

1. Let $f(x) = 2x^2 - 1$. Find and simplify the following.

(a) $f(0) =$

(d) $\frac{f(a+h) - f(a)}{h} =$

(b) $f(-2) =$

(c) $f(a+h) =$

2. Find the domains of the following functions.

(a) $f(x) = (3x^2 - 2x)\sqrt{6 - 7x}$

(c) $f(x) = \frac{3x - 2}{2x^2 - x - 6}$

(b) $f(x) = 3x^3 - 7x^2 + 10x - 6$

3. Solve the following inequalities. Express your answers in interval notation. (Continued on the next page.)

(a) $3(2x - 5) - (x + 6) \geq -3(x - 2)$

(b) $-4x(1 - 3x) - 12x^2 > 3$

(c) $\frac{2x}{2x - 3} \leq \frac{x + 2}{x + 5}$

4. Perform the indicated operations and simplify. (Continued on the next page.)

(a) $(3x^2 - 2x + 1) - (7x^2 + 3x - 4)$

(c) $\frac{9x^2 - 4}{3x^2 - 5x + 2} \cdot \frac{9x^4 - 6x^3 + 4x^2}{27x^4 + 8x}$

(b) $(3x + 2)(x^2 - 2x + 4)$

$$(d) \frac{2x+1}{x^2+4x+4} - \frac{6x}{x^2-4} + \frac{3}{x-2}$$

$$(e) \frac{\frac{x+2}{x} - \frac{a+2}{a}}{x-a}$$

5. Solve the following equations. Find all solutions, real or complex. (Continued on the next page.)

$$(a) 3x - 2(x + 2) = 3$$

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

$$(b) (3x+1)^2 = 4$$

$$(d) x(3x-1) = 4$$

(e) $x^2 - 5x + 2 = 0$

(i) $3 + 2|x + 1| = 2$

(f) $x^{\frac{2}{3}} - 5x^{\frac{1}{3}} + 6 = 0$

(j) $\frac{1}{x} - \frac{2}{x^2} = 3$

(g) $\sqrt{5 - x} + 1 = x - 2$

(k) $1 + \frac{2x}{x^2 + 7x + 12} = \frac{2}{x + 3} + \frac{4}{x + 4}$

(h) $-2 - |x + 9| = -4$