

Calculus H
Ch. 3 #6

Name _____

Find the derivatives of the following functions.

1. $f(x) = 5x^2 + 8x + 2$

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

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

4. $y = 4x^{\frac{1}{4}}$

5. $y = 12x^{\frac{1}{3}}$

6. $\frac{d}{dx}\left(3x^{\frac{7}{3}}\right)$

7. $\frac{d}{dx}\left(9\sqrt[3]{x^2}\right)$

8. $g(x) = 3x(6x - 5x^2)$

9. $y = 64\sqrt[4]{x^3}$

10. $f(x) = \frac{x^3 - 3x^2 + 4}{x^2}$

11. $\frac{d}{dx}\left(3x^2 + \sqrt[3]{x^4} + \pi\right)$

$$12. h(s) = s^{\frac{4}{5}} - \frac{1}{\frac{2}{s}} + e^3$$

For 13 – 16 find the equation of the tangent line to the graph at the indicated point.

$$13. y = x^4 - 3x^2 + 2 \text{ at } (1, 0)$$

$$14. g(x) = x^3 + x \text{ at } (-1, -2)$$

$$15. f(x) = \frac{2}{\sqrt[4]{x^3}} \text{ at } (1, 2)$$

$$16. y = (x^2 + 2x)(x + 1)$$

For 17 – 18 Use the limit definition of the derivative to find the derivative. Be sure to show all steps and use proper limit notation throughout.

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

$$18. g(x) = \frac{1}{x^2 + 1}$$