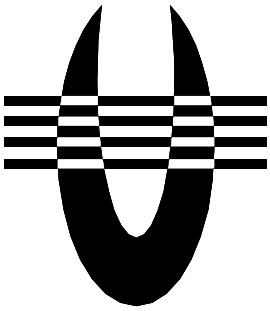
JUST FOR FUN

Use logical reasoning to answer the questions below.

1. How many four-cent postal cards are there in a dozen?	2. How far can you walk into a forest?	3. How much dirt is there in a hole that is three feet wide, four feet long, and two feet deep?
4. There was a blind beggar who had a brother, but this brother had no brothers. What was the relationship between the two?	5. Rearrange the letters of NEW DOOR to make one word.	6. If six glasses are arranged in a straight line and the first three are full of water and the last three are empty, what is the fewest number of glasses that can be moved so that the glasses alternate: empty, full, empty…?
7. Horace claimed that "2 x 10 = 2 x 11" is a true statement. What was his explanation?	8. What do all of the following words have in common? *deft hijack calmness* *canopy laughing first* *stupid crabcake*	9. A train that is one mile long traveling at 60 mph enters a tunnel that is one mile long. How long until the train is out of the tunnel?
10. Divide 30 by $\frac{1}{2}$ and add 10. What is your answer?	11. What mathematical symbol can be placed between 2 and 3 so that the resulting expression names a number between 2 and 3?	12. A student correctly shows that $\frac{1}{2}$ of 12 is seven. How?

Exploring Linear & Non-Linear Relationships



Objectives:

The learner will:

- analyze situations and formulate systems of equations to solve problems.

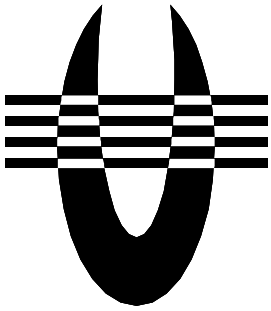
- investigate methods for determining the solution sets for systems of linear equations using and translating among concrete models, graphs, algebraic representations, and verbal models.

- explore the parent quadratic function using tabular and graphic methods, determine the effect of parameter changes on the parent graph, and analyze real-world situations modeled with quadratic functions.

- simplify and perform operations on powers, and identify and simplify polynomials, performing the operations of addition, subtraction, and multiplication.

Activity I

Brainstorm different linear situations we can graph on the same graph.



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Activity II

Compare the speed you write with your right hand to the speed you write with your left hand by writing one letter in each box on the next page. Use the letters "T" and "X" which represent TX (capital letters).

Right Hand Data

Time (s)					
# of squares completed					

Left Hand Data

Time (s)					
# of squares completed					

Activity II cont…

Discussion Questions:

1. What's the best way to compare these two sets of data?

2. What type of graph should we use?

3. Should we have (0,0) on our graph?

4. Examine your data, what type of graph would best represent your data?

5. What are some similarities and differences with your data?

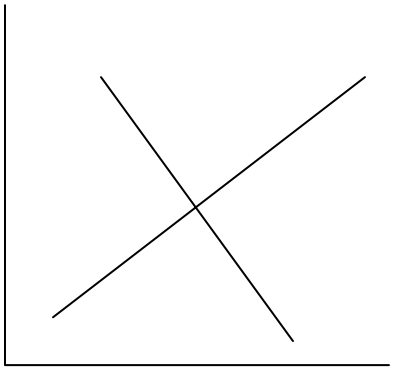
6. Is there an intersecting point for the graphs?

7. Is it possible for the graphs to have more than one intersecting point?

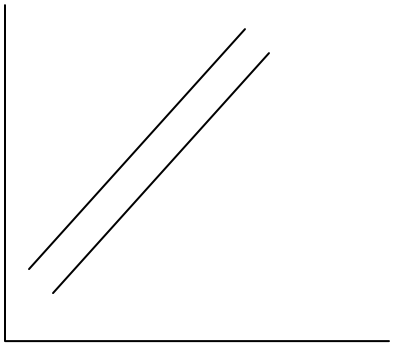
Activity III

Examine the graphs below and record your observations

1.



