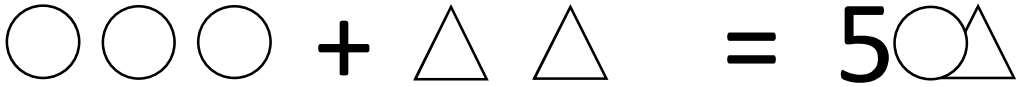
R.E.A.L. Math 1010 Supplemental Activity Name: _____
S5 Add Like Things

1. Discuss in your group why this is true

but this is not.



2. When you add whole numbers together such as 438 + 56, why can't you add the 5 to the 4 ?

3. Why do we line up the decimal point when we add 43.056 + 2.4 ?

4. Why do we have to find a common denominator to add $\frac{2}{3} + \frac{5}{6}$ ?

There is one answer to all of these questions. That is: we can only "add like things." Understanding the "add like things" principle makes algebra much easier to learn. When we add like things we are maintaining equivalence.

5. Circle the following items that are like things and can be added and Explain why or why not for each item. Add or subtract those that are like things.

a) $2x^5 + 5x^5$

b) $\sqrt[3]{x} + \sqrt[5]{x}$

c) $\frac{x}{3} + \frac{x}{6}$

d) $5i + 13i$

e) $xy^2 + x^2y$

f) $\sqrt{2x} + \sqrt{x}$

g) $\frac{2x}{3} + \frac{x}{3}$

h) $7 + 4i$

i) $\sqrt[3]{x^2} + 4\sqrt[3]{x^2}$

j) $\frac{4x}{x-2} - \frac{3x}{x-2}$

6. a) Why are $\frac{2}{3} + \frac{5}{6}$ not like things?

b) How do we make $\frac{2}{3} + \frac{5}{6}$ like things? Why can we do that? Which mathematical properties make that possible?

c) What name do we give to two fractions that look different, but have the same value? Give an example.

7. What would be the common denominator of the following pairs of rational expressions.

a) $\frac{1}{x^2y}$ and $\frac{3}{4y^2}$

b) $\frac{2}{x-1}$ and $\frac{4}{x+1}$

8. Using the Multiplicative Inverse and Identity Properties, convert each fraction to its equivalent fraction and add the two fractions. Explain the properties used to convert each fraction.

$\frac{1}{x^2y}$ and $\frac{3}{4y^2}$

$\frac{2}{x-1}$ and $\frac{4}{x+1}$

9. A expression that has real number coefficients and non-negative exponents is called a polynomial expression. Label the following expressions with all of the following words that apply to each:

Polynomial, Monomial, Binomial, Trinomial

a) $x^4y^3$ _____

b) $x^4 + y^3$ _____

c) $x^4 + y^3 - z$ _____

d) $x^4 + xy^3 + yz - 4$ _____

**Adding and Subtracting Polynomial Expressions and Polynomial Functions**

Polynomial expressions that have just one variable can also be functions.
The expression $x^4 + 2x^3 - 7x^2 + x - 5$
can also be a function represented as $p(x) = x^4 + 2x^3 - 7x^2 + x - 5$. Functions are like things that can be added together.

7. Consider a homeowner who needs to improve the soil for growing flowers in her yard. She identifies two soil amendments needed to turn her existing dirt into the perfect soil for growing beautiful flowers. She needs equal amounts of each amendment which are sold by the cubic yard. Peat moss is $32 per cubic yard and composted manure is $49 per cubic yard. The total cost for the amendments, based on the number of cubic yards needed, can be calculated two different ways.

a) What are the two different ways to calculate the total cost?

b) If $f(x) = 32x$ and $g(x) = 49x$, what is $(f + g)(x)$?

8. The profit earned from the sale of a product or service is calculated by subtracting the cost to produce the product or service from the total revenue, money collected by selling the product or service. Revenue and cost are functions of the number of product or services sold. A farm that makes and sells bars of goat milk soap. The function representing the cost to make a bar of soap is $c(x) = 3.25x + 125$. The revenue function is $r(x) = 6.75x$.

a) Write the equation of functions that represent the profit based on making and selling x bars of soap.

b) What is the profit function?

9. Because we can add like things, we can add (or subtract) polynomial functions. For the following functions find $(f + g)(x)$ and $(g - f)(x)$:
a) $f(x) = 12x^2 + 3x - 5$
b) $g(x) = 7x + 9$