

1. Simplify the expression:

(a) $4x^3(2x^0)^{-4}$

(b) $\frac{(3x^{-1})^2y^4z^8}{3xy^7z^0}$

2. Completely factor the polynomial:

(a) $x^3 - 5x^2 - 9x + 45$

(b) $3x^2 - 10x - 8$

3. Find all solutions to the equations:

(a) $x^4 - 8x^2 + 16 = 0$

(b) $\sqrt[3]{x-7} + 4 = 0$

(c) $x - 4 = \sqrt{2x}$

4. Find the Domain of the functions:

(a) $f(x) = 5x^2 + 19x - 12$

(b) $g(x) = \sqrt{6 - x}$

(c) $q(x) = \frac{3x}{9x^2 - 81}$

5. Find the following composition of:

$$f(x) = 2x + 6$$

$$g(x) = x^2 - 3x + 12$$

(a) Find the function $g \circ f$

(b) Find the function $f \circ f$

6. Write an equation for the line that satisfies the following characteristics:

(a) passes through points $(-3, -2)$ and $(6, 10)$

(b) passes through the point $(5, -2)$ and has an undefined slope

(c) passes through $(8, -1)$ and perpendicular to $6x - 3y - 5 = 0$

7. Find the inverse of the following functions:

(a) $f(x) = \sqrt{2x - 13}$

(b) $f(x) = \frac{4x - 3}{-x + 5}$