

# General Power Differentiation Rule ... Set 1

## Power Rule for Derivatives Practice

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

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

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

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

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

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

# General Power Differentiation Rule ... Set 1

## Answers

$$1) h'(r) = 0$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

# General Power Differentiation Rule ... Set 1

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)  $\lim_{h \rightarrow 0} \frac{\left(\frac{2}{3} + h\right)^2 - \left(\frac{2}{3}\right)^2}{h}$

28)  $\lim_{h \rightarrow 0} \frac{\left(\frac{5}{3} + h\right)^2 - \left(\frac{5}{3}\right)^2}{h}$

29)  $\lim_{t \rightarrow 0} \frac{\left(\frac{1}{3} + t\right)^4 - \left(\frac{1}{3}\right)^4}{t}$

30)  $\lim_{t \rightarrow 0} \frac{\left(\frac{2}{3} + t\right)^2 - \left(\frac{2}{3}\right)^2}{t}$

31)  $\lim_{x \rightarrow 0} \frac{\sqrt[3]{5+x} - \sqrt[3]{5}}{x}$

32)  $\lim_{x \rightarrow 0} \frac{\left(-\frac{1}{3} + x\right)^3 - \left(-\frac{1}{3}\right)^3}{x}$

# General Power Differentiation Rule ... Set 1

## Answers

19) 0

20) 4

21) 4

22) -2

23)  $y = 4x - 5$

24)  $y = -x + 1$

25)  $y = -3x - 3$

26)  $y = 1$

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

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

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

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

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

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

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