Word Problems 1

1. Solving math word problems:

There are two steps to solving math word problems:

- Translate the wording into a numeric equation that combines smaller "expressions"
- Solve the equation!

Math expressions (examples): after you review the keywords, test yourself

addition: 5 + x	subtraction: 5 - x
multiplication: 5*x; 5x	division: 5 ÷ x; 5/x

1) Key words for addition +:

increased by; more than; combined together; total of; sum; added to ("mouse over" the block for answer)

What is the sum of 8 and y?	8 + y
Express the number (x) of apples increased by two	x + 2
Express the total weight of Alphie the dog (x) and Cyrus the cat (y)	x + y

2) Key words for Subtraction - :

less than, fewer than, reduced by, decreased by, difference of

What is four less than y	y - 4
What is nine less than a number (y)	y - 9
What if the number (x) of children was reduced by 6?	x - 6
What is the difference of my weight (x) and your weight (y)	x - y

3) Key words for multiplication * x or integers next to each other (5y, xy):

of, times, multiplied by

What is y multiplied by 13	13y
Three runners averaged "y" minutes. Express their total running time:	3y
I drive my car at 55 miles per hour. How far will I go in "x" hours?	55x

4) Key words for division /

per, a; out of; ratio of, quotient of; percent (divide by 100)

What is the quotient of y and 3	y/3
Three students rent an apartment for $ "x" /month. What will each have to pay?	x/3
"y" items cost a total of $25.00. Express their average cost:	25/y

5) More vocabulary and key words:

- "Per" means "divided by"
  as "I drove 90 miles on three gallons of gas, so I got 30 miles per gallon."
  (Also 30 miles/gallon)
- "a" sometimes means "divided by"
  as in "When I filled up, I paid $10.50 for three gallons of gasoline,
  so the gas was 3.50 a gallon, or $3.50/gallon
- "less than"
  If you need to translate "1.5 less than x", the temptation is to write "1.5 - x". DON'T! Put a "real world" situation in, and you'll see how this is wrong: "He makes $1.50 an hour less than me." You do NOT figure his wage by subtracting your wage from $1.50.
  Instead, you subtract $1.50 from your wage
- "quotient/ratio of" constructions
  If a problems says "the ratio of *x* and *y*",
  it means "*x* divided by *y*" or x/y or x ÷ y

- "difference between/of" constructions
  If the problem says "the difference of *x* and *y*",
  it means "*x* - *y*"

What if the number (x) of children was reduced by six, and then they had to share twenty dollars? How much would each get?	20/(x - 6)
What is 9 more than y?	y + 9
What is the ratio of 9 more than y to y?	(y + 9)/y
What is nine less than the total of a number (y) and two	(y + 2) - 9 or y - 7
The length of a football field is 30 yards more than its width "y". Express the length of the field in terms of its width y	y + 30

Example

Constable Bob is driving along the Trans-Canada Highway at 100 km/h. He is passed by Melissa who is driving in the same direction at a constant speed. Ten seconds after Melissa passed Bob, their cars are 100m apart. What is the speed of Melissa's car in km/h?

Solution

Bob's speed

(100km/h) * (1h/3600sec) * (1000m/km) = 27.7778m/sec
In 10s Bob travels 10s * 27.7778m/sec=277.778m

Therefore Melissa must have travelled 277.778 m + 100m = 377.778m
Melissa's speed is 377.778m/10s=37.7778m/s

(37.7778m/s) * (1km/1000m) * (3600s/1h) = 136.00km/h

Melissa got a very big speeding ticket.

►Questions in class:

1. Four children find a bag of marbles and divide them among themselves. Each child takes a different number of marbles and no child has more than twice as many marbles as anyone else. What is the smallest possible number of marbles in the bag?

2. A box contains marbles, one-third of which are red, eighteen are green, and the remainder blue. After six blue marbles are added to the box, it is found that one-half of the marbles are blue. How many marbles were originally in the box?

3. It takes 880 drops of water to fill two teaspoons and 3 tablespoons. One tablespoon contains three teaspoons. How many drops of water does it take to fill one tablespoon?

4. Twenty-eight students in a class each select 2 gloves from a box containing red and green gloves. If 20 students have gloves that are both the same colour, how many students have at least one green glove?
(A) 8 (B) 15 (C) 20 (D) 28 (E) Not enough information

5. In the game of Martian Ball, scores are made in two ways: Kick and Throw. A Kick is worth three times as much as a Throw. Which of the following scores cannot be worth as much as 12 Kicks and 7 Throws?

(A) 1 Kick 40 Throws (B) 3 Kicks 34 Throws (C) 6 Kicks 24 Throws
(D) 13 Kicks 4 Throws (E) Not enough information

6. Paul is one-third of the way up a flight of stairs. If he climbs 11 more steps, he will be half way up. What is the number of steps in the flight?

7. If 6 men take 10 hours to plant 80 trees and if it takes two children to do the work of a single man, how many trees will a team of three men and 3 children plant in 5 hours?

8. A crate filled with empty bottles weighs 2 kg. The empty crate weighs 1.6 kg less than the bottles. How much does the empty crate weigh?

9. If Alphonse can shovel a walk in 2 hours and Beatrice can shovel the same walk in 1 hour, how many minutes will it take for them to shovel the walk together?

10. Martin ate 100 cookies in five days. Each day he ate 6 more than the day before. How many cookies did he eat on the first day?

11. In a country of Mathematics, the population consists entirely of mathematicians and politicians. Mathematicians always tell the truth and politicians always lie. One day, 3 persons A, B, and C meet. A whispers to B one of these two statements: ``I am a mathematician" or ``I am a politician." B turns to C and tells him that A claims to be a mathematician. Outraged, C replies that A is not a mathematician, but a politician. How many of these three people are mathematicians?

12. In a farm there are hens (no bump, 2 legs), camels (two bumps, four legs) and dromedaries (one bump, four legs). If the number of legs is 4 times the number of bumps, then the number of hens divided by the number of camels will be?