Translating mathematical words into symbols:

decrease	minus	less than
difference	reduce	fewer
take away	separate	remain

add
sum
plus
Total

increase
mixture

Together
more

All

times
product

per
twice

of

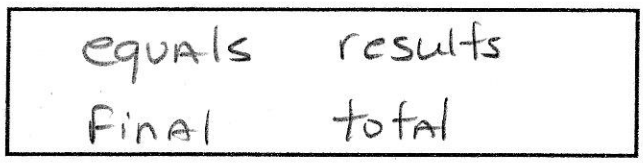
quadruple
triple

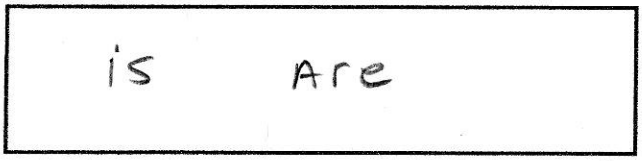
multiple

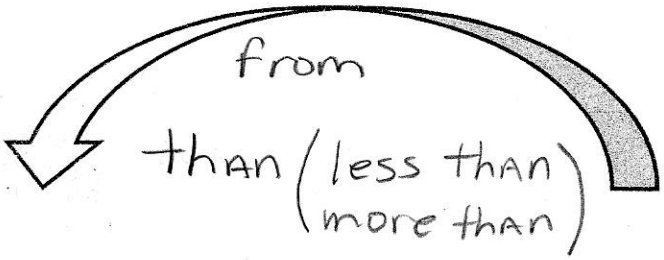
quotient
ratio

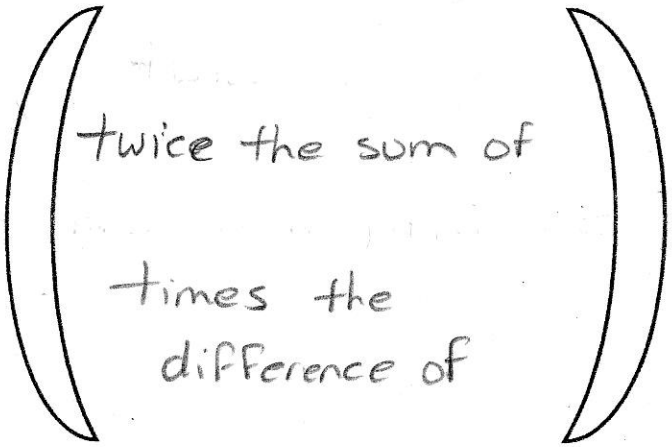
divided by
half

per









Translate into a mathematical expression:

The sum of a number and 7 $x+7$

6 more than a number $x+6$

3 plus a number $3+x$

A number increased by 5 $x+5$

2 less than a number $x-2$

12 minus a number $12-x$

A number decreased by 12 $x-12$

The difference between a number and 5 $x-5$

5 subtracted from a number $x-5$

16 times a number $16x$

One half of a number $\frac{1}{2}x$

33% of a number $.33x$

Twice a number $2x$

The product of 5 and a number $5x$

The quotient of 8 and a number $\frac{8}{x}$

A number divided by 13 $\frac{x}{13}$

The ratio of a number and 10 $\frac{x}{10}$

Tips for solving applied problems (word problems):

1. Read the entire problem
2. Read it again, pick out important information
3. Assign variables and organize information
4. write equation
5. solve equation
6. check answer, does it make sense?

EXAMPLE: Solve for the unknown number
If two is added to five times a number, then the result is equal to five more than 4 times a number. What is the number?

$$5x + 2 = 4x + 5$$
$$-4x \qquad -4x$$
$$x + 2 = 5$$
$$-2 \quad -2$$
$$x = 3$$

EXAMPLE: Solve for the unknown number
If two is subtracted from a number and that difference is tripled, the result is six more than the number. What is the number?

$$3(x-2) = x+6$$
$$3x - 6 = x + 6$$
$$-x \qquad -x$$
$$2x - 6 = 6$$
$$+6 \quad +6$$
$$\frac{2x}{2} = \frac{12}{2}$$
$$x = 6$$

EXAMPLE: Find the unknown quantities
Bon Jovi and Bruce Springsteen had two of the top grossing concert tours of 2008 and together they generated $415.3 million in tickets sales. Bruce took in $6.1 million less than Bon Jovi, so how much money did each group take in?

Bon Jovi + Bruce = 415.3

$x + x - 6.1 = 415.3$

$2x - 6.1 = 415.3$

$+6.1 \quad +6.1$

$\frac{2x}{2} = \frac{421.4}{2}$

$x = 210.7$

Bon Jovi = 210.7

Bruce = 204.6

EXAMPLE: Find the unknown quantities
In 2009, the US Senate had a total of 98 Democrats and Republicans. There were 18 fewer Republicans than Democrats. How many of each party were in the senate?

Dem + Rep = 98

$x + x - 18 = 98$

$2x - 18 = 98$

$+18 \quad +18$

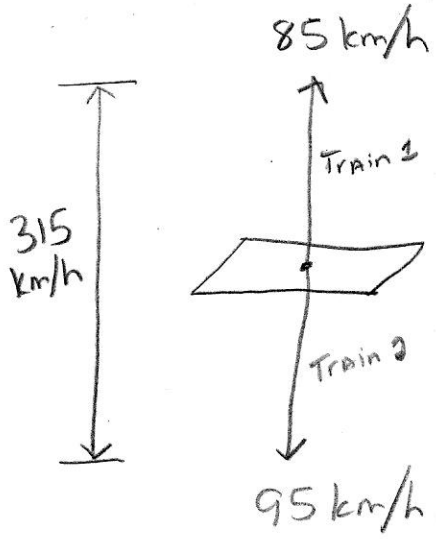
$\frac{2x}{2} = \frac{116}{2}$

$x = 58$

Dem = 58

Rep = 40

EXAMPLE: distance, rate, and time
A train leaves Nashville traveling north at 85 km per hour. At the same time, another train leaves Nashville traveling south at 95 km per hour. How long will it take until the two trains are 315 km apart?



$d = rt$

total distance = north Train + south Train

$315 = 85t + 95t$

$\frac{315}{180} = \frac{180t}{180}$

$1.75 = t$

hours

EXAMPLE: Mixture problems: Investing Money
John earned $12,000 last year from one of his jobs. He invested part of that money in a bond with a 3% interest rate. The rest of the money he invested in a CD at a 4% interest rate. He earned $440 back from his investments. How much money was invested at each interest rate?

3% investment + 4% investment = 440

$.03(x) + .04(12{,}000 - x) = 440$

$100\left[.03x + 480 - .04x = 440\right]$

$3x + 48000 - 4x = 44000$

$-1x + 48000 = 44000$

$-48000 \quad -48000$

$\frac{-1x}{-1} = \frac{-4000}{-1}$

$x = 4000$

3% = 4,000

4% = 8,000

STOP