

Complete the following on an index card:
(#1 on the front, #2 on the back)

$$1. 5x - (17x - 6) \leq 78$$

$$(5x) - (17x) + 6 \leq 78$$

$$-12x + 6 \leq 78$$

$$\begin{array}{r} -12x + 6 \leq 78 \\ -6 \quad -6 \\ \hline -12x \leq 72 \end{array}$$

$$\begin{array}{r} -12x \leq 72 \\ -12 \quad -12 \\ \hline x \geq -6 \end{array}$$

1, -6, 10

$$2. 4(-2x + 6) - (3x - 5) = -4x + 8$$

$$-8x + 24 - 3x + 5 = -4x + 8$$

$$-11x + 29 = -4x + 8$$

$$\begin{array}{r} -11x + 29 = -4x + 8 \\ +4x \quad +4x \\ \hline -7x + 29 = 8 \end{array}$$

$$\begin{array}{r} -7x + 29 = 8 \\ -29 \quad -29 \\ \hline -7x = -21 \end{array}$$

$$\begin{array}{r} -7x = -21 \\ -7 \quad -7 \\ \hline x = 3 \end{array}$$

Solve:

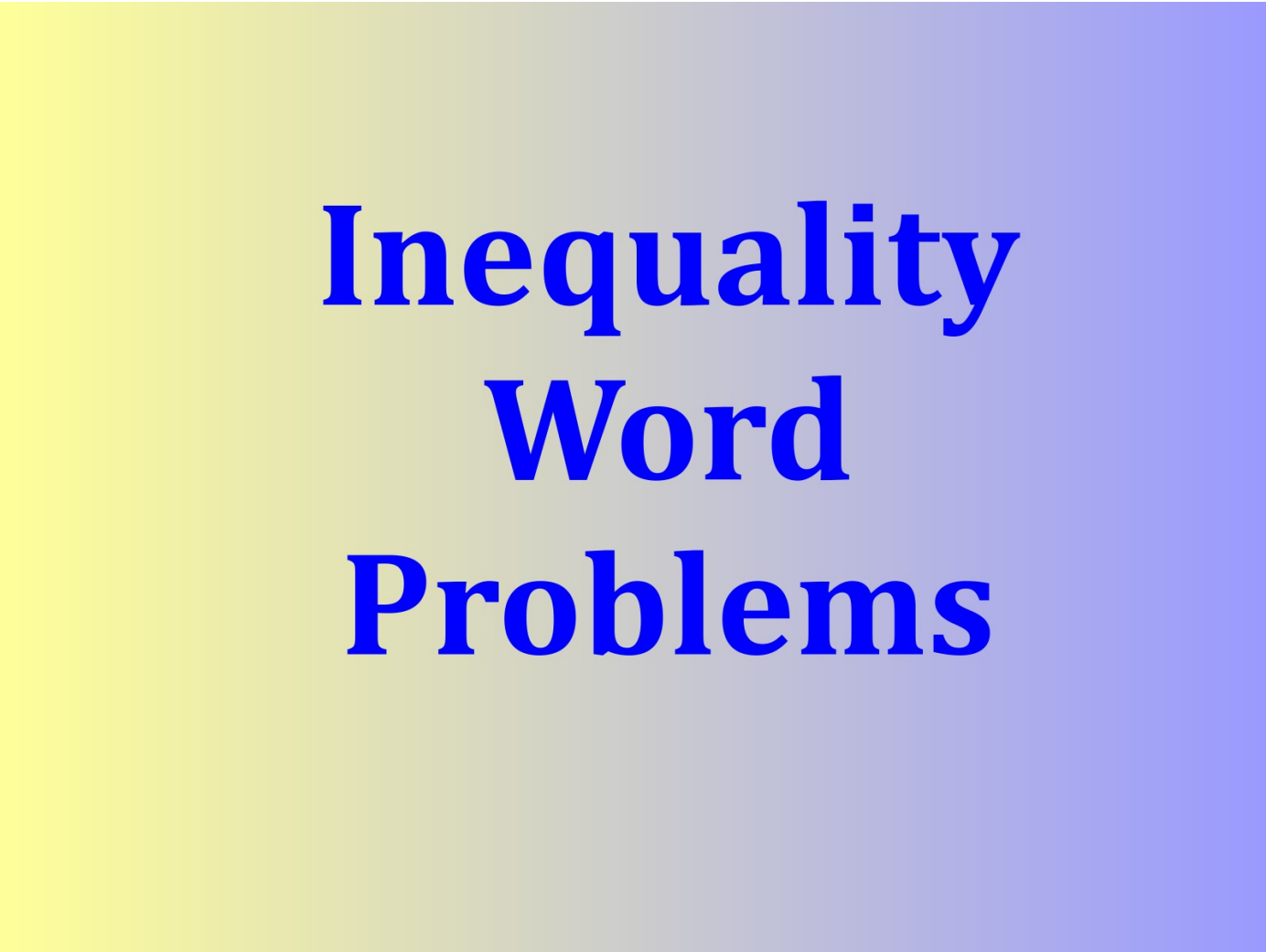
$$\begin{array}{r} x^2 + \cancel{5} = 30 \\ \quad \quad \quad \cancel{-5} \quad \cancel{-5} \\ \hline \sqrt{x^2} = \sqrt{25} \\ \boxed{x = 5} \end{array}$$

