

September 4, 2015
Complete the Square

$$7x^2 - 11x + 2 = 4$$

$$\frac{7x^2 - 11x}{7} = \frac{2}{7}$$

$$x^2 - \frac{11}{7}x = \frac{2}{7}$$

a) $-\frac{11}{7} \div 2 = -\frac{11}{14}$

b) $(-\frac{11}{14})^2 = \frac{121}{196}$ add to both sides

$$x^2 - \frac{11}{7}x + \frac{121}{196} = \frac{2}{7} + \frac{121}{196}$$

$$(x - \frac{11}{14})^2 = \frac{2 \cdot 28 + 121}{196} = \frac{56 + 121}{196} = \frac{177}{196}$$

$$\sqrt{(x - \frac{11}{14})^2} = \pm \sqrt{\frac{177}{196}}$$

$$x - \frac{11}{14} = \pm \sqrt{\frac{177}{196}}$$

$$x - \frac{11}{14} = \pm \frac{\sqrt{177}}{14}$$

$$x = \frac{11}{14} \pm \frac{\sqrt{177}}{14} \text{ or } \frac{11 \pm \sqrt{177}}{14}$$

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$\frac{x+2}{x-3} \leq 0$

Steps

- $x+2=0 \Rightarrow x=-2$
- $x-3=0 \Rightarrow x=3$

Number line analysis:

- Interval A: $x < -2$ (Test: $\frac{-3+2}{-3-3} = \frac{-1}{-6} > 0$)
- Interval B: $-2 < x < 3$ (Test: $\frac{0+2}{0-3} = \frac{2}{-3} < 0$)
- Interval C: $x > 3$ (Test: $\frac{4+2}{4-3} = \frac{6}{1} > 0$)

Solution Set: $[-2, 3]$

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$$\frac{5}{x+1} < \frac{-2}{1}$$

$$\frac{5}{x+1} < -2(x+1)$$

$$\frac{5}{x+1} < -2x - 2$$

- $x+1=0 \Rightarrow x=-1$
- $5 = -2x - 2$
 $7 = -2x$
 $x = -\frac{7}{2}$

Number line analysis:

- Interval A: $x < -\frac{7}{2}$
- Interval B: $-\frac{7}{2} < x < -1$
- Interval C: $x > -1$

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