

WORKSHEET 5 ¼
CALCULUS I
APPLYING THE CONSTANT, POWER, SUM, PRODUCT, OR CHAIN RULE ON
POLYNOMIALS OR RATIONAL FUNCTIONS OF POLYNOMIAL EXPRESSIONS
USING THE DEFINITION OF THE DERIVATIVE
DR. M. P. M. M. MCLOUGHLIN

Reduce numerical results. If an answer *does not exist*, write **DNE** in the corresponding answer blank!

1. Find $\frac{dy}{dx}$ where $f(x) = x^3$ $f: \mathbb{R} \longrightarrow \mathbb{R}$ using the definition of the derivative
2. Find $\frac{dy}{dx}$ where $f(x) = \sqrt{3x-7}$ $f: [7/3, \infty) \longrightarrow \mathbb{R}$ using the definition of the derivative
3. Find $\frac{dy}{dx}$ where $f(x) = \frac{3x+5}{5x-3}$ $f: (-\infty, 3/5) \cup (3/5, \infty) \longrightarrow \mathbb{R}$ using the definition of the derivative

The rest: You are insane if you use the definition of the derivative – so just find the derivative.

4. Find y' where $y = \sqrt{3x-7}$ $f: [7/3, \infty) \longrightarrow \mathbb{R}$ using the definition of the derivative
5. Find $f'(x)$ where $f(x) = \frac{x^3}{x+1}$ $f: (-\infty, -1) \cup (-1, \infty) \longrightarrow \mathbb{R}$
6. Find $f'(x)$ where $f(x) = 4x^2 - 5x + 8$ $f: \mathbb{R} \longrightarrow \mathbb{R}$
7. Find $f'(x)$ where $f(x) = \frac{4}{x^5} + 3x - 7x^8 - \sqrt[5]{x}$ $f: (0, \infty) \longrightarrow \mathbb{R}$
8. Find $f'(x)$ where $f(x) = (4x^2 - 5x + 8)(3x + 8)$ $f: \mathbb{R} \longrightarrow \mathbb{R}$
9. Find $f'(x)$ where $f(x) = (4x^2 - 5x + 8)(3x - 5)^9$ $f: \mathbb{R} \longrightarrow \mathbb{R}$
10. Find $f'(x)$ where $f(x) = (4x^2 - 5x + 8)^6(3x - 5)$ $f: \mathbb{R} \longrightarrow \mathbb{R}$
11. Find $f'(x)$ where $f(x) = (4x^2 - 5x + 8)^6(3x - 5)^9$ $f: \mathbb{R} \longrightarrow \mathbb{R}$
12. Find $f'(x)$ where $f(x) = (5x + 1)^4(2x - 7)^3$ $f: \mathbb{R} \longrightarrow \mathbb{R}$ and simplify or usefully the result.