$$\begin{array}{r} 2x^2 + \cancel{10} = 28 \\ \quad \quad \quad \cancel{-10} \quad \cancel{-10} \\ \hline \cancel{2}x^2 = 18 \\ \quad \quad \quad \cancel{2} \quad \quad \quad 2 \\ \hline \sqrt{x^2} = \sqrt{9} \\ \boxed{x = 3} \end{array}$$

$$\begin{array}{r} x^2 - \cancel{12} = 37 \\ \quad \quad \quad \cancel{+12} \quad \cancel{+12} \\ \hline \sqrt{x^2} = \sqrt{49} \\ \boxed{x = 7} \end{array}$$

$$\begin{array}{r} 2x^2 - \cancel{6} = 26 \\ \quad \quad \quad \cancel{+6} \quad \cancel{+6} \\ \hline \cancel{2}x^2 = 32 \\ \quad \quad \quad \cancel{2} \quad \quad \quad 2 \\ \hline \sqrt{x^2} = \sqrt{16} \\ \boxed{x = 4} \end{array}$$

$$\begin{array}{r} \sqrt{x^2} = \sqrt{81} \\ \boxed{x = 9} \end{array}$$



Inequality Word Problems

Words for each inequality symbol

$<$ (less than)	$=$ (equal)	$>$ (greater than)
is less than	is / are / will be /only	more than
is under	is the same as	above
is below	that is equal to	over
shorter / smaller than	exactly	greater / larger than
fewer than	half (= .5* or $\frac{1}{2}$ *)	exceeds / increased
is lower than		longer than
beneath		is higher than
a better deal		

\leq (less than or equal to)	\neq (not equal to)	\geq (greater than or equal to)
at most	is not equal to	at least
maximum	is not the same as	minimum
bottom	is different / differs from	top
is no more than		is no less than

Translate the verbal sentences into an algebraic inequality.

1) x is at most 50
 $x \leq 50$

2) The sum of 5x and 2x is at least 70
 $5x + 2x \geq 70$

Check Understanding

3) The maximum value of $4x - 6$ is 54.
 $4x - 6 \leq 54$

4) 6 less than a number is greater than 4
 $x - 6 > 4$

Write an inequality and solve the problem algebraically.

1) The product of nine and x is greater than six more than the product of three and x.

$$\begin{array}{r} 9x > 6 + 3x \\ -3x \quad \quad -3x \\ \hline \end{array}$$

$$\frac{6x}{6} > \frac{6}{6}$$

$$x > 1$$

2, 5, 100

- 2) Joan needed \$100 to buy a graphing calculator for her math class. Her neighbor will pay her \$5 per hour to babysit and her father gave her \$10 for cleaning her room. What is the minimum amount of hours she will need to babysit in order for her to buy her calculator?

\geq

$x = \text{hours}$

$$\begin{array}{r} 5x + 10 \geq 100 \\ -10 \quad -10 \\ \hline 5x \geq 90 \\ \frac{5x}{5} \geq \frac{90}{5} \end{array}$$

$x \geq 18 \text{ hours}$

At least
18 hours

- 3) The dance committee hired a DJ for the fall dance. The DJ charges \$125 per hour plus \$55 for an assistant. The committee wants to keep the total cost under \$600. What is the maximum amount of hours the DJ will play at the dance?

$x = \text{hours}$

$$\begin{array}{r} 125x + 55 < 600 \\ -55 \quad -55 \\ \hline 125x < 545 \\ \frac{125x}{125} < \frac{545}{125} \end{array}$$

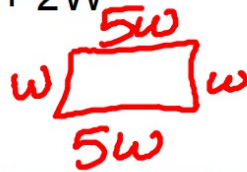
$x < 4.36 \text{ hrs.}$

At most
4 hours

4) The length of a rectangle is 5 times its width. The perimeter of the rectangle is at most 108 meters. Find the greatest possible dimensions of this rectangle. $P = 2L + 2W$

$$w = \text{width}$$

$$5w = \text{length}$$



$$\frac{12w}{12} \leq \frac{108}{12}$$

$$w \leq 9m$$

width 9m
length 45m

5) The cost per month of making n number of wooden toys is $C = 3n + 30$. The income from selling n toys is $I = 6n$. How many toys must the company make to get a profit ($I > C$)?

$$6n > 3n + 30$$

$$\begin{array}{r} 6n > 3n + 30 \\ -3n & -3n \\ \hline 3n > 30 \\ \frac{3n}{3} > \frac{30}{3} \\ n > 10 \end{array}$$

More than 10 toys