Calculus 1 Workbook

Derivative rules

POWER RULE

■ 1. Find the derivative of $f(x) = 7x^3 - 17x^2 + 51x - 25$ using the power rule.

■ 2. Find the derivative of $g(x) = 2x^4 + 8x^3 + 6x^2 - 32x + 16$ using the power rule.

■ 3. Find the derivative of $h(x) = 22x^3 - 19x^2 + 13x - 17$ using the power rule.

POWER RULE FOR NEGATIVE POWERS

■ 1. Find the derivative of the function using the power rule.

$$f(x) = \frac{7}{x^2} - \frac{5}{x^4} + \frac{2}{x}$$

■ 2. Find the derivative of the function using the power rule.

$$g(x) = \frac{1}{9x^4} + \frac{2}{3x^5} - \frac{1}{x}$$

■ 3. Find the derivative of the function using the power rule.

$$h(x) = -\frac{7}{6x^6} - \frac{1}{4x^4} + \frac{9}{2x^2}$$

POWER RULE FOR FRACTIONAL POWERS

■ 1. Find the derivative of the function using the power rule.

$$f(x) = 4x^{\frac{3}{2}} - 6x^{\frac{5}{3}}$$

■ 2. Find the derivative of the function using the power rule.

$$g(x) = 6x^{\sqrt{3}} - 4x^{\sqrt{5}}$$

■ 3. Find the derivative of the function using the power rule.

$$h(x) = \frac{1}{3}x^{\frac{6}{5}} + \frac{1}{4}x^{\frac{8}{3}} - \frac{1}{5}x^{\frac{5}{2}}$$

PRODUCT RULE, TWO FUNCTIONS

■ 1. Use the product rule to find the derivative of the function.

$$h(x) = (3x + 5)\ln(5x)$$

■ 2. Use the product rule to find the derivative of the function.

$$h(x) = 8x^3 e^{7x}$$

■ 3. Use the product rule to find the derivative of the function.

$$h(x) = (5x^2 - x)(e^{4x} - 6)$$

PRODUCT RULE, THREE OR MORE FUNCTIONS

■ 1. Use the product rule to find the derivative of the function.

$$y = 5x^4 e^{3x} \cos(6x)$$

■ 2. Use the product rule to find the derivative of the function.

$$y = (-6x^2)(-2e^{5x})\tan(5x)$$

■ 3. Use the product rule to find the derivative of the function.

$$y = (\sin(7x))(7e^{4x})(2x^6 + 1)$$

■ 4. Use the product rule to find the derivative of the function.

$$y = (\cos(3x))(\sin(2x))(\tan(5x))(e^{2x})$$

QUOTIENT RULE

■ 1. Use the quotient rule to find the derivative of the function.

$$h(x) = \frac{2x + 6}{7x + 5}$$

■ 2. Use the quotient rule to find the derivative of the function.

$$h(x) = \frac{5x - 3}{4x - 9}$$

■ 3. Use the quotient rule to find the derivative of the function.

$$h(x) = \frac{-8x}{5x + 2}$$

■ 4. Use the quotient rule to find the derivative of the function.

$$h(x) = \frac{3x^2 + 12x}{e^x}$$