

Who has the POWER?! Key _____ Period: _____

AP Calculus AB: 3.3 Power Rule

Find the $\frac{dy}{dx}$ of each of the following functions.

1) $y = 4$

$$y' = 0$$

2) $y = \pi$

$$y' = 0$$

3) $y = x^{12}$

$$y' = 12x^{11}$$

4) $y = t^4$

$$y' = 4t^3$$

5) $y = \sqrt{p} = p^{1/2}$

$$y' = \frac{1}{2\sqrt{p}}$$

6) $y = \sqrt[4]{x^3} = x^{3/4}$

$$y' = \frac{3}{4\sqrt[4]{x}}$$

7) $y = \sqrt[3]{x^5} = x^{5/3}$

$$y' = \frac{5\sqrt[3]{x^2}}{3}$$

8) $y = \frac{1}{x^5} = x^{-5}$

$$y' = \frac{-5}{x^6}$$

9) $y = \frac{1}{\sqrt[3]{x^4}} = x^{-4/3}$

$$y' = \frac{-4}{3\sqrt[3]{x^7}}$$

10) Find the instantaneous rate of change of the function $g(x) = \frac{1}{\sqrt[3]{x}}$ at $x=2$.

$$g'(x) = \frac{-1}{3\sqrt[3]{x^4}}$$

$$g'(2) = \frac{-1}{6\sqrt[3]{2}}$$

11) Where on the function $f(x) = \sqrt{x}$ does the slope of the tangent line equal 2?

$$f'(x) = 2$$

$$x = \frac{1}{16}$$

12) What x -value yields a slope of 12 on the function $y = x^3$?

$$y' = 12$$

$$x = \pm 2$$

(Calculator Allowed)

13) Let $f(x) = 3e^{7x^2}$, when does $f(x)$ have a tangent line parallel to $3x - 2y = 5$?

(Answer: 0.035)

$$f'(x) = y'$$

Solve in calculator

$$x = .035$$

$$-2y = -3x + 5$$

$$y = \frac{3x}{2} + \frac{5}{2}$$

Slope is $\frac{3}{2}$ $y' = \frac{3}{2}$

on calc AB exam always round to 3 digits.