

Functions

- If $f(x) = 2x + 5$ and $g(x) = x^2 + 2x - 5$, find;
 - the domain and range of $f(x)$
 - the domain and range of $g(x)$
 - $f(2)$
 - $f\left(\frac{3}{4}\right)$
 - $f(2a)$
 - $f(x) = 6$
 - $g(-2)$
 - $g\left(\frac{1}{2}\right)$
 - $g(3b)$
 - $g(x) = -3$
 - x when $f(x) = g(x)$
 - $f(3) - g(2)$
 - $g(5a) - f(4a)$
- If $f(x) = 4x + 8$,
 - State the domain and range
 - Graph the function
 - Find $f^{-1}(x)$ algebraically
 - Graph the inverse
 - Is the inverse a function? Why?
- If $g(x) = 2(x+3)^2 - 4$,
 - State the domain and range
 - State the transformations from the parent function
 - Graph the function
 - Find $g^{-1}(x)$ algebraically
 - Graph the inverse
 - Is the inverse a function? Why?
- If $h(x) = 3\sqrt{2(x+4)} - 9$,
 - State the domain and range
 - State the transformations from the parent function
 - Graph the function
 - Find $h^{-1}(x)$ algebraically
 - Graph the inverse
 - Is the inverse a function? Why?
- Simplify each of the following, state restrictions on the variables.
 - $\frac{12-24y}{6y-3}$
 - $\frac{x^2-9}{7x^2-21x}$
 - $\frac{5x^3}{4} \times \frac{8}{5x}$
 - $\frac{7x^3}{6} \div \frac{49}{12x}$
 - $\frac{x^2-5x}{3x^2} \times \frac{x+5}{x^2-25}$
 - $\frac{5-x}{x+2} \div \frac{x^2-25}{x^2-7x+10}$
 - $\frac{2}{6} + \frac{4}{3x}$
 - $\frac{5}{x} + \frac{4}{x-2}$
 - $\frac{3}{4x-2} + \frac{5}{6x-3}$
 - $\frac{5}{x-2} - \frac{3}{4-x^2} + \frac{1}{2+x}$

$$k. \frac{3}{x^2 - 4x + 3} - \frac{5}{x - 3}$$

$$l. \frac{7}{x - 4} + \frac{5}{x^2 + 3x - 28}$$

5. For each of the following rational functions, state the domain and range and graph the functions.

$$a. f(x) = \frac{1}{2x + 4}$$

$$b. g(x) = \frac{1}{-x + 6}$$

$$c. h(x) = \frac{1}{x^2 - 4}$$

will learn in grade 12

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

$$e. g(x) = \frac{x^2 + 4x - 12}{2x - 4}$$

$$f. h(x) = \frac{x + 5}{x^2 - 7x + 3}$$

6. Sketch a graph of each polynomial function.

$$a. y = (x + 1)(x - 4)(x + 3)$$

$$b. y = (x + 1)^2(x - 2)^2$$

7. For the function $f(x) = x^3 + 2x - 7$, find

a. The average rate of change between $f(-2)$ and $f(3)$

b. Estimate the instantaneous rate of change at $f(4)$

8. Let $f(x) = x - 2$ and $g(x) = x^2 + 3x - 3$, and $h(x) = 2^x$. Determine an algebraic and graphical model for each combined function. Identify the domain and range in each case.

$$a. y = f(x) + g(x)$$

$$b. y = \frac{f(x)}{g(x)}$$

$$c. y = f(x) - h(x)$$

$$d. y = f(g(x))$$

$$e. y = g(f(x))$$

$$f. y = f^{-1}(f(x))$$