Solving Quadratics Unit Day 2 IN CLASS NOTES

Completing the Square putting Quadratic Expressions into Vertex Form

Today we are going to learn how to convert from standard form to vertex form. VERTEX FORM is the third and final form of quadratic expressions. First let's look at the following standard quadratic function that is turned into factored form using the box method.

factored: $a(x-m)(x-n)$
Standard: ax^2+bx+c
Vertex: $a(x-h)^2+k$

$f(x)=x^2+6x+9 \rightarrow f(x)=(x+3)(x+3)$

x^2	3X
3X	9

This type of quadratic trinomial is called a trinomial perfect square because both of the factors end up being same. Instead of writing $f(x)=(x+3)(x+3)$ we can write it like this $(x+3)^2$

What we are going to do in class today is force quadratic expressions and functions that are NOT perfect square trinomials to look like perfect squares. This process is called Completing the Square and will be how we convert FROM Standard form TO Vertex form quadratics.

*note: we will not learn why it is called vertex form until next unit

What is the defining characteristic of squares?

Each area model below MUST be an actual square, what does that tell me about its base and height factors?

1. $f(x)=x^2+6x+8$ $\quad \frac{b}{2}=\frac{6}{2}=3$

	x	+3	
x	x^2	3x	
+3	3x	9	−1

$(x+3)(x+3)$
$x^2+3x+3x+9-1$
x^2+6x+8

Answer: $(x+3)(x+3)-1$ or $(x+3)^2-1$

2. $f(x)=x^2+6x+10$

	x	+3	
x	x^2	3x	
+3	3x	9	+1

Answer: $(x+3)^2+1$

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3. $f(x)=x^2+4x+8$ $\frac{4}{2}$

	x	+2
x	x^2	$2x$
+2	$2x$	4

+4

Answer: $(x+2)^2+4$

4. $f(x)=x^2+8x+3$ $\frac{8}{2}$

	x	+4
x	x^2	$4x$
+4	$4x$	16

-13

$(x+4)^2-13$

5. $f(x)=x^2+2x+0$ $\frac{2}{2}$

	x	+1
x	x^2	x
+1	x	1

-1

Answer: $(x+1)^2-1$

6. $f(x)=x^2-10x-20$ $\frac{10}{2}$

	x	-5
x	x^2	$-5x$
-5	$-5x$	25

-45

$25+\frac{45}{1}=-20$

$(x-5)^2-45$

7. $f(x)=x^2+9x+1$ $\frac{9}{2}$ (this is why you are in honors)

	x	$+\frac{9}{2}$
x	x^2	$\frac{9}{2}x$
$+\frac{9}{2}$	$\frac{9}{2}x$	$\frac{81}{4}$

$-\frac{77}{4}$

$\frac{81}{4}+\frac{-77}{4}=\frac{4}{4}=1$

Answer: $(x+\frac{9}{2})^2-\frac{77}{4}$

8. $f(x)=x^2+5x+2$ $\frac{5}{2}$

	x	$+\frac{5}{2}$
x	x^2	$\frac{5}{2}x$
$+\frac{5}{2}$	$\frac{5}{2}x$	$\frac{25}{4}$

$-\frac{17}{4}$

$\frac{25}{4}+\frac{-17}{4}=\frac{8}{4}=2$

$(x+\frac{5}{2})^2-\frac{17}{4}$

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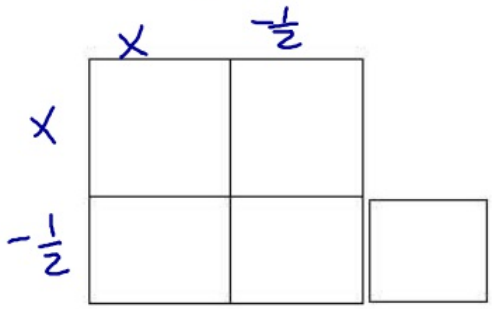
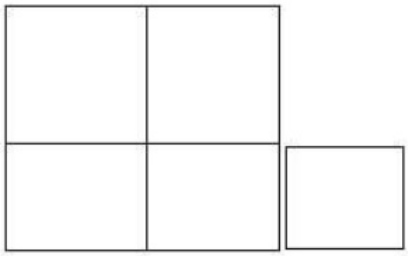
9. $x^2 - \frac{1}{2}x + 3$



Answer: _____

10. $x^2 + 3x - 2$



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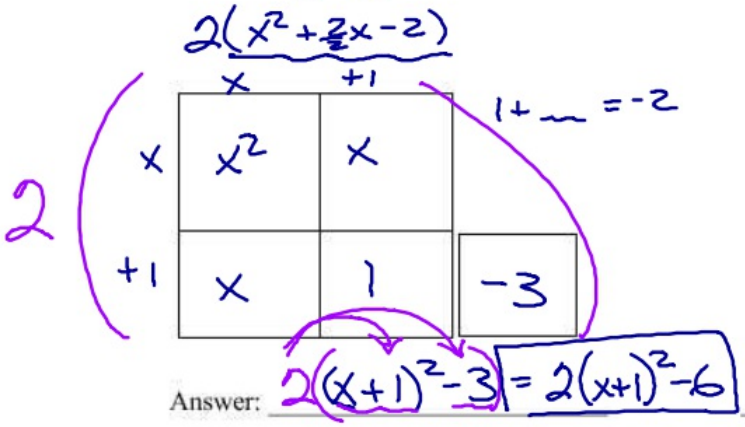
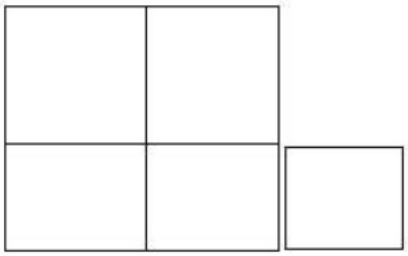
11. $f(x) = 2x^2 + 4x - 4$



Answer: _____

12. $f(x) = 3x^2 + 12x + 9$



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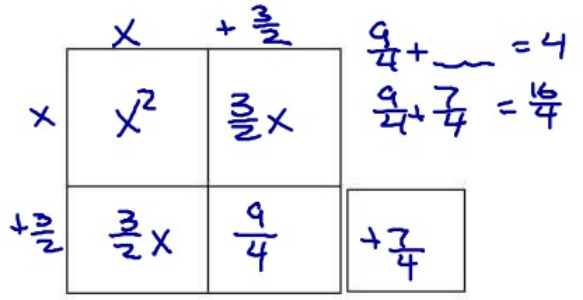
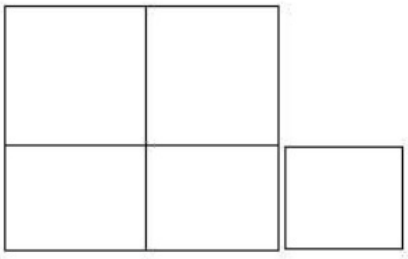
13. $f(x) = 2x^2 + 6x + 8$



Answer: _____

14. $f(x) = -x^2 - 2x - 1$



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