Name: ____________________________________ **For Students Entering Algebra 2**

Solving Algebraic Equations

1.Using order of operations, evaluate: $3[4 - 8 + 4^2(2 + 5)]$	2. Solve for x: $5x - (x + 3) = 7 + 2(x + 2)$
3. $-\frac{2}{7}x = 6$	4. $\frac{3}{4}t = \frac{2}{3}$
5. $2y - \frac{3}{5} = \frac{1}{2}$	6. $y - \frac{2}{5} = -\frac{1}{3}$
7. $m + \frac{2}{3} = \frac{1}{4}m - 1$	8. $\frac{3}{4}(2x + 1) = 2$
9. $\frac{1}{5}m + \frac{2}{3} - 2 = m - \frac{2}{5}$	10. $0.3x - 0.24 = 0.36 + 0.52x$

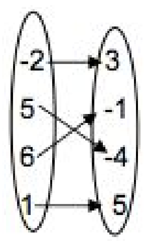
What are functions, how do you find their domain and range, and how do you use function notation?

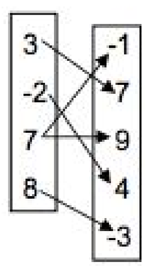
A function is a set of ordered pairs in which each element from the domain (set of all x-coordinates) is paired with one and only one element from the range (set of all y-coordinates).

Ex: Find the domain and range and decide if each of the following is a function:

{ (-2, 5), (3, 9), (5, 6), (-3, 9) }

{ (3, 8), (-4, 9), (-2, 3), (3, 1) }





x:	-3	6	1	-8	0
y:	5	-2	3	-2	0

x	5	2	4	5	1
y	3	-9	-5	2	-1

Function Notation: a form of substitution

If $f(x) = 2x - 3$, $g(x) = \sqrt{x+5}$, $h(x) = x^2 - 3x + 5$, $k(x) = \begin{cases} 2x+3 & x > -2 \\ 3-x & x \le -2 \end{cases}$

Find each of the following:

$f(-2)$ $g(7)$ $h(-3)$

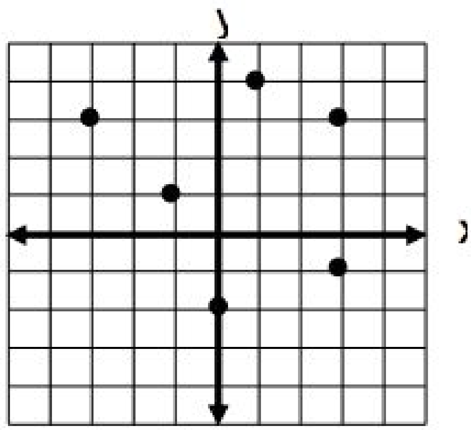
$g(t-3)$ $h(x+3)$ $f(2x+2)$

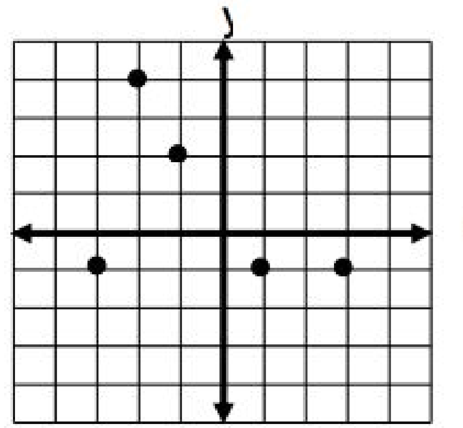
$k(-5)$ $k(-2)$ $k(3)$

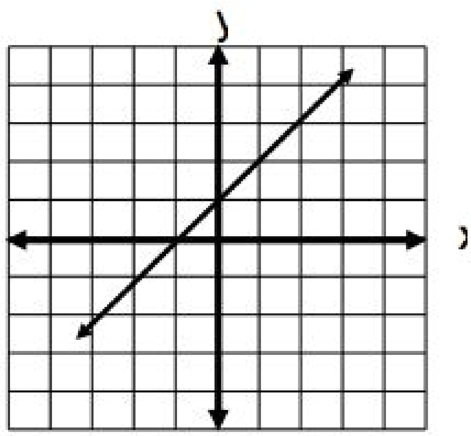
Characteristics of a Function

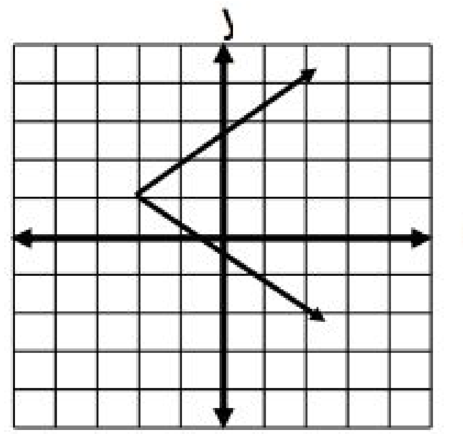
Look at each relation and tell whether or not it is a function.

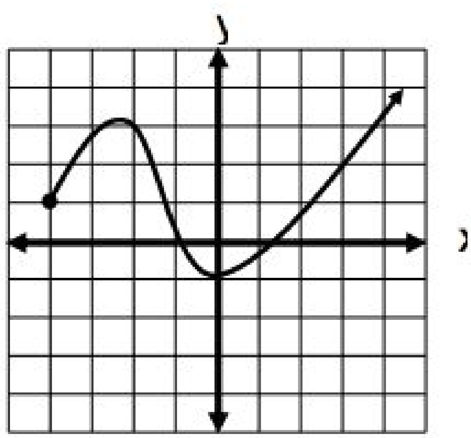
Determine the domain and range of each.

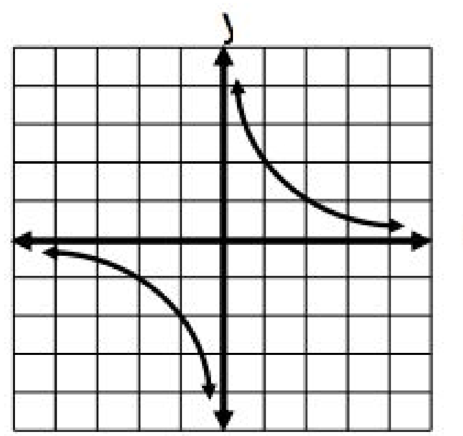




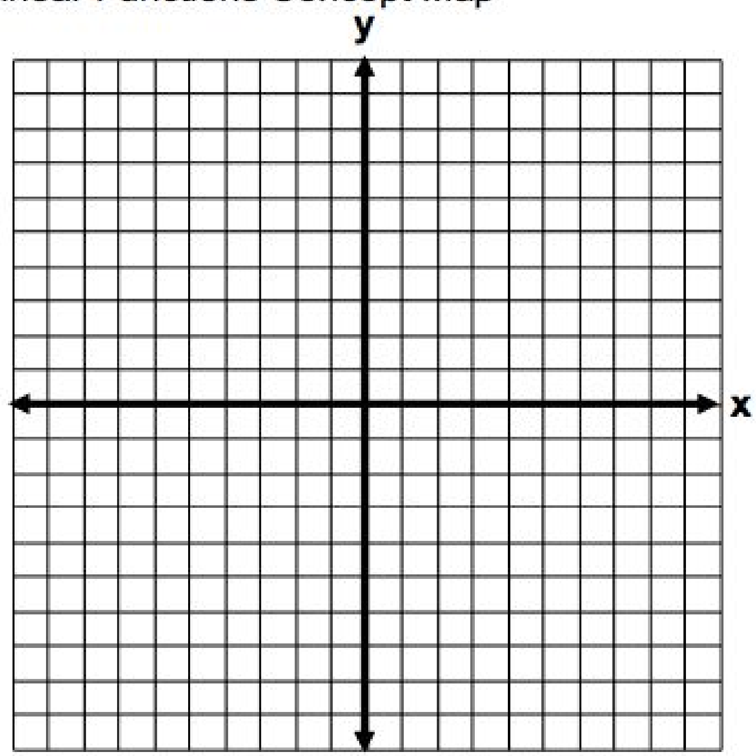








Families of Linear Functions Concept Map



Families of Linear Functions $f(x) = x + b$

Complete the table on each of the following and draw each in a different color on the graph to the right.

