

## MCS21 Homework 20

Do all work on a separate sheet of paper.

1. If  $f(x) = (1 + \sqrt{x})(x^3)$ , find  $f'(x)$  in simplest form.
2. If  $y = \frac{x^3 + 5x + 7}{x^2 + 7x + 9}$ , find  $\frac{dy}{dx}$  in simplest form.
3. Find  $\frac{dx}{dt}$  in simplest form if  $x = \frac{3 - \frac{1}{t}}{t + 5}$ .
4. If  $g(x) = \frac{x^3 + 4}{2x^2 + x - 9}$ , find  $g'(x)$  in simplest form.
5. Find  $\left. \frac{dy}{dx} \right|_{x=1}$  if  $y = (2x^7 - x^2) \left( \frac{x-1}{x+1} \right)$ .
6. Given  $f(2) = -4$ ,  $f'(2) = 1$ ,  $g(2) = -5$ , and  $g'(2) = 6$ .
  - (a) Find  $h'(2)$  if  $h(x) = f(x) \cdot g(x)$
  - (b) Find  $h'(2)$  if  $h(x) = \frac{f(x)}{g(x)}$
  - (c) Find  $h'(2)$  if  $h(x) = \frac{2x+1}{g(x)}$
  - (d) Find  $h'(2)$  if  $h(x) = (6x^2 - 5x) \cdot f(x)$