

Name: _____ Algebra 10 Unit 8 Lesson 4

Completing the Square

DO NOW ~ Monday 1/13

Identify the vertex (turning point) of the following quadratic equation written in vertex form: _____

(3, 2)

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

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



Classwork

Standard Form of a Parabola: $y = ax^2 + bx + c$			Vertex (Shifted) Form of a Parabola: $y = (x - h)^2 + k$		
Write each of the following as an equivalent trinomial.			Each of the following trinomials is a perfect square. Write it in factored (or perfect square) form.		
$(x+5)^2$ $(x+5)(x+5)$ $x^2 + 5x + 5x + 25$ $x^2 + 10x + 25$	~~$(x-1)^2$~~	~~$(x-4)^2$~~	$x^2 + 20x + 100$ $(x+10)^2$ $(x+10)(x+10)$ $x^2 + 10x + 10x + 100$ $x^2 + 20x + 100$	$x^2 - 6x + 9$ $(x-3)^2$	$x^2 + 2x + 1$ $(x+1)^2$
Take a look at b and c 's relationship...			Now you will be ready to "Complete the Square" at Mrs. Ferreri's station.		

DO NOW ~ Tuesday 1/14

Does the following parabola shift to the left, right, up or down?

Right 2 spaces

How do you know?

up 6 spaces

$$g(x) = (x - 2)^2 + 6$$



Classwork

Place the following quadratic function, written in standard form, into vertex form by completing the square.

$$y = x^2 - 12x + 40$$

$$y = (x^2 - 12x + 36) + 40 - 36$$

$$y = (x - 6)^2 + 4$$

vertex: (6, 4)

$$\frac{-12}{2} = (-6)^2$$

Steps for Completing the Square

1) Rewrite the equation by putting parenthesis around the x^2 and x values. Give yourself space inside the parenthesis to be able to write a third value.

2) Divide the b value (the # in front of the x) by 2. Now square it.

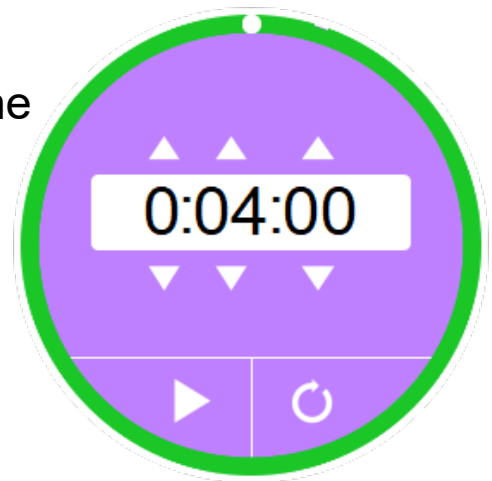
3) Write this value inside of the parenthesis, where you left yourself some space. Take the opposite of this value and write that at the very end of the equation.

4) Factor what is inside your parenthesis. Write this in perfect square form. Ex: $(x - 6)^2$

5) Add or subtract the numbers on the outside of the parenthesis.

To earn your full participation point for the Do Now be sure to have completed all of the following by the time is up:

- 1) Be in your seat
- 2) Take out your calculator or grab one
- 3) Have last night's homework out
- 4) Complete the do now



DO NOW ~ Wednesday 1/15

What does "Completing the Square" do? Changes the equation to vertex form.



Classwork

Use the information provided to write the vertex form equation of each parabola and identify the vertex.

$$\frac{-b}{2} = \frac{-(-6)}{2} = 3$$

$$y = x^2 - 6x + 5$$

$$y = (x^2 - 6x + 9) + 5 - 9$$

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

$(3, -4)$

$$y = x^2 + 16x + 71$$

$$y = (x^2 + 16x + 64) + 71 - 64$$

$$y = (x + 8)^2 + 7$$

$$(-8, 7)$$

$$\frac{16}{2} = (8)^2$$

DO NOW ~ Thursday 1/16***Complete the square.***

$$y = x^2 + 6x + 8$$

**Classwork**

Use the information provided to write the vertex form equation of each parabola and identify the vertex.

$$y = x^2 - 22x - 75$$

$$y = x^2 - 12x - 5$$

Mrs. Ferreri's Station ~ Completing the Square

$$y = x^2 + 6x - 2$$

$$y = x^2 - 2x + 11$$

$$y = x^2 - 10x + 27$$

$$y = x^2 + 8x$$

$$f(x) = x^2 + 10x$$

$$y = x^2 - 24x + 146$$

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$y = x^2 - 12x + 40$	$y = x^2 - 2x + 11$
$y = x^2 - 10x + 27$	$y = x^2 + 8x$
$y = x^2 + 4x + 14$	$y = x^2 - 24x + 146$

Computer Station ~ Delta Math

Complete the "Finding the Square Constant" assignment.

