Essential Question: How do we set up and solve word problems?

Do Now: Solve the following problems using any method. Show all work.

1. Twice a number decreased by 5 is 7. Find the number.

$$x = \text{a number} = 6$$
$$2x - 5 = 7$$
$$2x = 12$$
$$x = 6$$

2. Fred saves $\frac{2}{3}$ as much as John. John saves 5 times as much as Mary. Together, all three save $14.00. How much does each person save?

$m = $ amount of money Mary saved $= 1.50$

$5m = $ amount of money John saved $= 7.50$

$\frac{2}{3}(5m) = $ amount of money Fred saved $= 5$

$$m + 5m + \frac{2}{3}(5m) = 14$$
$$3(6m + \frac{2}{3}(5m)) = 14 \cdot 3$$
$$18m + 10m = 42$$
$$28m = 42$$
$$m = 1.5$$

3. One number is 4 more than another number. Three times the larger number equals 4 times the smaller number. Find both numbers.

$x = $ smaller number

$(x+4) = $ larger number

$$3(x+4) = 4x$$
$$3x + 12 = 4x$$
$$12 = x$$

Problem Solving Method: *An Algebraic Approach*

1) Define all unknowns

2) set up an equation relating all unknowns

3) solve

4) answer the question in words
   (use appropriate units)

Examples:

1. The length of a rectangle is three times its width. The perimeter is 50 feet. Find the length and width of the rectangle.

   Let x = width

   3x = the length

   $2(x) + 2(3x) = 50$

   $2x + 6x = 50$

   $8x = 50$

   $x = 6.25$ width: 6.25 feet length: 18.75 feet

2. Thirty-five is 15 less than a number. Find the number.

   Let x = the number

   $35 = 2x - 15$

   $50 = 2x$

   $25 = x$ number is 25

3. Jerry's age is $\frac{1}{3}$ of Pete's age. The sum of their ages is 24 years. How old is each person?

   Let x = Pete's age

   $\frac{1}{3}x$ = Jerry's age

   $x + \frac{1}{3}x = 24$

   $\frac{4}{3}x = 24$

   $x = 18$ Pete: 18 years old, Jerry: 6 years old

4. A phone call costs $0.80 for the first minute and $0.25 for each additional minute. The total cost of the call is $3.30. How long did the call last?

   Let x = additional minutes $.80 + .25x = 3.30$

   $.25x = 2.50$

   $x = 10$ the call lasted 11 minutes

5. Dan wanted to cash his paycheck for an equal number of $5, $20 and $50 dollar bills. How many of each kind will he get if his check is $450?

   Let x = the number of bills of each denomination $5x + 20x + 50x = 450$

   $75x = 450$

   $x = 6$ 6 of each bill

6. Ashley has $880 in her savings account. If she saves $35 per week, how long will it take for her to save $2000?

   Let x = the number of weeks

   $880 + 35x = 2000$

   $35x = 1120$

   $x = 32$ 32 weeks

7. The total cost of a sandwich, drink and an apple is $3.50. The drink costs one and a half times as much as the apple. The sandwich costs $2.00. What is the price of one drink and one apple?

   Let x = price of apple

   $2 + x + 1.5x = 3.50$

   $1\frac{1}{2}x$ = price of drink

   $2 + 2.5x = 3.50$

   $2.5x = 1.50$

   $x = .60$ apple is $.60 and drink is $.90