2.



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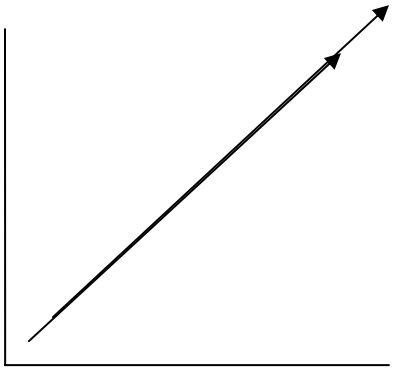
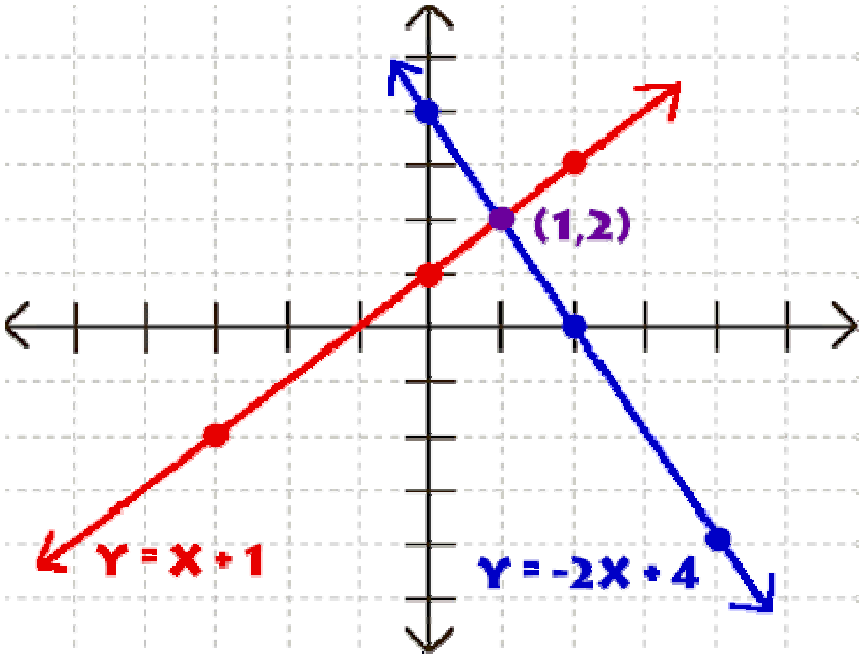


Activity IV

Create a story problem for the graph illustrated



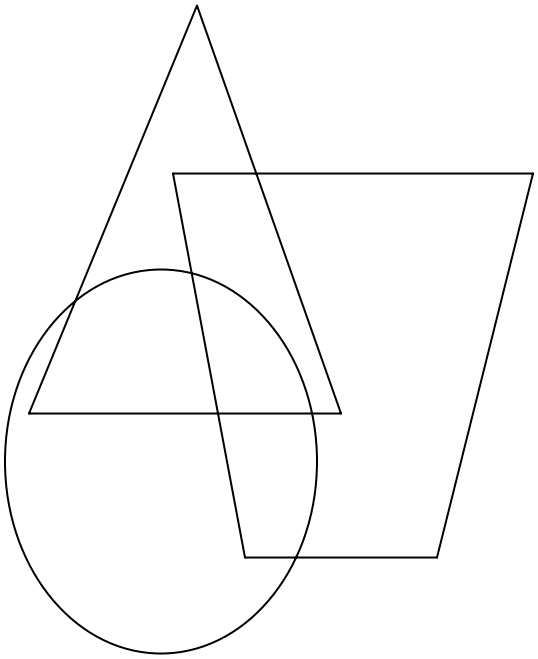
Activity V

Place the numbers from 1 – 15 in the appropriate place according to the following rules:

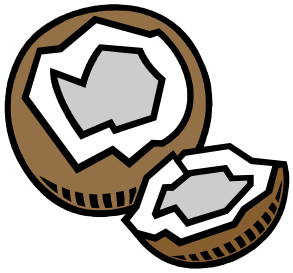
1. All even numbers must be inside the triangle.

