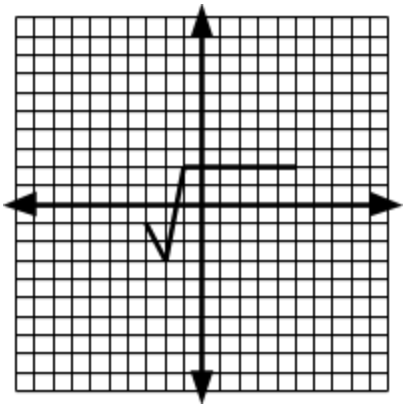
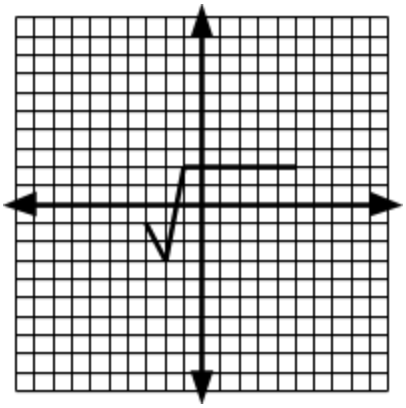
On each grid, **Ginger, G(x),** is graphed. Graph the given function.

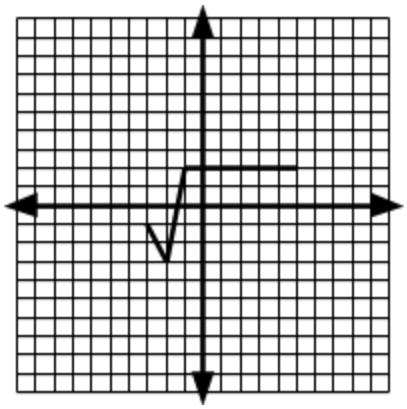
1. Graph: y = G(x) – 6.



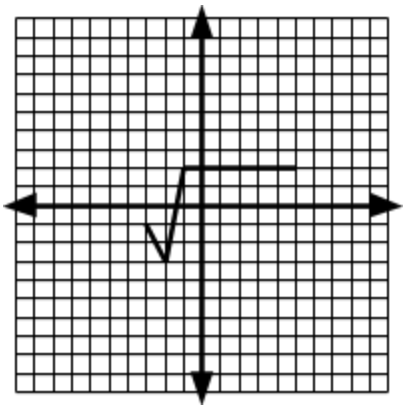
2. Graph: y = G(x + 6)



3. Graph: y = G(x + 2) + 5



4. Graph: y = G(x – 4) – 5



Using the understanding you have gained so far, describe the effect to Fred for the following functions.

Equation	Effect to Fred's graph
1. y = F(x) + 82	
2. y = F(x – 13)	
3. y = F(x) – 9	
4.	Translate left 31
5.	Translate right 8 and down 54

Use your understanding of transformations of functions to determine the effect of each transformation to function Polly, *P(x)*.

1. P(x) + 5

   Transformation on Polly:

   _____

   Does this effect x values or y values? _____

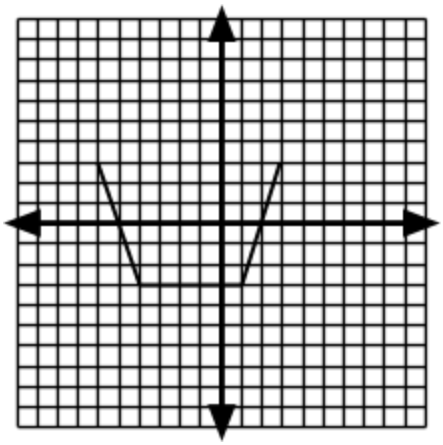
2. P(x + 5)

   Transformation on Polly:

   _____

   Does this effect x values or y values? _____

This is the function **Bowl, B(x)**.



1. List its characteristic points.

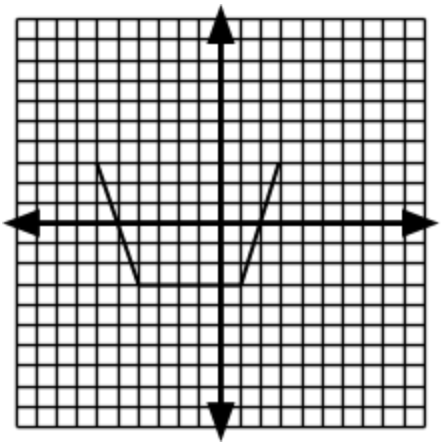
2. Are these the only points on the graph of Bowl? Explain.

