Lesson 14 ~ From Problems to Equations

Many problems can be transformed into equations.
To transform them you must:

Step 1 - Identify the unknown quantity or quantities. ?? what "X"?

example #1 The sum of Claude and Jean's ages is 52 years. Jean is 10 years older than twice Claude's age. Determine Claude and Jean's ages.

What THINGS are we talking about?????

Claude's age   Jean's age

Step 2 - Represent each unknown with a variable or algebraic expression.

The sum of Claude and Jean's ages is 52 years. Jean is 10 years older than twice Claude's age. Determine Claude and Jean's ages.

Plain old "X"

Claude	Jean
X	$2X + 10$

Step 3 - Form an equation.

$+ - \times \div$
$=$

The sum of Claude and Jean's ages is 52 years. Jean is 10 years older than twice Claude's age. Determine Claude and Jean's ages.

$$C + J = 52$$
$$X + 2X + 10 = 52$$

Step 4 - Solve.

$$3X + 10 = 52$$
$$3X = 52 - 10$$
$$3X = 42$$
$$X = 14$$

Step 5 - Express and verify the solution.

The sum of Claude and Jean's ages is 52 years. Jean is 10 years older than twice Claude's age. Determine Claude and Jean's ages.

$$Claude = X = 14$$
$$Jean = 2X + 10 = 38$$
$$(14)$$

video clip
solve PS
equations

Claude 14 yrs.
Jean 38 yrs.

1

5 less than the product of 3 and a number is 19. What is the number?

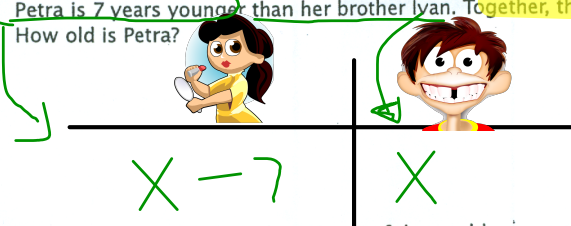Masa wants to rent a motor scooter. It costs $10.00, plus $4.25/h. He has $27.00. How many hours can he afford?

The cost for a bus to cross the bridge is $5.00 for the bus and driver, plus $1.25 for each passenger. Including the driver, how many can cross the bridge for $15.00?

Lesson 14 continued ....

2. Petra is 7 years younger than her brother Ivan. Together, their ages total 43 years. How old is Petra?

$$P + I = 43$$
$$X - 7 + X = 43$$
$$2X = 50 \quad X = 25$$

$$X - 7 \quad | \quad X$$

Petra is $X - 7$
$$25 - 7$$
$$18$$

3. There are 43 marbles in a box. Some of the marbles are yellow, and the rest are blue. There are 9 more yellow marbles than blue marbles. How many blue marbles are in the box?

$$+ \quad \blacksquare = 43$$

$$X + 9 \quad | \quad X$$
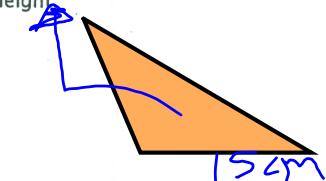
$$X + 9 + X = 43$$
$$2X + 9 = 43$$
$$2X = 34$$
$$X = 17 \quad \text{blue}$$

4. Twice a number increased by three is the same as four less than three times the same number. What is the number?

$$\boxed{2X + 3} \quad = \quad \boxed{3X - 4}$$

$$X = 7$$

5. A triangle has an area of 60 cm². If one of its bases is 15 cm long, determine the corresponding height.

15 cm

$$A = \frac{b(h)}{2}$$
$$60 = \frac{15h}{2}$$
$$h = 8$$

6. The sum of 3 consecutive odd numbers is 147. What are these numbers?

Jump by 2

first	second	third
X	X + 2	X + 4 = 147

$$X = 47$$
$$X + 2 = 49$$
$$X + 4 = 51$$

7. A number is 3 more than twice another number. The sum of these numbers is 75. What are the two numbers?

a number	the other number
2x + 3	X

$$2X + 3 + X = 75$$
$$3X = 75 - 3$$
$$3X = 72$$
$$X = \frac{72}{3}$$
$$X = 24$$

Answer
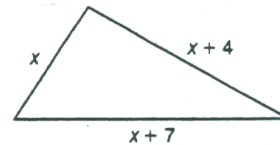$$X = 24$$
$$2X + 3 = 51$$
$$(24)$$

L.14 Practice

Writing and Solving Two-Step Equation Word Problems

Real-life situations can often be described in terms of mathematics. All of the problems in this activity relate to daily occurrences.

Directions: Identify the variable in each of the descriptions below. Write and solve an equation for each one.

1) The sum of three consecutive numbers is 72. What are the smallest of these numbers?

2) You bought a magazine for $5 and four erasers. You spent a total of $25. How much did each eraser cost?

3) How old am I if 400 reduced by 2 times my age is 244?

4) In a class of 30 students, there are 6 more girls than twice the number of boys. Let x represent the number of boys.

5) The sum of three numbers is 81. The second number is 4 times the first. The third number is 3 more than the first. What are the three numbers?

6)

The perimeter of the triangle is 74 cm. Find the length of each side.