

Derivative Practice (power & product rules)

Date _____ Period _____

© 2013 Kuta Software LLC. All rights reserved.

Differentiate each function with respect to x .

1) $y = -2x^5$

2) $y = -5x$

3) $y = 3x^2$

4) $y = 5x^5$

5) $y = -5x^4$

6) $y = 3x^5$

7) $y = x^5$

8) $y = -2x$

9) $y = 3x^3$

10) $y = 2x^3$

11) $y = -3x^{-3}$

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

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

14) $f(x) = -2x^{-5}$

15) $f(x) = x^4$

16) $f(x) = -3$

17) $f(x) = \frac{1}{2}x^{\frac{2}{3}}$

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

19) $f(x) = \frac{5}{3}$

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

$$21) f(x) = 2x^4 + 2x^{\frac{3}{2}} - \frac{1}{2}x^{\frac{4}{3}}$$

$$22) f(x) = 2x^3 + \frac{4}{3}x^{\frac{4}{3}} + 5x$$

$$23) f(x) = -\frac{3}{5}x^5 + x + 3x^{\frac{1}{4}}$$

$$24) f(x) = -5x^5 + 4x^2 - \frac{1}{5}x^{-3}$$

$$25) y = -5x^4 + \frac{1}{2}x + 5x^{-1}$$

$$26) y = -\frac{5}{2}x^5 + \frac{3}{4}x^{-1} - \frac{3}{4}x^{-5}$$

$$27) f(x) = \frac{1}{4}x^5 - 4x^{\frac{4}{3}} - \frac{5}{3}x^{\frac{1}{3}}$$

$$28) f(x) = -\frac{4}{5}x^4 - x^{\frac{3}{2}} - \frac{1}{4}x$$

$$29) y = 4x^{-1} + 4x^{-2} - \frac{4}{3}x^{-5}$$

$$30) f(x) = \frac{1}{2}x^4 + \frac{3}{4}x^{-3} + 2x^{-5}$$

$$31) y = 3x^5(2x^2 + 2)$$

$$32) y = x^4(x^5 + 3)$$

$$33) y = (-x^5 + 1) \cdot 5x^2$$

$$34) y = (4x^4 + 1) \cdot -x^4$$

$$35) y = (-4x^5 + 5) \cdot 2x^2$$

$$36) y = (1 - 5x^{-3})(-2x^5 - 1)$$

$$37) y = (-\sqrt[5]{x} + 1)(-5x^3 + 4)$$

$$38) y = \left(-4x^{\frac{5}{4}} - 4\right)(x^2 + 4)$$

$$39) y = \left(-5 + \frac{5}{x^2}\right)(-3x^3 - 5)$$

$$40) y = (2 + 3x^{-5})(x^2 + 2)$$

Answers to Derivative Practice (power & product rules)

$$1) \frac{dy}{dx} = -10x^4$$

$$2) \frac{dy}{dx} = -5$$

$$3) \frac{dy}{dx} = 6x$$

$$4) \frac{dy}{dx} = 25x^4$$

$$5) \frac{dy}{dx} = -20x^3$$

$$6) \frac{dy}{dx} = 15x^4$$

$$7) \frac{dy}{dx} = 5x^4$$

$$8) \frac{dy}{dx} = -2$$

$$9) \frac{dy}{dx} = 9x^2$$

$$10) \frac{dy}{dx} = 6x^2$$

$$11) \frac{dy}{dx} = \frac{9}{x^4}$$

$$12) \frac{dy}{dx} = \frac{5x^4}{3}$$

$$13) f'(x) = 0$$

$$14) f'(x) = \frac{10}{x^6}$$

$$15) f'(x) = 4x^3$$

$$16) f'(x) = 0$$

$$17) f'(x) = \frac{1}{3x^{\frac{1}{3}}}$$

$$18) f'(x) = \frac{9}{2x^4}$$

$$19) f'(x) = 0$$

$$20) f'(x) = -\frac{5x}{2}$$

$$21) f'(x) = 8x^3 + 3x^{\frac{1}{2}} - \frac{2x^{\frac{1}{3}}}{3}$$

$$22) f'(x) = 6x^2 + \frac{16x^{\frac{1}{3}}}{9} + 5$$

$$23) f'(x) = -3x^4 + 1 + \frac{3}{4x^{\frac{3}{4}}}$$

$$24) f'(x) = -25x^4 + 8x + \frac{3}{5x^4}$$

$$25) \frac{dy}{dx} = -20x^3 + \frac{1}{2} - \frac{5}{x^2}$$

$$26) \frac{dy}{dx} = -\frac{25x^4}{2} - \frac{3}{4x^2} + \frac{15}{4x^6}$$

$$27) f'(x) = \frac{5x^4}{4} - \frac{16x^{\frac{1}{3}}}{3} - \frac{5}{9x^{\frac{2}{3}}}$$

$$28) f'(x) = -\frac{16x^3}{5} - \frac{3x^{\frac{1}{2}}}{2} - \frac{1}{4}$$

$$29) \frac{dy}{dx} = -\frac{4}{x^2} - \frac{8}{x^3} + \frac{20}{3x^6}$$

$$30) f'(x) = 2x^3 - \frac{9}{4x^4} - \frac{10}{x^6}$$

$$31) \frac{dy}{dx} = 3x^5 \cdot 4x + (2x^2 + 2) \cdot 15x^4 \\ = 42x^6 + 30x^4$$

$$32) \frac{dy}{dx} = x^4 \cdot 5x^4 + (x^5 + 3) \cdot 4x^3 \\ = 9x^8 + 12x^3$$

$$33) \frac{dy}{dx} = (-x^5 + 1) \cdot 10x + 5x^2 \cdot -5x^4 \\ = -35x^6 + 10x$$

$$34) \frac{dy}{dx} = (4x^4 + 1) \cdot -4x^3 - x^4 \cdot 16x^3 \\ = -32x^7 - 4x^3$$

$$35) \frac{dy}{dx} = (-4x^5 + 5) \cdot 4x + 2x^2 \cdot -20x^4 \\ = -56x^6 + 20x$$

$$36) \frac{dy}{dx} = (1 - 5x^{-3}) \cdot -10x^4 + (-2x^5 - 1) \cdot 15x^{-4} \\ = -10x^4 + 20x - \frac{15}{x^4}$$

$$37) \frac{dy}{dx} = \left(-x^{\frac{1}{5}} + 1\right) \cdot -15x^2 + (-5x^3 + 4) \cdot -\frac{1}{5}x^{-\frac{4}{5}} \\ = 16x^{\frac{11}{5}} - 15x^2 - \frac{4}{5x^{\frac{4}{5}}}$$

$$38) \frac{dy}{dx} = \left(-4x^{\frac{5}{4}} - 4\right) \cdot 2x + (x^2 + 4) \cdot -5x^{\frac{1}{4}} \\ = -13x^{\frac{9}{4}} - 8x - 20x^{\frac{1}{4}}$$

$$39) \frac{dy}{dx} = (-5 + 5x^{-2}) \cdot -9x^2 + (-3x^3 - 5) \cdot -10x^{-3} \\ = 45x^2 - 15 + \frac{50}{x^3}$$

$$40) \frac{dy}{dx} = (2 + 3x^{-5}) \cdot 2x + (x^2 + 2) \cdot -15x^{-6} \\ = 4x - \frac{9}{x^4} - \frac{30}{x^6}$$