3. What is the domain of Bowl?

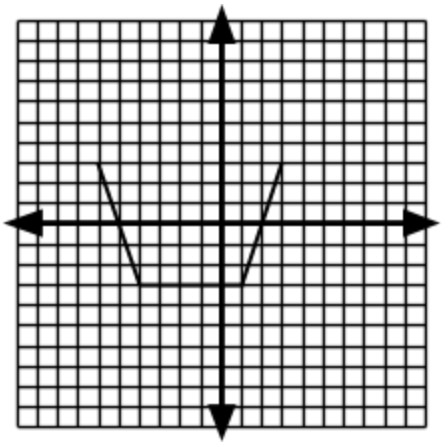
4. What is the range of Bowl?

For each of the following, list the effect on the graph of Bowl and then graph the new function.

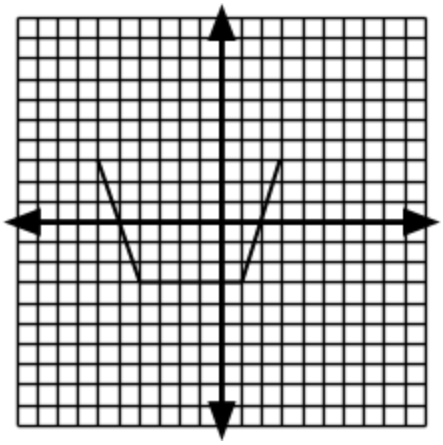
5. $y = B(-x)$



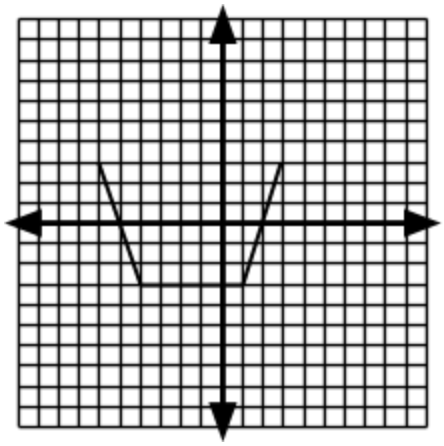
6. $y = -B(x)$



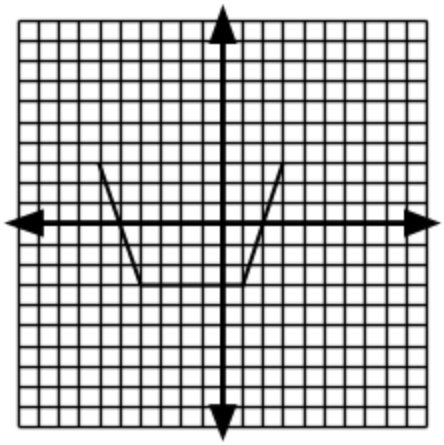
7. $y = \frac{1}{3} B(x)$



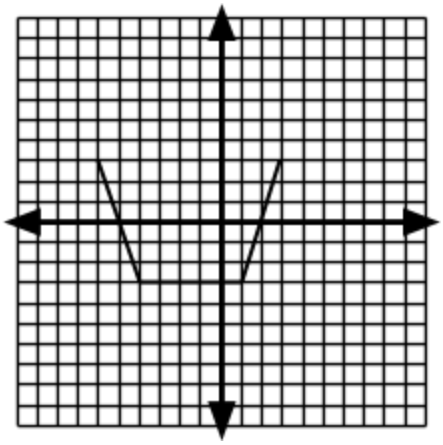
8. $y = 3 B(x)$



9. $y = B(x - 3)$



10. $y = B(x + 2) - 1$



Describe how the following equations were transformed from $y = x^2$.

1. $y = x^2 - 5$
2. $y = (x-5)^2 + 1$
3. $y = \frac{1}{2}(x+3)^2$
4. $y = -3(x-6)^2$

State the vertex for each of the following parabolas.

9. $y = (x+1)^2 + 1$
10. $y = (x-2)^2 + 9$
11. $y = x^2 + 4$
12. $y = -3(x-6)^2$

Match each equation to its graph below.