$f(x) = x + 3$	
x	f(x)
-5	
-2	
0	
3	
7	
x-int =	
y-int=	

$f(x) = x - 4$	
x	f(x)
-6	
-3	
0	
2	
5	
x-int =	
y-int=	

$f(x) = x - 7$	
x	f(x)
-2	
-1	
0	
4	
8	
x-int =	
y-int=	

$f(x) = x + 6$	
x	f(x)
-8	
-6	
-1	
2	
3	
x-int =	
y-int=	

How are the lines above alike?

How are they different?

Write the equation of a line in this family with a y –intercept of –2.

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Write the equation of a line in this family with a y –intercept of +5.

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Write the equation of a line in this family with a y –intercept of –10.

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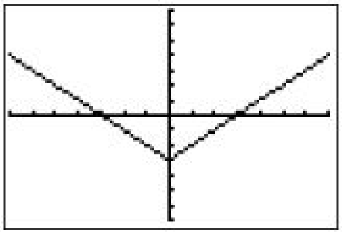
ABSOLUTE VALUE FUNCTIONS

Match the graph of each function (1-6) with the equation of each function (a-f).

1.



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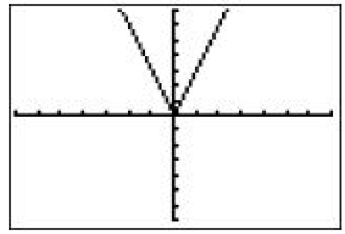

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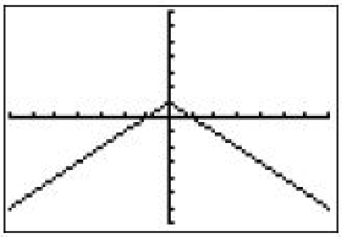

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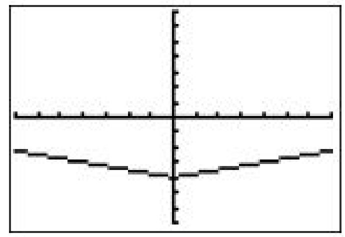

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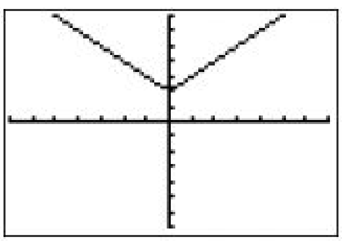

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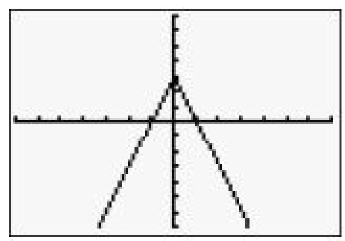


A. $f(x) = -|x| + 1$

B. $f(x) = \frac{1}{4}|x| - 4$

C. $f(x) = |x| - 3$

D. $f(x) = -3|x| + 3$

E. $f(x) = 3|x|$

F. $f(x) = |x| + 2$

QUADRATIC FUNCTIONS

$y = x^2$ is called the *parent function.*
Let's explore some transformations of the parent function.

1. Graph: $y = x^2 + 2$
Compare your new graph to the parent graph. How does it change?

What characteristics (domain, range, maximum, minimum, zeros, end behavior, intercepts) of the function change? How?

2. Graph: $y = x^2 – 2$
Compare your new graph to the parent graph. How does it change?

What characteristics (domain, range, maximum, minimum, zeros, end behavior, intercepts) of the function change? How?

3. Graph: $y = 2x^2$
Compare your new graph to the parent graph. How does it change?

What characteristics (domain, range, maximum, minimum, zeros, end behavior, intercepts) of the function change? How?