Mrs. Kennedy's Station ~ Review of FOILing and unFOILing (factoring)

1. Find each of the following products in standard form.

(a) $(x+4)^2$

(b) $(x-1)^2$

(c) $(x+8)^2$

(d) $(x-7)^2$

(e) $(x+2)^2$

(f) $(x-10)^2$

2. Each of the following trinomials is a perfect square. Write it in factored form, i.e. $(x+a)^2$ or $(x-a)^2$.

(a) $x^2 + 6x + 9$

(b) $x^2 - 22x + 121$

(c) $x^2 + 10x + 25$

(d) $x^2 + 30x + 225$

(e) $x^2 - 2x + 1$

(f) $x^2 - 18x + 81$

Continue onto next page.

Write each of the following products in standard form.

$(x-3)^2$

$(x+5)^2$

$(x-9)^2$

Each of the following trinomials is a perfect square. Write it in factored form.

$a^2 + 4a + 4$

$x^2 - 10x - 100$

$a^2 + 12a + 36$

$n^2 - 8n + 16$

$x^2 + 6x - 9$

$x^2 - 14x + 49$

Axis of Symmetry Review.

Which is an equation of the axis of symmetry of the parabola whose equation is $y = x^2 - 4x + 2$?

A. $x = -2$

B. $x = 2$

C. $y = -2$

D. $y = 2$

Which is an equation of the axis of symmetry of the parabola whose equation is $y = 3x^2 - 12x - 13$?

A. $x = -4$

B. $x = 2$

C. $x = 3$

D. $x = 4$

Which is an equation of the axis of symmetry of the graph of the equation $y = x^2 - 6x + 9$?

A. $y = 3$

B. $y = -3$

C. $x = 3$

D. $x = -3$

Independent Station ~ Quadratic Review

1. What are the coordinates of the minimum point of a parabola whose equation is $y = x^2 + 2$?
A. (0, 3) B. (-1, 2) C. (3, 0) D. (3, 12)

2. What is the minimum point of the graph of the equation $y = 2x^2 + 8x + 9$?
A. (2, 33) B. (2, 17) C. (-2, -15) D. (-2, 1)

3. What are the coordinates of the turning point for the graph of the parabola whose equation is $y = x^2 - 4$?
A. (0, -2) B. (0, 2) C. (0, -4) D. (0, 4)

4. How is the graph of $y = x^2 + 4x + 3$ affected when the coefficient of x^2 is changed to a smaller positive number?
A. The graph becomes wider, and the y-intercept changes.
B. The graph becomes wider, and the y-intercept stays the same.
C. The graph becomes narrower, and the y-intercept changes.
D. The graph becomes narrower, and the y-intercept stays the same.

5. Which is an equation of the axis of symmetry of the parabola whose equation is $y = x^2 - 4x + 2$?
A. $x = -2$ B. $x = 2$ C. $y = -2$ D. $y = 2$

6. What is the turning point of the parabola whose equation is $y = 2x^2 + 4x - 3$?
A. (1, 3) B. (-2, -3) C. (2, 13) D. (-1, -5)

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7. What is the y -intercept of the graph of the equation $y = x^2 - 2x + 3$?
- A. 1 B. 2 C. 3 D. -2
8. The graph of which equation contains a maximum point?
- A. $y = 2$ B. $y = -2$ C. $y = x^2$ D. $y = -x^2$
9. Which is an equation of the axis of symmetry of the parabola whose equation is $y = 3x^2 - 12x - 13$?
- A. $x = -4$ B. $x = 2$ C. $x = 3$ D. $x = 4$
10. What is the equation of a parabola that goes through points $(0, 1)$, $(-1, 6)$, and $(2, 3)$?
- A. $y = x^2 + 1$ B. $y = 2x^2 + 1$ C. $y = x^2 - 3x + 1$ D. $y = 2x^2 - 3x + 1$

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Which is an equation of the axis of symmetry of the parabola whose equation is $y = x^2 - 4x + 2$?

