

2.2 Worksheet #2 - More Power Rule Practice

Compute the derivatives of the following functions.

$$(1) f(x) = x^2 - 2$$

$$(2) f(x) = x - x^3$$

$$(3) f(x) = x^2 + 3x - 6$$

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

$$(5) f(x) = \frac{2}{x}$$

$$(6) f(x) = \frac{4}{x^2} - \frac{x^2}{4}$$

$$(7) f(x) = 2x^{10} - 4x^2$$

$$(8) f(x) = 3\sqrt{x}$$

$$(9) f(x) = x\sqrt{3}$$

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

$$(11) f(x) = x(x + 1)$$

$$(12) f(x) = x^2 - e^2$$

$$(13) f(x) = 5x^3 - \frac{5}{x^3}$$

$$(14) f(x) = (6x + 5) - (3x + x^2)$$

$$(15) f(x) = 2x^2 - 5x + 10$$

$$(16) f(x) = x - \frac{1}{x}$$

$$(17) f(x) = 4x^{\frac{5}{2}}$$

$$(18) f(x) = 1 - 5$$

$$(19) f(x) = \frac{1}{3x}$$

$$(20) f(x) = \frac{x^2}{2} - 3x$$

$$(21) f(x) = 5^2$$

$$(22) f(x) = (x^2 + 1)^2$$

$$(23) f(x) = x^{1000}$$

$$(24) f(x) = \frac{1}{x^{1000}}$$

$$(25) f(x) = \frac{x^2}{\ln(2)}$$

$$(26) f(x) = \sqrt{3x}$$

$$(27) f(x) = \sqrt{7}$$

$$(28) f(x) = \frac{x^2 - 1}{x}$$

$$(29) f(x) = \frac{8}{\sqrt{x}} - 3x$$

$$(30) f(x) = \frac{7x + 3x^2}{5\sqrt{x}}$$

Answers

- | | | |
|---------------------------|-----------------------------------|---|
| (1) $2x$ | (2) $1 - 3x^2$ | (3) $2x + 3$ |
| (4) $4x$ | (5) $-2x^{-2}$ | (6) $-8x^{-3} - \frac{x}{2}$ |
| (7) $20x^9 - 8x$ | (8) $\frac{3}{2}x^{-\frac{1}{2}}$ | (9) $\sqrt{3}$ |
| (10) $x^3 + 1$ | (11) $2x + 1$ | (12) $2x$ |
| (13) $15x^2 + 15x^{-4}$ | (14) $3 - 2x$ | (15) $4x - 5$ |
| (16) $1 + x^{-2}$ | (17) $10x^{\frac{3}{2}}$ | (18) 0 |
| (19) $-\frac{1}{3}x^{-2}$ | (20) $x - 3$ | (21) 0 |
| (22) $4x^3 + 4x$ | (23) $1000x^{999}$ | (24) $-1000x^{-1001}$ |
| (25) $\frac{2x}{\ln(2)}$ | (26) $\frac{\sqrt{3}}{2\sqrt{x}}$ | (27) 0 |
| (28) $1 + x^{-2}$ | (29) $-4x^{-\frac{3}{2}} - 3$ | (30) $\frac{7}{10}x^{-\frac{1}{2}} + \frac{9}{10}x^{\frac{1}{2}}$ |

Differentiation - Power, Constant, and Sum Rules

Differentiate each function with respect to x .

1) $y = 5$

2) $f(x) = 5x^{18}$

3) $y = 4x^5 + x$

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

5) $y = 3x^{\frac{5}{4}}$

6) $y = \frac{5}{4}x^{\frac{2}{3}}$

7) $y = -4x^{-5}$

8) $y = \frac{3}{x^3}$

9) $y = x^{\frac{2}{3}}$

10) $f(x) = -2\sqrt[4]{x}$

$$11) y = \frac{2}{3}x^4 + 5x - x^{-3}$$

$$12) y = -\frac{1}{2}x^4 + 3x^{\frac{5}{3}} + 2x$$

Differentiate each function with respect to the given variable.

$$13) y = -3r^5 - 5r^2$$

$$14) f(s) = -\frac{3}{s^2} - \frac{4}{s^4}$$

$$15) f(x) = \frac{2}{3}x^{\frac{3}{2}} - \frac{3}{4}x^{\frac{3}{5}}$$

$$16) h(s) = \sqrt{2} \cdot \sqrt[3]{s} + \sqrt{2} \cdot \sqrt[5]{s}$$

Differentiate each function with respect to x . Problems may contain constants a , b , and c .

$$17) y = 5c$$

$$18) y = 4ax^{3a} - bx^{3c}$$