2. All odd numbers must be inside the ellipse.

3. All multiples of 5 must be inside the trapezoid.



Basket of Coconuts



Work with your group to solve this problem. You may solve it using any strategy.

1. Five baskets contain coconuts. The first and second baskets together have a total of 52 coconuts. The second and third baskets have 43 coconuts. The third and fourth baskets have 34 coconuts. The fourth and fifth baskets have 30 coconuts. And the first and fifth baskets have 47 coconuts. How many coconuts are in each basket?

2. Solve the problem another way. Describe how this method is similar to or different from the method you used in problem 1.

Examining Quadratic Functions
(Graphing)

Use the vertex form $a(x-h)^2+k$ to examine the role of "a", "k", and "h" in quadratic functions. Graph the functions on graph paper using different colored dots to plot each function and by using the colored wire to connect the dots.

Set 1

$y_1 = x^2$
$y_2 = 2x^2$
$y_3 = 4x^2$
$y_4 = 6x^2$
$y_5 = 3x^2$

Set 2

$y_1 = x^2$
$y_2 = x^2 + 2$
$y_3 = x^2 - 3$
$y_4 = x^2 + 5$
$y_5 = x^2 - 6$

Set 3

$y_1 = x^2$
$y_2 = (x+2)^2$
$y_3 = (x-4)^2$
$y_4 = (x-6)^2$
$y_5 = (x+3)^2$

Set 4

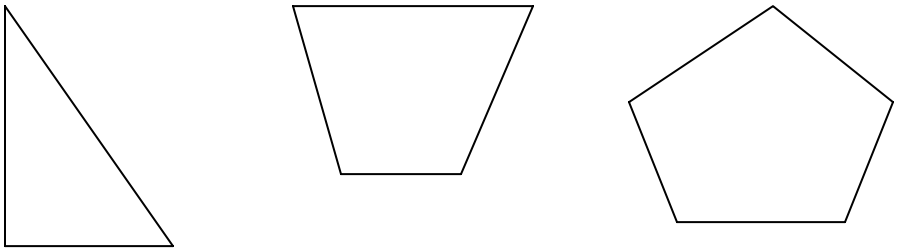
$y_1 = x^2$
$y_2 = -x^2$
$y_3 = 5x^2$
$y_4 = -5x^2$

Set 5

$y_1 = x^2$
$y_2 = (x+2)^2$
$y_3 = (x-4)^2$
$y_4 = 2(x-4)^2$
$y_5 = -2(x-4)^2 - 3$

Polygons & Diagonals

Jake discovered a relationship between the number of sides in a polygon and the number of its diagonals.



1. Complete Jake's table:

Number of Sides (x)	Number of Diagonals (y)
3	
4	
5	
6	
7	
8	
9	

2. Describe patterns you notice in the table.

3. Write an equation whose graph would include the points given by the data in your table. Graph your equation.

4. A polygon has 17 sides. How many diagonals will it have? Describe your reasoning?

5. A polygon has 209 diagonals. How many sides does it have? Describe your reasoning?

Laws of Exponents
Activity Sheet A

1. Write a^4b^7 x a^2b^3 without using exponents. DO NOT multiply them out.

    a. How many a's are being multiplied? How many b's are being multiplied?

    b. Rewrite your expression using exponents.

2. Write m^4n^3 x m^3n without using exponents. DO NOT multiply them out.

    a. How many m's are being multiplied? How many n's are being multiplied?

    b. Rewrite your expression using exponents.