_____ 18. $y = (x+2)^2 - 1$

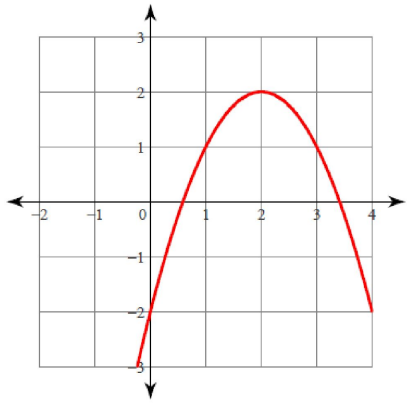
_____ 19. $y = -(x-2)^2 + 2$

_____ 20. $y = 2(x+1)^2 - 1$

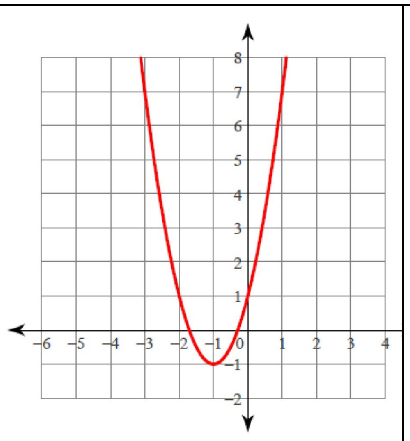
_____ 21. $y = (x-1)^2 - 1$

_____ 22. $y = -2(x-1)^2 + 2$

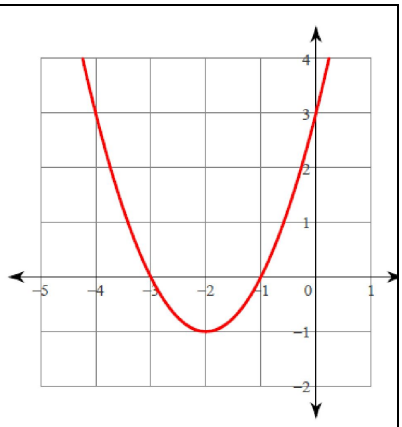
a



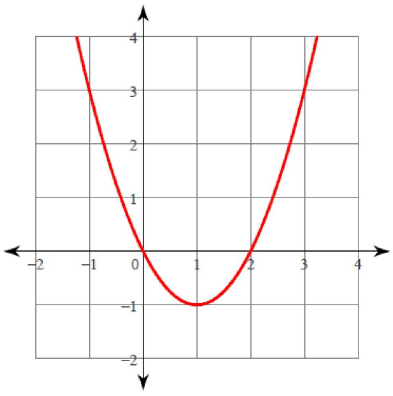
b



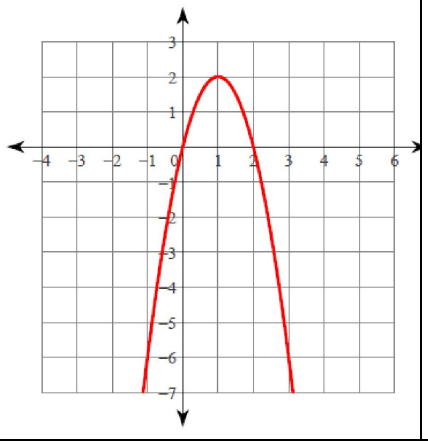
c



d

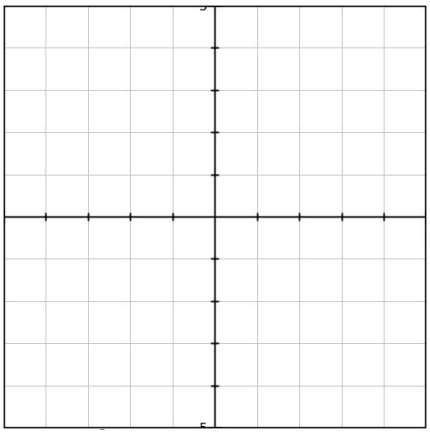


e

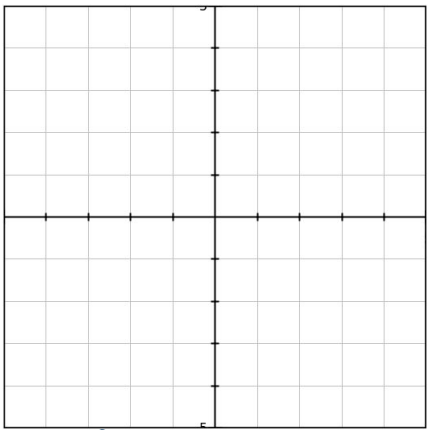


Part 1: Sketch each of the following parabolas.