- A. $x = -2$ B. $x = 2$ C. $y = -2$ D. $y = 2$

Which is an equation of the axis of symmetry of the parabola whose equation is $y = 3x^2 - 12x - 13$?

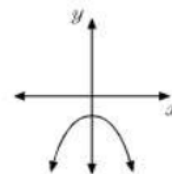
- A. $x = -4$ B. $x = 2$ C. $x = 3$ D. $x = 4$

Which is an equation of the axis of symmetry of the graph of the equation $y = x^2 - 6x + 9$?

- A. $y = 3$ B. $y = -3$ C. $x = 3$ D. $x = -3$

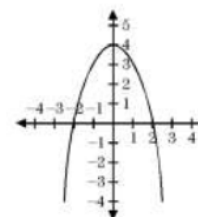
Which equation can represent the parabola in the diagram?

- A. $y = -x^2$ B. $y = x^2$ C. $y = x^2 - 3$ D. $y = -x^2 - 3$



Which is an equation of the graph shown in the diagram?

- A. $y = x^2 - 4$ B. $y = -x^2 + 4$ C. $x = y^2 - 4$ D. $x = -y^2 + 4$



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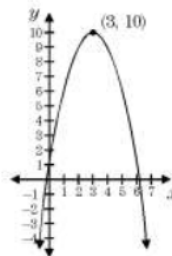
Which equation defines the graph in the diagram?

A. $y = x^2 + 6x + 1$

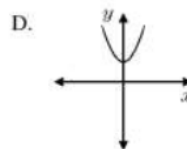
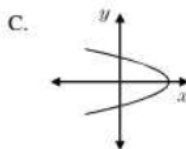
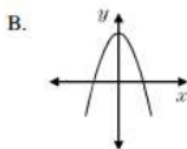
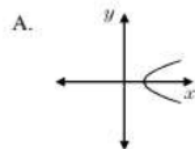
B. $y = -x^2 + 6x + 1$

C. $y = x^2 + 3x$

D. $y = -x^2 + 3x - 1$



Which graph represents the equation $y = -x^2 + 4$?



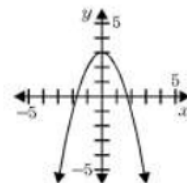
What is an equation of the function shown in the accompanying diagram?

A. $y = x^2 + 3$

B. $y = -x^2 + 3$

C. $y = -x^2 - 3$

D. $y = (x - 3)^2$



Homework ~ Monday 1/13

What is the y -intercept of the parabola whose equation is $y = x^2 + 7x + 5$?

A. $-\frac{7}{2}$

B. 5

C. 3

D. $\frac{7}{2}$

Find the product in standard form.

$(x - 5)^2$

Each of the following trinomials is a perfect square. Write it in factored form, i.e. $(x + a)^2$ or $(x - a)^2$.

$x^2 + 12 - 36$

Homework ~ Tuesday 1/14

Which is true of the graph of the parabola whose equation is $y = x^2 - 2x - 8$?

A. The x -intercepts are at $x = 2$ and $x = -4$.B. The only x -intercept is at $x = 4$.C. The x -intercepts are at $x = 4$ and $x = -2$.D. There are no x -intercepts.

Find the product in standard form.

$(x + 7)^2$

Each of the following trinomials is a perfect square. Write it in factored form, i.e. $(x + a)^2$ or $(x - a)^2$.

$x^2 - 4 + 4$

Homework ~ Wednesday 1/15

Use the information provided to write the vertex form equation of each parabola and identify the vertex.

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

Vertex: _____

$$y = x^2 + 16x - 23$$

Vertex: _____

Homework ~ Thursday 1/16

Use the information provided to write the vertex form equation of each parabola and identify the vertex.

$$y = x^2 - 16x + 67$$

Vertex: _____

$$y = x^2 + 6x + 1$$

Vertex: _____