

WARM-UP

Solve the following rational equations:

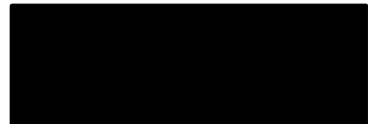
1. $x + 2 = \frac{15}{x}$

$x = -5, 3$



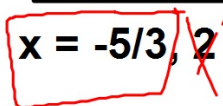
2. $2 - \frac{1}{x+1} = \frac{1}{x^2+x}$

$x = -1, 1/2$



3. $\frac{3x}{x+1} + \frac{5}{x-2} = \frac{15}{x^2-x-2}$

$x = -5/3, 2$



Homework

10. $x + \frac{6}{x} = -7$ $x = -6$ or $x = -1$

12. $2 - \frac{3}{x+4} = \frac{12}{x^2+4x}$ 12. $x = \frac{3}{2}$ or $x = -4$, the latter is extraneous.

15. $\frac{x-3}{x} - \frac{3}{x+1} + \frac{3}{x^2+x} = 0$ $x = 5$ or $x = 0$, the latter is extraneous.

18. $\frac{x+3}{x} - \frac{2}{x+3} = \frac{6}{x^2+3x}$ $x = -1$ or $x = -3$, the latter is extraneous.

27. $\frac{4x}{x+4} + \frac{5}{x-1} = \frac{15}{x^2+3x-4}$ No real solutions

30. $x^2 - \frac{3}{x} = 7$ $x \approx -2.398$ or $x \approx -0.441$ or $x \approx 2.838$

5 The total electrical resistance R of two resistors connected in parallel with resistances R_1 and R_2 is given by

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$$

One resistor has a resistance of 2.3 ohms. Let x be the resistance of the other resistor.

Express the total resistance R as a function of x . $R(x) = \frac{2.3x}{x+2.3}$

Find the resistance of the second resistor if the total resistance of the pair is 1.7 ohms. $x \approx 6.52$ ohms

6 Finding Rectangles Consider all rectangles with an area of 400 square metres. Let x be the length of one side of such a rectangle.

Express the perimeter P as a function of x .

Find the dimensions of a rectangle whose perimeter is 70 m.

(a) $P(x) = 2x + \frac{400}{x}$ (b) 7.1922 m \times 27.8078 m

47. **Multiple Choice** Which of the following are the solutions of the equation $x - \frac{3x}{x+2} = \frac{6}{x+2}$? **D**

(A) $x = -2$ or $x = 3$

(B) $x = -1$ or $x = 3$

(C) only $x = -2$

(D) only $x = 3$

(E) There are no solutions.

48. **Multiple Choice** Which of the following are the solutions of the equation $1 - \frac{3}{x} = \frac{6}{x^2 + 2x}$? **C**

(A) $x = -2$ or $x = 4$

(B) $x = -3$ or $x = 0$

(C) $x = -3$ or $x = 4$

(D) only $x = -3$

(E) There are no solutions.

49. **Multiple Choice** Which of the following are the solutions of the equation $\frac{x}{x+2} + \frac{2}{x-5} = \frac{14}{x^2 - 3x - 10}$? **E**

(A) $x = -5$ or $x = 3$

(B) $x = -2$ or $x = 5$

(C) only $x = 3$

(D) only $x = -5$

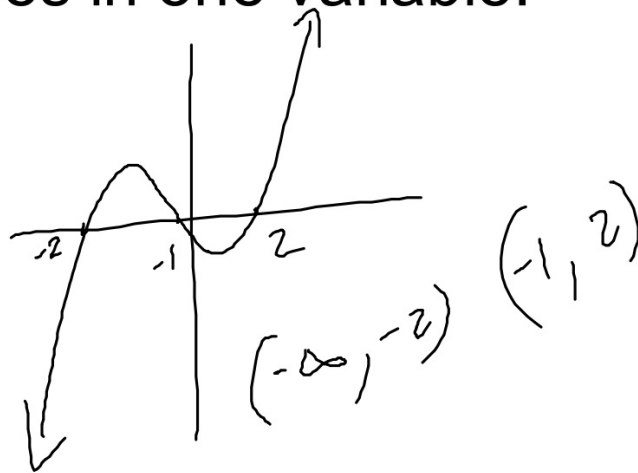
(E) There are no solutions.

