

## C: Solving Multi-Step Inequalities Continued

### Examples:

1. A phone company charges \$18 plus \$0.05 per text for one plan and a flat rate of \$0.14 per text. How many text messages must be sent in order for the second plan to be better?

$$\begin{array}{rcl} \text{Plan 1} & > & \text{Plan 2} \\ 18 + 0.05x & > & 0.14x \\ -0.14x & & -0.14x \\ \hline 18 - 0.09x & > & 0 \\ -18 & & -18 \\ \hline -0.09x & > & -18 \\ \frac{-0.09x}{-0.09} & > & \frac{-18}{-0.09} \end{array}$$

$x$  - # of text messages.

$$x < 200$$

The second option is better if less than 200 texts are sent.

2. Jill compares two job offers. One is \$8.50/h plus 7% commission, the second is \$19/h. Assuming a 40 hour week when would the 1st offer be better than the second?

$x$  - weekly sales.

$$\begin{array}{rcl} \text{1st} & > & \text{2nd} \\ (8.50 \times 40) + 0.07x & > & (19 \times 40) \end{array}$$

$$\begin{array}{rcl} 340 + 0.07x & > & 760 \\ -340 & & -340 \end{array}$$

$$\begin{array}{rcl} 0.07x & > & 420 \\ \frac{0.07x}{0.07} & > & \frac{420}{0.07} \end{array}$$

$$x > 6000$$

The 1st job would be better if Jill's weekly sales were greater than \$6000.

3. A standard cable plan is \$8 per channel. A member's cable plan is \$100 per month plus \$1.70 per channel. How many channels must be purchased in order to make the monthly deal better?

$$\begin{aligned} \text{Monthly} &< \text{Standard} && x - \# \text{ of channels.} \\ 100 + 1.70x &< 8x \\ -8x &&& -8x \\ \hline 100 &- 6.3x &< 0 \\ -100 &&& -100 \\ \hline -6.3x &< -100 \\ \frac{-6.3x}{-6.3} &&& \frac{-100}{-6.3} \end{aligned}$$

$$x > 15.8730159$$

$\therefore x > 15$  because talking about channels. You can't have 0.8730159 of a channel.

The monthly deal is better if more than 15 channels are purchased.

4. Two tanks drain water. The 1st holds 900L of water and drains at 16L/min. The second holds 600L and drains at 5L/min. When will the 1st tank contain less than the second.

$$\begin{aligned} x - \# \text{ of min passed} &&& \begin{array}{ccc} 1^{\text{st}} & < & 2^{\text{nd}} \\ \text{TOTAL LITRES} - \text{Drained Litres} & < & \text{Total Litres} - \text{Drained Litres} \end{array} \\ 900 - (16/\text{min})(\text{min}) &< & 600 - (5/\text{min})(\text{min}) \\ 900 - 16x &< & 600 - 5x \\ + 5x &&& + 5x \end{aligned}$$

*x* min are the unknown

$$\begin{aligned} 900 - 11x &< 600 \\ -900 &&& -900 \\ \hline -11x &> & -300 \\ \frac{-11x}{-11} &> & \frac{-300}{-11} \end{aligned}$$

$x > 27.27$  min  
The 1st tank contains less than the 2nd after 27.27 min.

Assignment: Pg. 365 #8-16