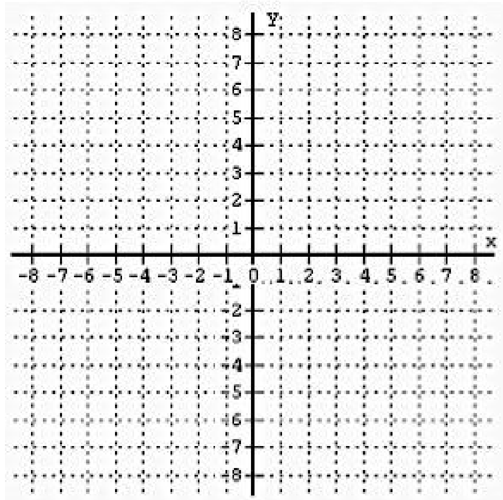
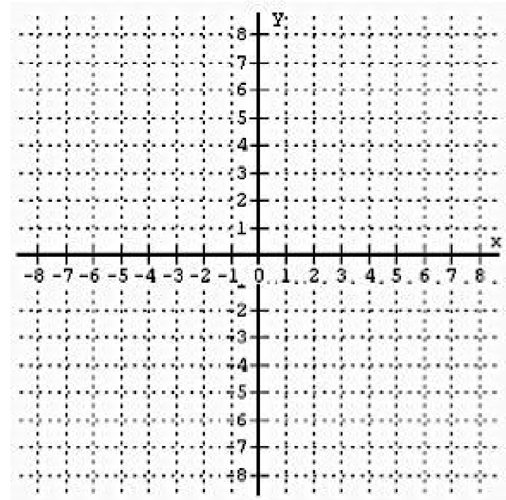
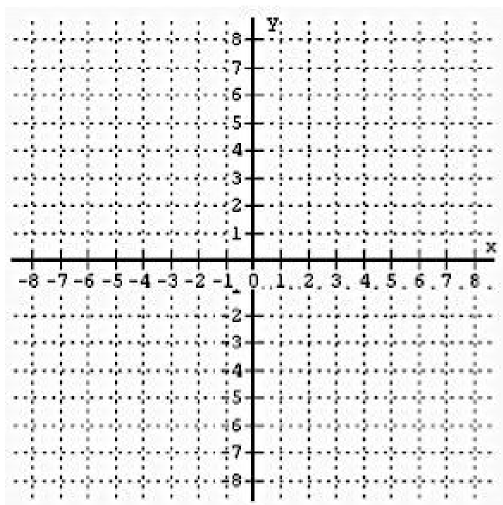
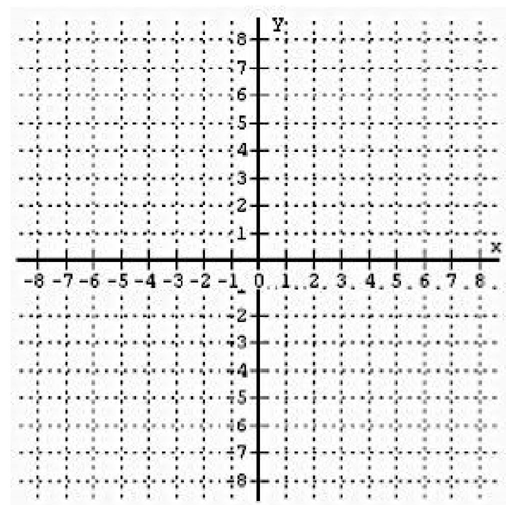
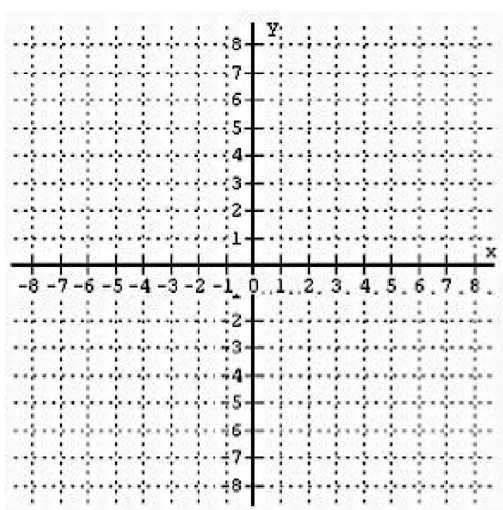
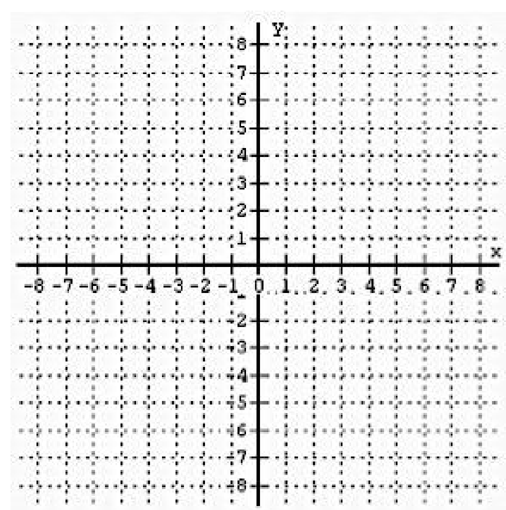
4. Graph: $y= ½x^2$
Compare your new graph to the parent graph. How does it change?