Solving Inequalities

Objective:

Solve inequalities in one variable.

$$+x^3$$

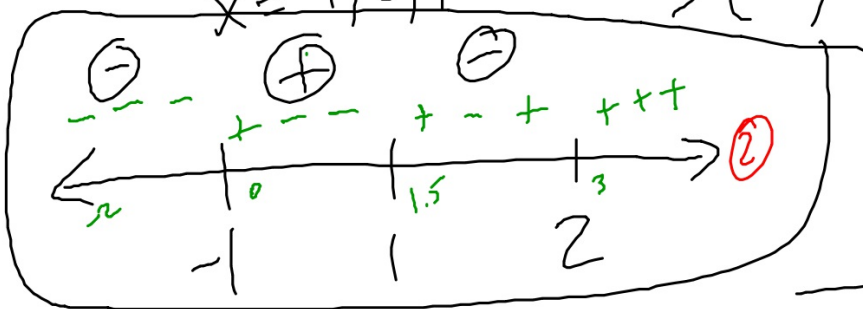


Solve the polynomial inequality using a sign chart.

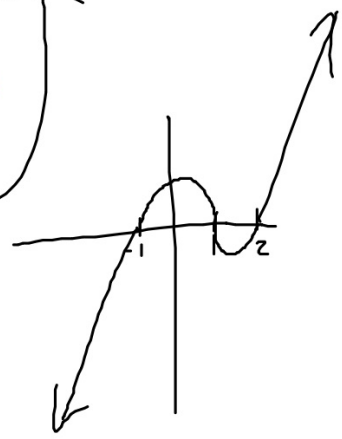
$$(x + 1)(x^2 - 3x + 2) < 0 \quad \leq \left[\right.$$

$$(x + 1)(x - 2)(x - 1) < 0 \quad \textcircled{1} \quad \left. \begin{array}{l} \neq \\ \geq \end{array} \right]$$

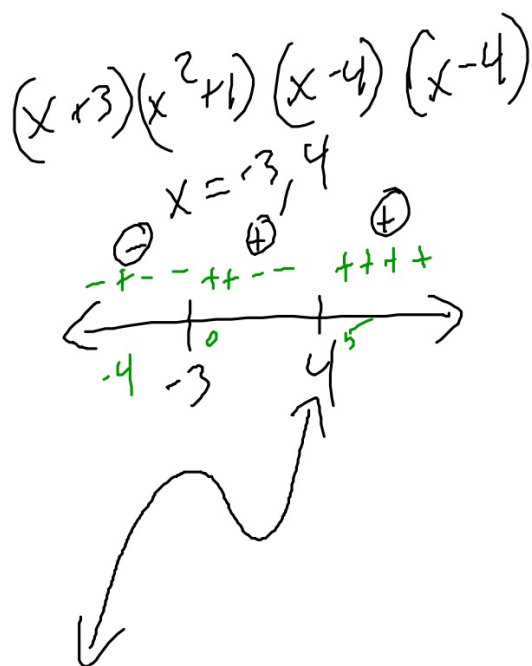
$x = -1, 2, 1$ $> () \quad \geq$



$$(-\infty, -1) \cup (1, 2)$$



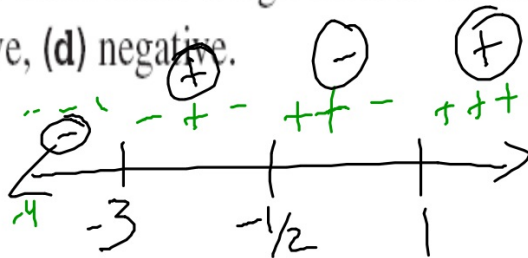
Let $f(x) = (x + 3)(x^2 + 1)(x - 4)^2$. Determine the real number values of x that cause $f(x)$ to be (a) zero, (b) positive, (c) negative.



- a) $x = -3, 4$
 b) $(-3, 4) \cup (4, \infty)$
 c) $(-\infty, -3)$

Let $r(x) = (2x + 1)/((x + 3)(x - 1))$. Determine the values of x that cause $r(x)$ to be (a) zero, (b) undefined. Then make a sign chart to determine the values of x that cause $r(x)$ to be (c) positive, (d) negative.

$$\frac{2x+1}{(x+3)(x-1)}$$



a) $x = -1/2$

b) $x = -3, 1$

c) $(-3, -1/2) \cup (1, \infty)$

d) $(-\infty, -3) \cup (-1/2, 1)$

Solve $(x - 3)\sqrt{x + 1} \geq 0$.


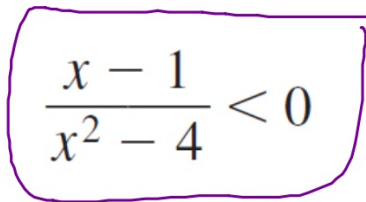

Solve graphically

$$x^3 - x^2 - 2x \geq 0$$

$$2x^3 - 5x^2 - x + 6 > 0$$

$$f(x) = (x - 1)(5x + 1)(x + 4)$$

More Practice... $f(x) = (x + 7)(x + 4)(x - 6)^2$


$$\frac{x - 1}{x^2 - 4} < 0$$

