. $y = \sin^2(\cos(4x))$

30. Prove that $f(x)$ is differentiable at $x = 1$.

$$f(x) = \begin{cases} x^2 - 1, & x > 1 \\ 2x - 2, & x \leq 1 \end{cases}$$

1. $f(x) = x^2 + 1$ at $x = 2$

a) Use the limit definition to find the derivative of $f(x)$.

2. $f(x) = \frac{x}{x-2}$ at $x = 3$

a) Use the limit definition to find the derivative of $f(x)$.

b) Use the power rule to verify your answer.

b) Use the quotient rule to verify your answer.

c) Find the slope of the tangent line at $x=2$.

c) Find the slope of the tangent line at $x=3$.

d) Write the equation of the tangent line at $x=2$.

d) Write the equation of the tangent line at $x=3$.

3. Suppose $g(t) = 1 - t^2$.

a. Find the slope of the line secant to $g(t)$ from $t = -1$ to $t = 3$.

b. Find the average rate of change of g on the interval $[-1, 1]$