The Math Dugout - Worksheet

CHAIN RULE

Useful Videos - https://youtu.be/DiHNaFPSy0c

EXERCISE 1 – Use the "chain rule" formula below to find the derivatives of the following functions.

$$If \quad y = f(u) \ and \ \ u = g(x) \quad then \ldots. \quad \frac{dy}{dx} = \frac{dy}{du} \cdot \frac{du}{dx}$$

(a) $f(x) = (2x + 1)^3$

(b) $g(x) = (5 + 2x)^5$

(c) $f(x) = (3 - 7x)^7$

(d) $g(x) = (6x^2 + 3)^3$

(e) $f(x) = (2 - 5x^2)^3$

(f) $g(x) = (-3 - 4x^2)^3$

EXERCISE 2 – Assuming that you didn't yet know the magic formula for differentiating sine and cosine… can you differentiate the following functions using the chain rule?

(a) $g(x) = sin(2x)$

(b) $f(x) = sin(3x^2)$

(c) $g(x) = cos(2x + 1)$

(d) $f(x) = cos(4x^2 + 3)$

EXERCISE 3 – Using the product rule, quotient rule and chain rule, find the derivative of the following functions.

(a) $f(x) = \frac{(3x+72)^2}{\sin(x)}$

(b) $g(x) = \frac{\cos(2x)}{(4x+2)^3}$

(c) $f(x) = \frac{(2x+1)^2}{\sin(x) \cdot e^x}$