What characteristics (domain, range, maximum, minimum, zeros, end behavior, intercepts) of the function change? How?

5. Graph: $y = -x^2$
Compare your new graph to the parent graph. How does it change?

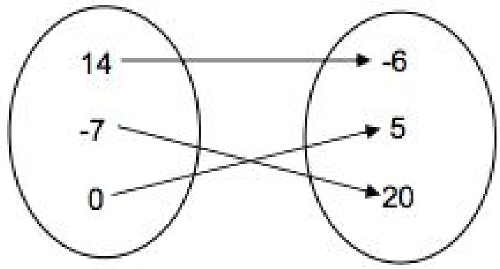
What characteristics (domain, range, maximum, minimum, zeros, end behavior, intercepts) of the function change? How?

**** GRAPH EACH FUNCTION ON THE FOLLOWING PAGE ****

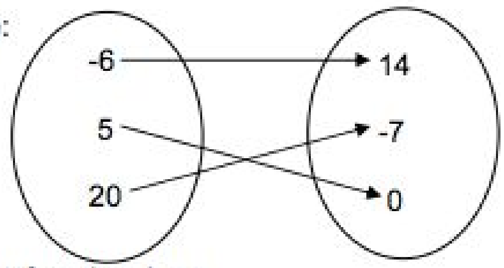
Parent Function 	1. 
2. 	3. 
4. 	5. 

Inverses

Consider the following mapping:



The inverse of this mapping would be:



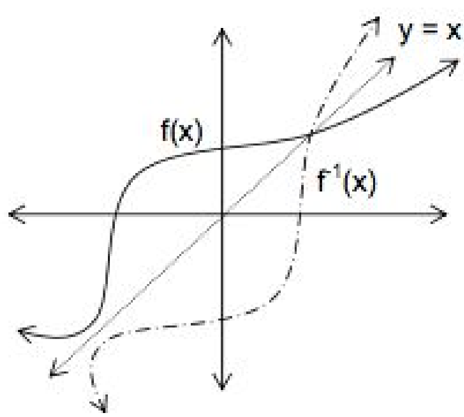
Essentially an inverse "undoes" what a function does.

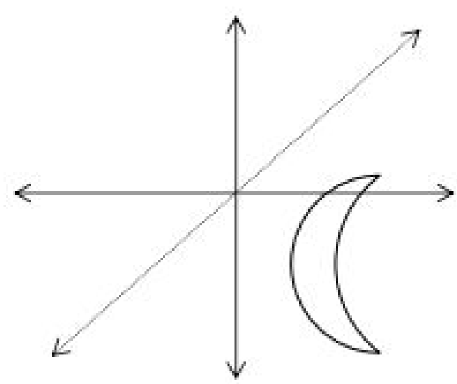
If a function maps x onto y, then the inverse of that function maps y back onto x.

In the mappings above, the first mapping maps -7 onto 20. The second mapping then takes the 20 and maps it back onto -7. This is what inverses do.

Sketching a curve and its inverse

The inverse of a curve is its mirror image across the line y = x on a graph.