Look at Questions 1 and 2 above. What patterns do you notice?

What rule can you generalize about multiplying expressions with like bases?

Try your new rule:

3. $(x^2y^4z^3)(xy^5z^7)$

4. $(r^6s^4t^3)(r^2s^3t^2)(rs^7t^5)$

Laws of Exponents
Activity Sheet A Cont…

5. Write $\frac{a^4b^7}{a^2b^3}$ without using exponents. DO NOT divide them out.

   a. Cancel out any common factors between the numerator and denominator. How many a's remain? How many b's remain?

   b. Rewrite your expression using exponents.

6. Write $\frac{m^4n^5}{m^9n^2}$ without using exponents. DO NOT divide them out.

   a. Cancel out any common factors between the numerator and denominator. How many m's remain? How many n's remain?

   b. Rewrite your expression using exponents.

Look at Questions 5 and 6 above. What patterns do you notice?

What rule can you generalize about dividing expressions with like bases?

Try your new rule:

7. $\frac{x^3y^4z^4}{xy^6z^7}$

8. $\frac{r^4s^3t^5}{r^4s^8t^{10}}$

Laws of Exponents
Activity Sheet A Cont…

9. Write $(a^3b^5)^2$ without using exponents. DO NOT multiply out.

   a. How many a's are being multiplied? How many b's are being multiplied?

   b. Rewrite your expression using exponents.

10. Write $(m^2n^5)^3$ without using exponents. DO NOT multiply out.

   a. How many m's are being multiplied? How many n's are being multiplied?

   b. Rewrite your expression using exponents.

Look at Questions 9 and 10 above. What patterns do you notice?

What rule can you generalize about raising expressions with like bases to a power?

Try your new rule:

11. $(x^3y^4z^4)^2$

12. $(r^4s^3t^5)^4$

Laws of Exponents
Activity Sheet B

Use your TAKS formula chart to identify the following formulas:

Area of rectangle:

Area of triangle:

Area of trapezoid:

1. Calculate the area of a rectangle that has a length of $x^3y^4z^6$ and a width of xy^2z^2.

2. Calculate the area of a trapezoid that has base lengths of s^3t^5 and $3s^3t^5$, and a height of s^2t^4.

3. Calculate the area of a triangle that has a base of $8m^2n^7$ and a height of $3m^4n$.

4. If a rectangle has an area of $16x^7y^4$ and a base of $2x^4y$, what is its height?

5. If a triangle has an area of $48m^{12}n^{10}$ and a height of $16m^6n^3$, what is its base?

6. Distance (d), rate (r), and time (t) are related by the formula d=rt. If a ball rolls $36p^4q^9$ feet for $4p^2q^3$ minutes, what is the rate?

Power Bingo

Power Bingo uses game sheets of 16 squares containing monomials that are the products of any three of the following monomials.

3x	3x	3x	3x	3y	3y	3y	3y
x^2	x^2	x^2	x^2	y^2	y^2	y^2	y^2

Three tiles are drawn from the sack, and the three monomials picked are announced to the class and displayed on the overhead. If a square on your game sheet contains the product of the three monomials announced, you may cover or mark that square. The first player to cover four squares in a row vertically, horizontally, or diagonally wins the game.

1. One possible monomial is $9x^3y$, the product of 3x, 3y, and x^2. How many possible products do you think there are? How did you arrive at your answer?

2. Find all possible monomials that are products of any three of the 16 monomials listed above. Write your products on notebook paper.

3. How does the number of monomials in part 2 compare with your answer in part 1?

4. You are almost ready to play Power Bingo. Before you can play, you need to fill your game sheet with different possible products of three monomials that might be drawn from the sack. When you are done, you are ready to play.

5. Once you have played Power Bingo, think about changes you may make in filling out your game sheet? Why?

Power Bingo Game Sheet

Power Bingo Game Sheet

Resources Used

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