

**Translating Word Problems into Equations /
Inequalities**

There are two type of problems to be aware of:

1. Problems that compare variables to one another

-There at least twice as many girls that attend University as boys

-There is a maximum of 7 more boys than girls in this class

2. Problems that give a total / sum

-The total number of players on a mixed volleyball team is at most 15

-The dogs increased by twice as many cats is equal to 20

Steps to Follow:

Step 1 – Identify the variables in the problem

Step 2 – Highlight the key information
(numbers and operations)

Step 3 – Determine the type of problem

Step 4 – Set up the equation / inequality

Step 5 – Determine the inequality symbol

Inequality Symbol	Meaning
<	“is less than” / “fewer than”
>	“is greater than” / “more than” / exceeds
≤	“is less than or equal to” / “at most” / “no more than” / “up to” / “maximum”
≥	“is greater than or equal to” / “at least” / “no less than” / “minimum”

Example #1

Cynthia is at least 3 times the age of her brother

Step 1 – Identify the variables in the problem

X = Cynthia's Age Y = Brother's Age

Step 2 – Highlight the key information (numbers and ops)

3 times

Step 3 – Determine the type of problem

Compare type problem

Step 4 – Set up the equation / inequality

Write the equation / inequality with the variables in the order that they appear in the sentence & the number goes on the 2nd variable ALWAYS.

$$x = 3y$$

$$15 = 3(5)$$

$$\begin{array}{r} x \\ 15 \overline{) 5} \end{array}$$

Step 5 – Determine the inequality symbol based on key words

$$x \geq 3y$$

Example #2

Julie is paid at least 5 dollars more than her co-worker

Step 1 – Identify the variables in the problem

X = Julie's Money Y = Co-worker's Money

Step 2 – Highlight the key information (numbers and ops)

5 dollars more

Step 3 – Determine the type of problem

Compare type problem

Step 4 – Set up the equation / inequality

Write the equation / inequality with the variables in the order that they appear in the sentence & the number goes on the 2nd variable ALWAYS.

$$x = y + 5$$

Step 5 – Determine the inequality symbol based on key words

$$x \geq y + 5$$

Example #3

The number of instructors **increased by twice** the number of attendants is **no more than 10**

Step 1 – Identify the variables in the problem

$X = \#$ of Instructors $Y = \#$ of attendants

Step 2 – Highlight the key information (numbers and ops)

twice
equal to 10

Step 3 – Determine the type of problem

Total type problem

Step 4 – Set up the equation / inequality

Write the equation / inequality with the variables in the order that they appear in the sentence.

$$x + 2y = 10$$

Step 5 – Determine the inequality symbol based on key words

$$x + 2y \leq 10$$

Practice

Ex #4. The width of a rectangle is at most 4 times its length

x : width y : length

$$x \leq 4y$$

Ex #5. There are at most **3 times more** girls in a class than boys

x : # of girls y : # of boys

$$\begin{array}{l} 3x > y \\ 3(30) = 10 \end{array}$$

$$\begin{array}{r|l} x & y \\ 30 & 10 \\ 29 & 10 \end{array}$$

$$\begin{array}{l} x \leq 3y \\ 29 \stackrel{?}{\leq} 3(10) \end{array}$$

Ex #6. An amusement park sells more than 5 times as many adult tickets as student tickets

x : # of adult tickets y : # of student tickets

$$x > 5y$$

Ex #7. The mean mass of a man is 75kg whereas a woman is 60kg. The maximum mass that an elevator can support is 1580kg.

x : # men y : # women

$$75x + 60y \leq 1580$$

Ex #8. A financial centre hires regular staff and contract staff. Regular employees earn \$20/hr and contract employees earn \$25/hr. The center has a maximum budget of \$2000 per week. x : # hrs reg staff y : # hrs of contract

$$20x + 25y \leq 2000$$

Ex #9. The number of apples is less than one third of the number of oranges decreased by 1

x : # apples y : # oranges

$$x < \frac{1}{3}y - 1$$

Homework:

Textbook #1

P. 11 #5

P. 12 #6 & 7

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