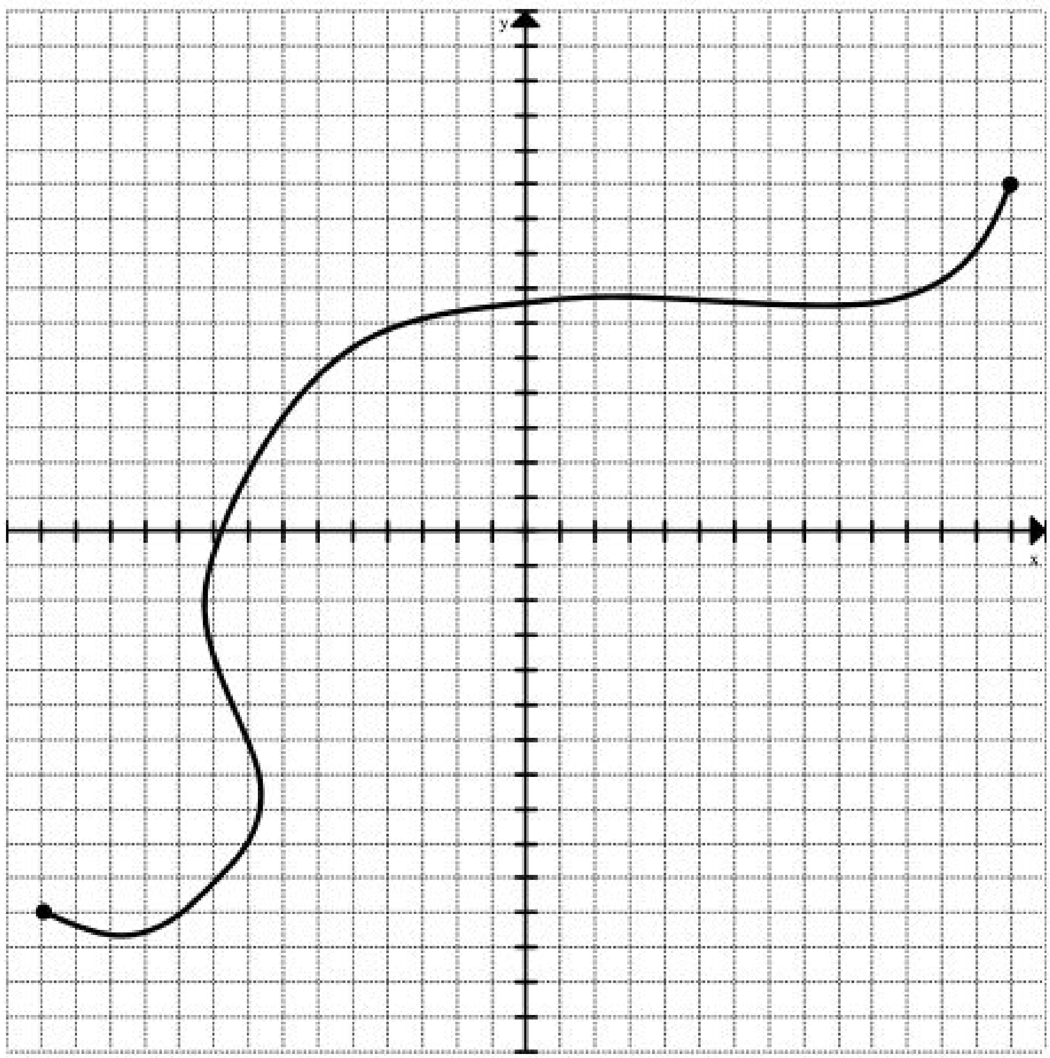




How would you sketch the inverse without folding or guessing? Hint: Remember the mapping concept. Try it on the curve on the following page.

Sketching Inverses From Points on the Curve

Determine the coordinates of at least 20 points on the curve below. Switch the x-coordinate and the y-coordinate of each point and plot those, connecting them in the same order as the original points. The curve you just sketched is the mirror image of the original curve across the line y = x. Sketch that line in as a dotted line and fold across it. The original curve and the curve you just drew should lie on top of each other.



Operations with Polynomials

Perform the indicated operation(s).

1) $(3v^4 - 2 + 8v^2) + (6v^2 + 4 - 7v^4)$

2) $(4v^2 - 5 - v^3) - (3 - 6v^3 - 3v^2)$

3) $(2x^4 + x) + (7x - 2x^2) - (4x - 6x^4 + 5x^2)$

4) $3x(x^2 - 7x + 2)$

5) $(6n + 5)(3n - 5)$

6) $(8a - 2)(3a^2 + 2a - 2)$

7) $(3a + 2b)(8a + 8b)$

8) $(8m^2 - 2mn - 7n^2)(6m + 3n)$

9) $(8b - 7)(8b + 7)$

10) $(2y + x)(2y - x)$

11) $(5p - 3)^2$

12) $(6x + y)^2$

Factoring

Binomials	Trinomials
1. $2x^2 - 8$	1. $2x^2 + 8x + 6$
2. $2x - 2xy^2$	2. $3y^2 + 9y - 30$
3. $8x^2 - 18$	3. $6x^2 - 26x - 20$
4. $4x^4 - 4x^2$	4. $5s^2 + 15s + 10$
5. $3t^3 - 27t$	5. $14x^2 + 7x - 21$