1) $y = (x-2)^2 - 1$



2) $y = -(x+3)^2 + 4$



Part 2: Match each parabola with its graph below.

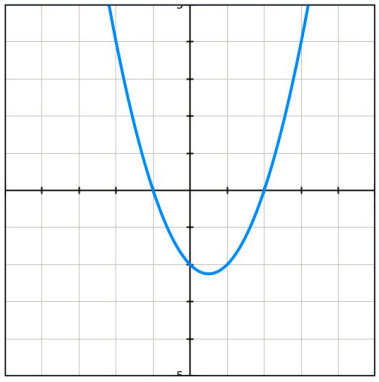
_____ 3) $y = (x+1)(x-2)$

_____ 4) $y = -(x-1)(x-2)$

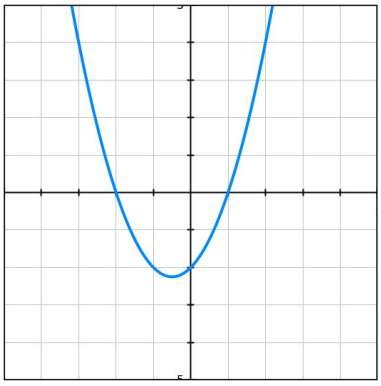
_____ 5) $y = -(x+1)(x+2)$

_____ 6) $y = (x+2)(x-1)$

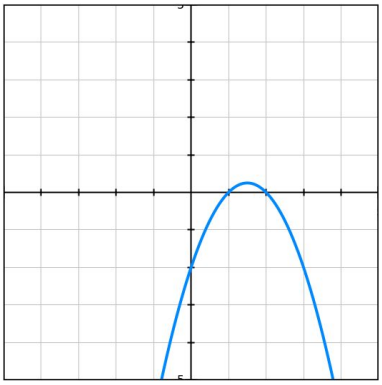
a.



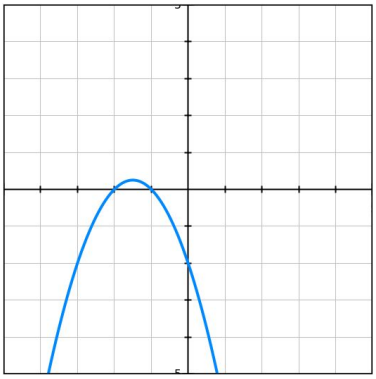
b.



c.

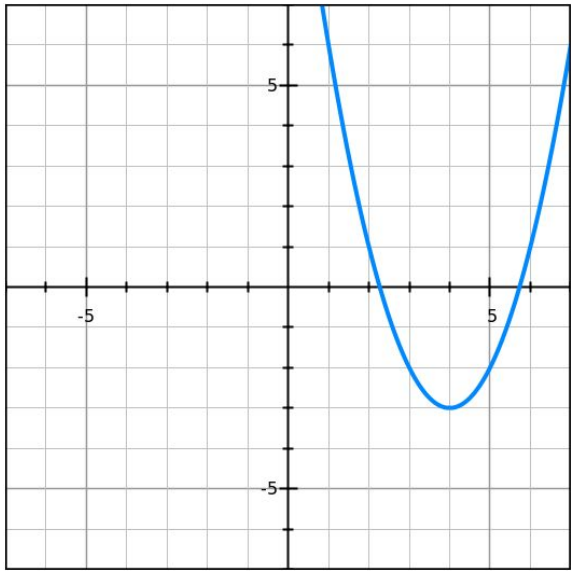


d.

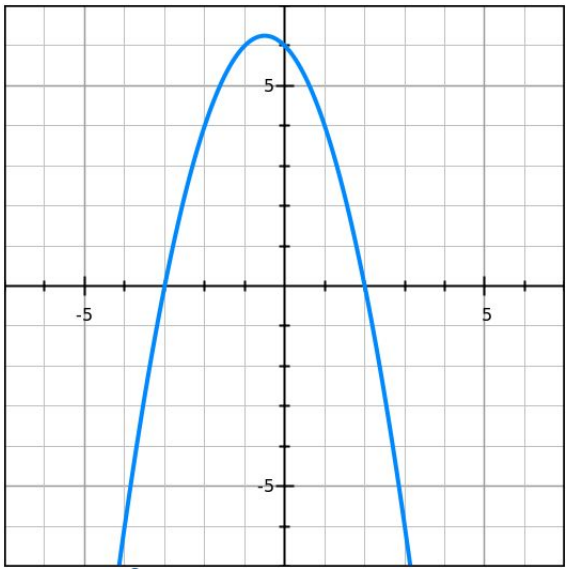


Part 3: Write an equation for each of the following parabolas. **You will need to decide which form** to use - **vertex or intercep**t form! Choose the best equation for each graph given.

