

Creating Inequalities from a Context

When creating problems that involve inequalities, you will use the same methods as creating equations, except you have new keywords that will replace the equal sign with an inequality sign.

<	≤	>	≥
Less than	Less than or equal to	Greater than	Greater than or equal to
Fewer than	At most	More than	At least
	Maximum		Minimum
	No more than		No less than

Examples: Define a variable for the unknown quantity, create an inequality, and then solve.

1. One half of a number decreased by 3 is no more than 33.  
 Variables:  $x$

$$\frac{1}{2}x - 3 \leq 33$$

$$\frac{1}{2}x - 3 \leq 33$$

$$+3 \quad +3$$

$$\frac{1}{2}x \leq 36$$

$$\cdot 2 \quad \cdot 2$$

$$x \leq 72$$

$x = 71$  ✓  
 $x = 72$  ✓  
 ~~$x = 73$~~

2. Alexis is saving to buy a laptop that costs \$1,100. So far she has saved \$400. She makes \$12 an hour babysitting. What's the least number of hours she needs to work in order to reach her goal?  
 Variables:  $h = \text{hours}$

$$400 + 12h \geq 1100$$

$$400 + 12h \geq 1100$$

$$-400 \quad -400$$

$$12h \geq 700$$

$$\frac{12h}{12} \geq \frac{700}{12}$$

$$h \geq 58.3$$

~~$h = 57$~~  ✗  
 ~~$h = 58$~~  ✗  
 $h = 59$  ✓

58 hrs 30 min = 58.5h

3. Keith has \$500 in a savings account at the bank at the beginning of the summer. He wants to have at least \$200 in the account by the end of the summer. He withdraws \$25 each week for food, clothes, and movie tickets. How many weeks can Keith withdraw money from his account?  
 Variables:  $w = \text{weeks}$

$$500 - 25w \geq 200$$

$$500 - 25w \geq 200$$

$$-500 \quad -500$$

$$-25w \geq -300$$

FLIP

$$+25 \quad +25$$

$$w \leq 12$$

$w = 11$  ✓  
 $w = 12$  ✓  
 ~~$w = 13$~~  ✗

4. Yellow Cab Taxi charges a \$1.75 flat rate in addition to \$0.65 per mile. Katie has no more than \$10 to spend on a ride. How many miles can Katie travel without exceeding her limit?  
 Variables:  $m = \text{miles}$

$$1.75 + 0.65m \leq 10$$

$$1.75 + 0.65m \leq 10$$

$$-1.75 \quad -1.75$$

$$0.65m \leq 8.25$$

$$\frac{0.65m}{0.65} \leq \frac{8.25}{0.65}$$

$$m \leq 12.7$$

$m = 11$  ✓  
 $m = 12$  ✓  
 ~~$m = 13$~~