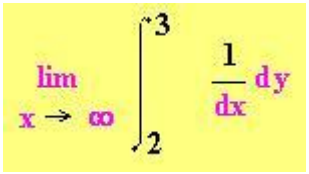

SOME BASIC DIFFERENTIATION RULES

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Problem 1:

Find the derivative of the following functions:

a. $f(x) = -4x^{5/4}$

b. $f(x) = 6 - x + 2x^3 - 4x^6$

c. $f(x) = -2x^3 - \sqrt[3]{x^5}$

d. $f(x) = x^{4/3}(x^2 + 3x^{2/3} - 6)$

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

f. $f(x) = (x^3 - 2)(2x + 1)$

Problem 2:

Differentiate the following functions. Write any negative exponents in your answer as fractions and then write as a SINGLE fraction, if necessary.

a. $f(x) = x^3 + \frac{1}{x}$

b. $f(x) = (4x)^{-2}$

c. $f(x) = \dfrac{3x^2 - 7x + 2}{x}$

d. $f(x) = \dfrac{4x^3 + 5x - 9}{2}$

e. $f(x) = \dfrac{3\sqrt{x}}{x}$

f. $y = \dfrac{4x^2 - 5}{x^3}$

Problem 3:

Find the slope-intercept equation of the line tangent to the graph of $f(x) = 2x - 3x^{1/2}$ at the point $(9,9)$.

Problem 4:

Find the first, second derivative, and third derivatives of the following functions:

a. Given $f(x) = -2x^{6/5}$

b. Given $y = 3x - 1$

SOLUTIONS

You can find detailed solutions below the link for this problem set!

1.a. $f'(x) = -5x^{1/4}$	1.b. $f'(x) = -1 + 6x^2 - 24x^5$	1.c. $f'(x) = -6x^2 - \frac{5}{3}x^{2/3}$
1.d. $f'(x) = \frac{10}{3}x^{7/3} + 6x - 8x^{1/3}$	1.e. $f'(x) = 8x - 12$	1.f. $f'(x) = 8x^3 + 3x^2 - 4$
2.a. $f'(x) = \frac{3x^4 - 1}{x^2}$	2.b. $f'(x) = \frac{-1}{8x^3}$	2.c. $f'(x) = \frac{3x^2 - 2}{x^2}$
2.d. $f'(x) = \frac{12x^2 + 5}{2}$	2.e. $f'(x) = \frac{-3}{2x^{3/2}}$	2.f. $\frac{dy}{dx} = \frac{-4x^2 + 15}{x^4}$
3. $y = \frac{3}{2}x - \frac{9}{2}$	4.a. $f'(x) = -\frac{12}{5}x^{1/5}$ $f''(x) = -\frac{12}{25}x^{-4/5}$ $f'''(x) = \frac{48}{125}x^{-9/5}$	4.b. $\frac{dy}{dx} = 3$ $\frac{d^2y}{dx^2} = 0$ $\frac{d^3y}{dx^3} = 0$