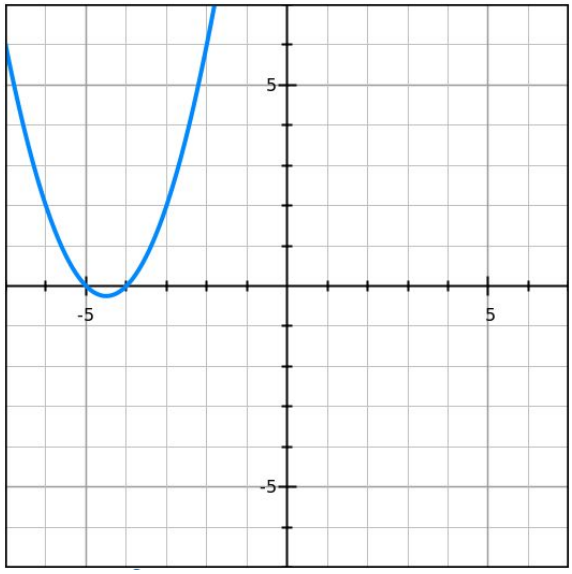
7) _____



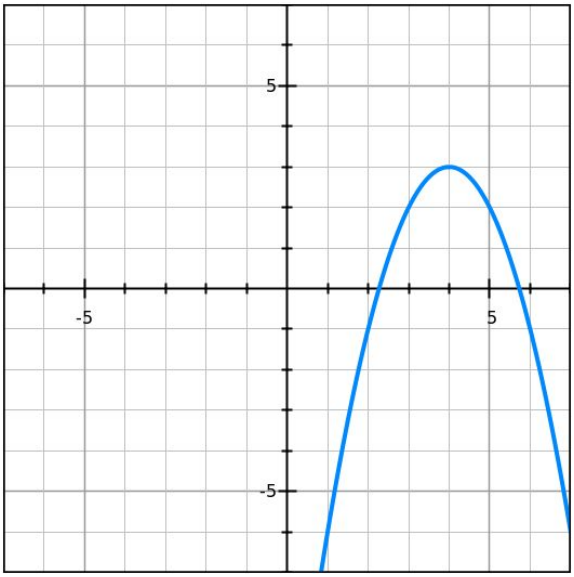
8) _____



9) _____



10) _____



REVIEW OF VERTEX AND FACTORED FORM: State what information each equation gives you about the graph (key features, transformations, etc.).

1. $y = (x-6)^2 - 1$
What this equation tells me about the graph?

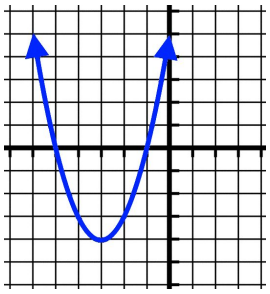
2. $y = (x-5)(x-11)$
What this equation tells me about the graph?

3. $y = -(x+8)(x-3)$
What this equation tells me about the graph?

4. $y = 2x^2 + 10$
What this equation tells me about the graph?

Write two equations to describe each parabola below – one in vertex form, and one in factored form.

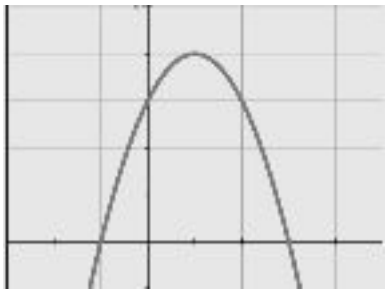
5. Graph:



Vertex Form: _____

Factored Form: _____

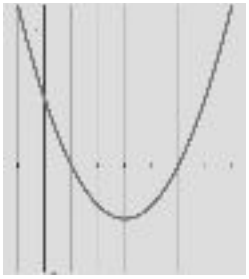
6. Graph:



Vertex Form: _____

Factored Form: _____

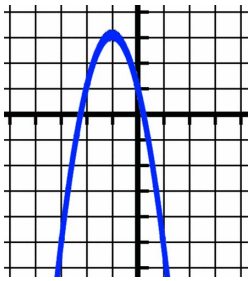
7. Graph:



Vertex Form: _____

Factored Form: _____

8. Graph:



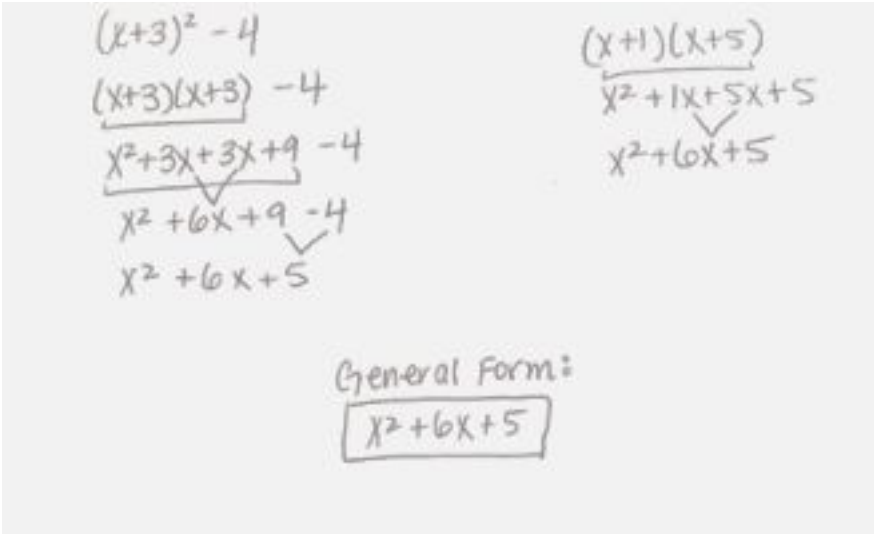
Vertex Form: _____

Factored Form: _____

CONNECTING THESE TO STANDARD FORM: Verify the two equations represent the same quadratic by converting them to standard form. The first one has been done for you as an example.

Example:

Vertex Form: $y = (x+3)^2 - 4$ Factored Form: $y = (x+1)(x+5)$



9. Vertex Form: $y = (x+4)^2 - 4$ Factored Form: $y = (x+6)(x+2)$

10. Vertex Form: $y = (x-2)^2 - 9$ Factored Form: $y = (x-5)(x+1)$

Completing the Square

REVIEW OF QUADRATIC EQUATIONS:

1. Define a quadratic: _____

2. Circle each equation that will graph as a parabola:

$y = x^2 + 12$	$y = 3x^5 + x^4 - 6$	$y = 3 - x - x^2$
$y = 4x^2 + x^3$	$y = 2x + 2$	$y = -x^2 + 7x$

3. State what information each equation gives you about the graph (key features, transformations, etc.).

a) $y = x^2 - 9$
What this equation tells me about the graph:

b) $y = (x - 5)(x + 6)$
What this equation tells me about the graph:

c) $y = 4(x - 3)^2 - 1$
What this equation tells me about the graph:

d) $y = 3(x - 10)(x - 8)$
What this equation tells me about the graph:

e) $y = x^2 - 5 + 1$
What this equation tells me about the graph:

COMPLETING THE SQUARE: Rewrite each equation in vertex form.

4. $y = x^2 + 8x + 12$

Vertex Form: _____

5. $y = x^2 + 4x - 5$

Vertex Form: _____

6. $y = x^2 - 12x$

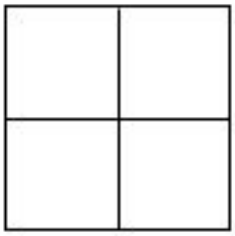
Vertex Form: _____

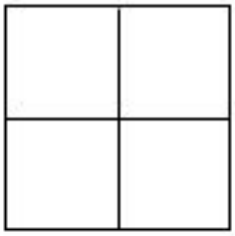
7. $x^2 - 10x = 24$

Vertex Form: _____

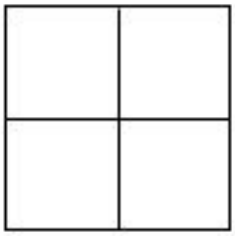
Directions: Use the boxes to factor each of the quadratic equations. Check your work by multiplying back out.

