Algebra Word Problems
Part 3
Algebra in everyday use
Inequalities

- Inequalities are values that are no more than or no less than a particular value.
- We say less than or equal to – or – greater than or equal to.

≤ ≥
To make copies of blueprints, Vantage Reprographics charges a $5 setup fee plus $4 per copy. Myra can spend no more than $65 for the copying. What number of copies will allow her to stay within budget?

- How to set up the problem:
  
  \[ \frac{x}{4} = 65 - 5 \]
  
  The $5 setup fee is a one time charge, so deducted from the total. After that, it is just $4 per copy.

  \[ X = \frac{60}{4} \]

  \[ X = 15 \]

  The answer is 15 or fewer copies.

  \[ X \leq 15 \]
We can spend no more than $450 for a banquet. There is a $40 setup fee plus $16 per person. What is the max number of attendees?

- Again, the $40 setup fee is a one time charge.
- \( \frac{x}{16} = 450 - 40 \)
- \( \frac{x}{16} = 410 \)
- \( X = 25.625 \)
- Since we cannot have \( \frac{1}{2} \) of a person, the maximum number of attendees will be 25.
It costs $3.00 each time a person calls an overseas customer. If the typical call costs $.75 plus $.45 for each minute, how long do the calls normally last?

- \[ \frac{x}{.45} = 3.00 - .75 \]
- \[ \frac{x}{.45} = 2.25 \]
- \[ x = 5 \]
- The calls normally last 5 minutes
It costs at least $2.20 each time you park in the parking garage. If the garage charges $.45 plus $.25 for each half hour, how long do you normally leave your car parked in the garage.

- In this example, be sure to watch your units!!!
- \( x/0.25 = 2.20 - 0.45 \)
- \( x/0.25 = 1.75 \)
- \( x = 7 \)
- 7 is the amount of ½ hour segments; therefore, the answer is 3 ½ hours.
Financial aid stipulates that your tuition cannot exceed $1000. Your college charges a $35 registration fee plus $375 per course. What is the maximum number of courses you can register for?

- \( \frac{x}{375} = 1000 - 35 \)
- \( \frac{x}{375} = 965 \)
- \( x = 2.5 \)

You cannot register for more than 2 courses seeing that there is not a half of a course.
You are taking a course where 4 tests are given. To get a B, you must average at least 80 on the four tests. You have scored 82, 76 and 78 on the first three tests. What must you at least score on the 4th test to earn a B?

- \( \frac{82 + 76 + 78 + x}{4} = 80 \)
- \( \frac{236 + x}{4} = 80 \)
- \( 236 + x = 320 \)
- \( x = 320 - 236 \)
- \( x = 84 \)

You must score at least an 84 to maintain a B average.
Your quiz grades are 73, 75, 89 and 91. What must you score on the 5\textsuperscript{th} exam to maintain an 85 average?

\begin{align*}
(73+75+89+91+x)/5 &= 85 \\
(328 + x)/5 &= 85 \\
328 + x &= 85 \times 5 \\
328 + x &= 425 \\
x &= 425 - 328 \\
x &= 97
\end{align*}
George and Joan do volunteer work at a hospital. Joan worked 3 more hrs. than George and together they worked more than 27 hrs. About how many hours did each work?

- Let George be \( x \) and Joan be \( x + 3 \)
- \((x) + (x+3) = 27\)
- \(2x + 3 = 27\)
- \(2x = 24\)
- \(x = 12\)
- George worked about 12 hours and Joan about 15 hours
- Or, \((12 + 15)/2 = 27/2 = 13.5\) or they worked about 13.5 hrs each.
A person is considered to be feverish when their temp is higher than 98.6°F. To convert to celcius, use \( F = \frac{9}{5}C + 32 \). At what temperature Celsius is a person feverish?

- \( 98.6 = \frac{9}{5} C + 32 \)
- \( \frac{9}{5} C = 98.6 - 32 \)
- \( \frac{9}{5} C = 66.6 \)
- \( 9C = 66.6 \times 5 \)
- \( 9C = 333 \)
- \( C = 37 \)

If the person’s temperature rises above 37° C, they are running a temperature.
Reduced fat peanut butter contains 12 g of fat per serving. For a food to be labeled “reduced fat,” it must have at least 25% less fat than the regular item. What can you conclude about the number of grams of fat in a serving of regular peanut butter?

- \[12 = x \times 0.75\]
- \[x = \frac{12}{0.75}\]
- \[x = 16\]

Regular peanut butter must contain at least 16 grams of fat per serving.
Reduced fat chocolate chip cookies have 5g of fat per serving. How much is in the regular cookies?

- \( X \times .75 = 5 \)
- \( X = \frac{5}{.75} \)
- \( X = 6.66 \)
- There must be at least 6.66 grams of fat in the regular chocolate chip cookies.
Conclusion

- I hope you now see that we use algebra in normal everyday decision making.
- Algebra makes it easier to discover information and helps us to make important choices in our day to day living.
- As with all things.....use it or lose it!