

# Study Guide

## Number Relation Problems

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### Number Relation Problems

Number relation problems involve sentences that must be translated into equations.

To translate sentences, review the following phrase/number equivalences:

If x is equal to 4, then  $x = 4$

If the sum of  $2x$  and  $2y$  is 23, then  $2x + 2y = 23$

If 3 is less than twice y, then  $2y > 3$

If  $5x$  decreased by y is more than  $2y$ , then  $5x - y > 2y$

If the result of 7 more than 3 times x is y, then  $3x + 7 = y$

**Example:** One number is 2 less than another number. If twice the larger number is decreased by 3 times the smaller number, the result is 20.

Step 1: Translate the first sentence in the problem into the first equation.

Let x and y represent the unknown numbers, with y representing the larger number and x representing the smaller number.

Step 2: Translate the second sentence in the problem into the second equation.

Use x and y as in the first equation, substituting them into their respective locations in the equation.

Step 3: Substitute  $x + 2$  for y in the second equation.

Step 4: Distribute the 2 across  $(x + 2)$ .

Step 5: Combine the similar terms.

Step 6: Subtract 4 from both sides.

Step 7: Divide each side by -1 to find the value of x.

