Section 1.2 Addition with Whole Numbers and Perimeter

1. Review Addition Facts and Algorithm: Please review your addition facts and the addition algorithm (the process for adding numbers).

2. Vocabulary: If a and b are any two numbers, then the sum of a and b is a + b. To find the sum of two numbers, we add them.

English words	Math symbols
the sum of a and b	a+b
the sum of 4 and 8	
the sum of y and 2	
8 more than 9	
5 more than x	
y increased by 5	

Example: Translate each English phrase into math symbols.
a. the sum of b and 10

b. the sum of p and q

c. p increased by 5

d. 7 more than z

Example: Find the sum of 10 and 18.

3. Properties of Addition: The three properties of addition are:
- the addition property of zero
- the commutative property of addition
- the associative property of addition.

These properties are stated below. On the first test, you may be asked to state these properties in proper mathematical vocabulary. You should memorize them as given below.

Addition property of zero: If a is any number, then it is true that
$$a + 0 = 0 + a = a$$
Commutative property of addition: If a and b are any two numbers, then it is true that:
$$a + b = b + a$$
Associative property of addition: If a, b, and c are any three numbers, then it is true that:
$$(a + b) + c = a + (b + c)$$

Example: Rewrite each of the following using the addition property of zero.

a. $5 + 0 = 0 + 5 = 5$

b. $z + 0 =$

Example: Rewrite each of the following using the commutative property of addition.

a. $5 + 7 = 7 + 5$

b. $z + 8 =$

c. $2 + (4 + 5) =$

d. $x + (z + 9) =$

Example: Rewrite each of the following using the associative property of addition.

a. $3 + (5 + 8) = (3 + 5) + 8$

b. $z + (x + 6) =$

c. $y + (p + 4) =$

Example: Name the addition property or properties used in each of the following.

a. 4 + (5 + 6) = (4 + 6) + 5 (both comm. and assoc. prop. of addition are used since both order and grouping change)

b. (x + 2) + 8 = x + (2 + 8)

c. y + (5 + 4) = y + (4 + 5)

d. x + (4 + 7) = (x + 7) + 4

4. Solving Equations By Simplifying and Then Guessing the Answer: In the given equations, first use the properties of addition to simplify, then "guess" the solution.

Example: Simplify and solve:

a. n + 3 = 8

        n = 5   guess the solution

b. (x + 4) + 5 = 12   given equation

     x + (4 + 5) = 12   associative prop. of addition

        x + 9 = 12   addition facts

          x = 3   guess the solution

c. 5 + (6 + x) = 14 + 2

5. Polygons: A polygon is any closed geometric figure, with at least three sides, in which each side is a straight line. Figures such as rectangles, squares, triangles and octagons are all polygons. A circle is not a polygon since it doesn't have "sides" that are straight lines.

6. Perimeter: The perimeter of any polygon is the sum of the lengths of the sides, and it is denoted with the letter P. To find the perimeter of a polygon, first label the sides with letters starting with the letter a, and then write the formula for the perimeter by writing P = a + b + .. , expressing P as the sum of all of the letters representing the sides. Next plug in the known values for the sides, and lastly find the sum to get the perimeter. Be sure to attach the correct units to your answer.

Example: Find the perimeter of a triangle with sides 5 ft, 11 ft. and 21 ft. Write the formula, plug in the known values, and find the perimeter.

P = a + b + c	Since there are three sides, you need three letters to represent the sides.
P = 5 + 11 + 21	Plug in the known values.
P = 37 ft.	Find the sum to get the perimeter. Attach the correct units.

Example: Find the perimeter of the given figure. Write the formula, plug in the known values, and find the perimeter

7 ft.   13 ft.

2 ft.

22 ft.
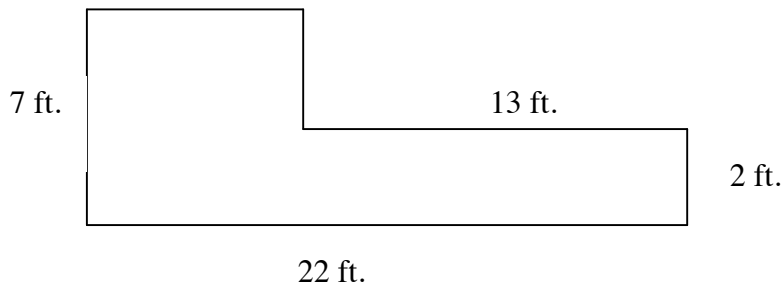
This figure has _____ sides. Write the formula for the perimeter.

Notice that the lengths of two of the sides are not given. Locate the horizontal sides. There are _____ horizontal sides. The sum of the two short horizontal sides must equal the length of the longest horizontal side. The longest horizontal side has length _____. One of the shorter horizontal sides has length _____. What is the length of the third horizontal side? _____

Use this same principle to find the vertical side that does not have a given length.
Now the lengths of all the sides are known. Plug those lengths into the formula, and then add them to find the perimeter.