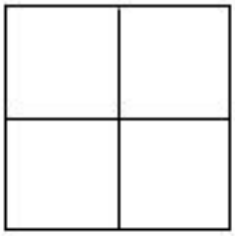
1. $x^2 + 7x + 10 = (\quad)(\quad)$



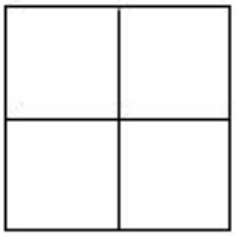


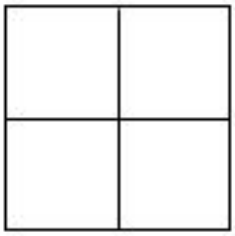
2. $x^2 - x - 30 = (\quad)(\quad)$



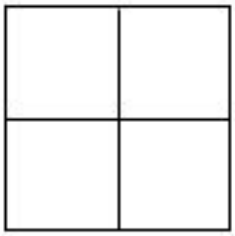


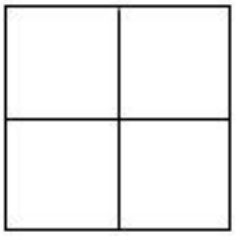
3. $x^2 - 7x - 8 = (\quad)(\quad)$





4. $x^2 - 13x + 36 = (\quad)(\quad)$





Part I: Factor each of the quadratics. Don't forget to look for a GCF first!

1.) $2x^2 + 13x + 15$

2.) $4x^2 - 13x + 3$

3.) $x^2 + 0x - 36$

4.) $2x^2 - 4x - 6$

5.) $15x^2 + 55x + 50$

6.) $14x^2 + 21x - 14$

Part II: A Team Valor Exeggutor uses barrage attack on an opposing Team Mystic Magikarp. It hurls an egg high into the air. The trajectory of the thrown egg can be modeled by the quadratic function $h(t) = -16t^2 + 40t + 5$, where is the amount of time in seconds since the egg was released and is the height at that time. Sketch a graph of the function and determine the *maximum* height that the egg reaches and *when it hits the ground*.

Directions: Factor each of the following polynomials. Don't forget to check for a GCF!

1.) $x^2 + x - 20$

2.) $4x^2 - 12x + 5$

3.) $3x^2 + 15x + 18$

4.) $2x^2 - 6x - 8$

5.) $10x^2 - 35x + 30$

6.) $12x^2 - 18x$

7.) $x^2 - 25$

8.) $4x^2 - 16$

Unit 2A Review

1. a) How do you know if an equation will graph as a parabola?

b) Circle all the equations below that will graph as a parabola.

$y = (x + 4)(2x - 1)$ $y = 6x + 8$

$y = x^4 - x^2$ $y = x^2 - 3x + 9$

2. Rewrite the following quadratic equation in standard form: $y = (x - 6)(2x + 3)$

3. Multiply: $(3x - 4)^2$

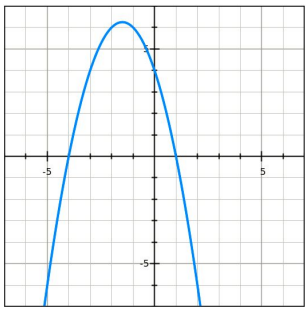
4. Identify the vertex of the function: $y = 2(x + 1)^2 + 9$.

5. Identify the roots of the function: $y = (x - 8)(x + 2)$.

6. If a parabola opens down and has a vertex of (3, -5), how many roots will it have?

7. A parabola is known to have 2 roots and a vertex at (3, -5). If one x-intercept is at the at (1, 0), what are the coordinates of other x-intercept?

8. Write 3 equations (one in each form) for the given parabola:

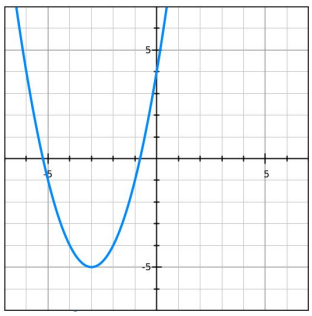


Vertex Form: _____

Factored Form: _____

Standard Form: _____

9. Write 3 equations (one in each form) for the given parabola:



Vertex Form: _____

Factored Form: _____

Standard Form: _____

10. Factor: $x^2 - 9x - 36$

11. Factor: $3x^2 + 15x + 12$

12. Factor: $4x^2 + 6x - 18$

13. Factor: $9x^2 - 25$

Work Space: Here are some spare coordinate grids to work out problems if needed: