Extra Study Notes for Quiz/Module 1
Intermediate Algebra Telecourse

This module mostly deals with review topics: solving linear equations, simple inequalities, rules of exponents, compound inequalities, and verbal problems. These are the things you'll most likely need to work on:

II. Inequalities - solving an inequality is the same as solving an equation, except that when you divide (or multiply) by a negative number, the direction changes, so...

\[-2x \geq 4 \quad \text{(divide by } -2\text{, switch)} \quad x \leq -2\]
\[-6x < -2 \quad \text{(divide by } -6\text{, switch)} \quad x > \frac{-2}{-6} \quad \text{or} \quad x > \frac{1}{3}\]

\[3x \leq 12 \quad \text{(divide by } 3\text{, stay same)} \quad x \leq 4\]

Remember, when graphing inequalities, put your expression in a form with \(x\) on the left:

\[6 \leq 3 - 3x\]
\[-2 \quad -2\]
\[3 \leq -3x \quad \Rightarrow\]
\[-\frac{1}{3}\]
\[-\frac{1}{3}\]

\[1 \geq x \quad \text{which is the same as} \quad x \leq -1\]

So, drawn circle for \(\leq\) or \(\geq\)

\[\text{less than } -1\]

\[\text{closed circle for } \leq \text{ or } \geq\]
III. **Compound inequalities** – or means both conditions must be met, and means either condition must be met.

Think of or as the union of two sets, and and as the intersection, so...

\[ x < 3 \text{ or } x \geq 5 \]

is both conditions need not be satisfied.

\[ x > 3 \text{ and } x \leq 5 \]

between 3 & 5.

\[ x < 3 \text{ and } x \geq 5 \]

has no members, since no number can satisfy both of those conditions simultaneously.

III. **Literal equations** – more than one variable. Move terms without the variable to be solved for to the other side of the equation, then divide... Example:

Solve \[ 7x + 3y - 2 = rx - 8 \] for \( y \).

\[
\begin{align*}
-7x & \quad + 2 \\
3y & = rx - 7x - 6
\end{align*}
\]

Only term containing \( y \), so move other terms to right.

\[
\begin{align*}
\frac{3y}{3x} & = \frac{rx - 7x - 6}{3x} \\
y & = \frac{rx - 7x - 6}{3x}
\end{align*}
\]

IV. Verbal problems. Try to determine what the unknowns are, and represent them in terms of the same variable. For instance, if the length of a rectangle is 3 less than twice the width...

Length = \( l = 2w - 3 \) and width = \( w \). Then, set up an equation with the remaining information in the problem and solve.