Calculus
Name_____ ID: 1

Practice- Power Rule for Derivatives

Date_____ Period____

Differentiate each function with respect to the given variable.

1) $h(r) = 2$

2) $y = -3$

3) $h(r) = -4r^4$

4) $g(t) = 2t^3$

5) $f = -\dfrac{1}{t^2}$

6) $f = -2x^{-3}$

7) $g = \dfrac{4}{x^4}$

8) $f = 4s^{-4}$

9) $g(x) = \dfrac{4}{x^2}$

10) $h(t) = 3t^{\frac{1}{5}}$

11) $g(s) = \sqrt[5]{s}$

12) $g(w) = 5\sqrt[5]{w^2}$

13) $f(w) = 2\sqrt[4]{w}$

14) $h = \sqrt[4]{r}$

15) $s = 4\sqrt[4]{r}$

16) $h(r) = 5\sqrt[5]{r}$

17) $h(t) = -4t^a$

18) $g(w) = 3w^{4b}$

For each problem, find the instantaneous rate of change of the function at the given value.

19) $y = x^2 + 2x - 2;\ -1$

20) $y = -2x^2 + 2;\ -1$

21) $y = 2x^2 - 1;\ 1$

22) $y = x^2 + 2x + 1;\ -2$

For each problem, find the equation of the tangent line to the function at the given point.

23) $y = x^2 - 1;\ (2, 3)$

24) $y = x^2 + x + 2;\ (-1, 2)$

25) $y = x^2 + x + 1;\ (-2, 3)$

26) $y = x^2 + 1;\ (0, 1)$

Evaluate each limit.

27) $\lim\limits_{h \to 0} \dfrac{\left(\frac{2}{3} + h\right)^2 - \left(\frac{2}{3}\right)^2}{h}$

28) $\lim\limits_{h \to 0} \dfrac{\left(\frac{5}{3} + h\right)^2 - \left(\frac{5}{3}\right)^2}{h}$

29) $\lim\limits_{t \to 0} \dfrac{\left(\frac{1}{3} + t\right)^4 - \left(\frac{1}{3}\right)^4}{t}$

30) $\lim\limits_{t \to 0} \dfrac{\left(\frac{2}{3} + t\right)^2 - \left(\frac{2}{3}\right)^2}{t}$

31) $\lim\limits_{x \to 0} \dfrac{\sqrt[3]{5 + x} - \sqrt[3]{5}}{x}$

32) $\lim\limits_{x \to 0} \dfrac{\left(-\frac{1}{3} + x\right)^3 - \left(-\frac{1}{3}\right)^3}{x}$

Answers to Practice- Power Rule for Derivatives (ID: 1)

1) $h'(r) = 0$

2) $\dfrac{dy}{dt} = 0$

3) $h'(r) = -16r^3$

4) $g'(t) = 6t^2$

5) $\dfrac{df}{dt} = 2t^{-3}$

6) $\dfrac{df}{dx} = 6x^{-4}$

7) $\dfrac{dg}{dx} = -16x^{-5}$

8) $\dfrac{df}{ds} = -16s^{-5}$

9) $g'(x) = -8x^{-3}$

10) $h'(t) = \dfrac{3}{5}t^{-\frac{4}{5}}$

11) $g'(s) = \dfrac{1}{5}s^{-\frac{4}{5}}$

12) $g'(w) = 2w^{-\frac{3}{5}}$

13) $f'(w) = \dfrac{1}{2}w^{-\frac{3}{4}}$

14) $\dfrac{dh}{dr} = \dfrac{1}{4}r^{-\frac{3}{4}}$

15) $\dfrac{ds}{dr} = r^{-\frac{3}{4}}$

16) $h'(r) = r^{-\frac{4}{5}}$

17) $h'(t) = -4at^{a-1}$

18) $g'(w) = 12bw^{4b-1}$

19) 0

20) 4

21) 4

22) -2

23) $y = 4x - 5$

24) $y = -x + 1$

25) $y = -3x - 3$

26) $y = 1$

27) $\dfrac{4}{3}$

28) $\dfrac{10}{3}$

29) $\dfrac{4}{27}$

30) $\dfrac{4}{3}$

31) $\dfrac{\sqrt[3]{5}}{15}$

32) $\dfrac{1}{3}$