**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

1. **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 Age Y = Brother’s Age  
  
**Step 2 – Highlight the key information (numbers and operations)**  
  
 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

**Step 5 – Determine the inequality symbol based on key words**

x ≥ 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 operations)**  
  
 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 ≥ 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 operations)**  
  
 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 ≤ 10

The number of instructors in a class is x

The number of students in the same class is y

When the number of teachers is added to twice the number of students the answer is at most 10

**This is a “Total Type” problem i.e. the 2nd type (easier)**

x + 2y ≤ 10

**Practice**

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

2) There are at most 3 times more girls in a class than boys

3) An amusement park sells more than 5 times as many adult tickets as student tickets

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

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.

The number of apples is less than one third of the number of oranges decreased by 1