Warm-up

Solve the rational equation.
Identify any extraneous solutions.

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

$(x-1)(x-2)$

$(x-2)(x-1)$ → $(x-1)(x-2)$

$x=1, 2$

$x^2-x+3x-6=-3$

$+3 \quad +3$

$x^2+2x-3=0$

$(x-1)(x+3)=0$

$x-1=0 \qquad x+3=0$

~~$x=1$~~ $\qquad x=-3$

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Calc 4 Life

Section R.5

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Properties of Inequalities

1) If $a < b$, then $a + c < b + c$.

2) If $a < b$ and if $c > 0$, then $ac < bc$.

3) If $a < b$ and $c < 0$, then $ac > bc$.

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Solve a linear inequality:

$4 - 3y < 7 + 2y$

$-4 \quad -2y \quad -4 \quad -2y$

$\frac{-5y}{-5} < \frac{3}{-5}$

$y > -\frac{3}{5}$

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Interval Notation

Brackets - Inclusive of boundary $\leq \quad \geq$

Parentheses - Exclusive of boundary $< \quad >$

Examples:

$x > 4$

$(4, \infty)$

$7 \leq x < 11$

$[7, 11)$

$x \leq -3$

$(-\infty, -3]$

$5 < x < 6$

$(5, 6)$

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Solve $-2 < 5 + 3m < 20$.
Graph the solution.

$-2 < 5 + 3m < 20$

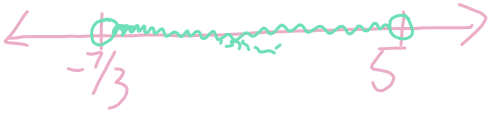
$-5 \quad -5 \quad -5$

$-7 < 3m < 15$

$\frac{-7}{3} < \frac{3m}{3} < \frac{15}{3}$

$-\frac{7}{3} < m < 5$

$(-\frac{7}{3}, 5)$



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Solving polynomial inequalities:

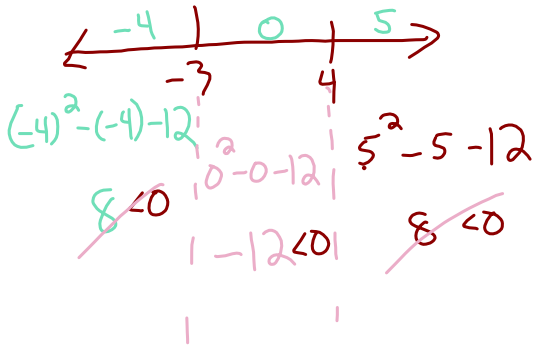
$x^2 - x < 12$

$x^2 - x - 12 < 0$

$(x-4)(x+3) \not< 0$

$x-4=0$ $\quad x+3=0$

$x=4$ $\quad x=-3$



$(-3, 4)$

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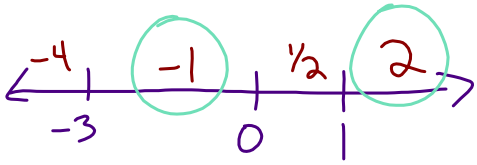
$x^3 + 2x^2 - 3x > 0$

$x(x^2+2x-3) = 0$

$x(x+3)(x-1) = 0$

$x=0$ $\quad x+3=0$ $\quad x-1=0$

$x=-3$ $\quad x=1$



-4: $(-4)^3+2(-4)^2-3(-4) = -20$

-1: $(-1)^3+2(-1)^2-3(-1) = 4$

$\frac{1}{2}$: $(\frac{1}{2})^3+2(\frac{1}{2})^2-3(\frac{1}{2}) = -.875$

2: $2^3+2(2)^2-3(2) = 10$

$(-3,0) \cup (1,\infty)$

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Inequalities with Fractions

$$\frac{2x-1}{x} \geq 3$$

$2x-1 \geq 3x$

$-1 \geq x$

$x \leq -1$

$(-\infty, -1]$

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Inequalities with Fractions

$$\frac{2x^2-9}{x^2} \geq 1$$

$2x^2-9 \geq x^2$

$x^2-9 \geq 0$

$(x-3)(x+3) \geq 0$

$x-3=0 \quad x+3=0$

$x=3 \quad x=-3$

$-4: (-4)^2-9=7$

$0: 0^2-9=-9$

$4: 4^2-9=7$

$(-\infty, -3] \cup [3, \infty)$

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Inequalities with Fractions

$$\frac{x^2 - 9}{x^2 - 3x} > \frac{1}{4}$$

$$\frac{(x-3)(x+3)}{(x-3)\,x} > \frac{1}{4}$$

$$4x+12 > x$$

$$3x+12 > 0$$

$$3x > -12$$

$$x > -4 \quad , x \neq 3, 0$$

$$(-4, 0) \cup (0, 3) \cup (3, \infty)$$

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Homework

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1 - 23 odd, 35 - 49 odd

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