2.10 I've Got a Fill-in

A Practice Understanding Task

For each problem below, you are given a piece of information that tells you a lot. Use what you know about that information to fill in the rest.

1. You get this:	Fill in this:
$y = x^2 - x - 12$ $.5^2 - .5 - 12 =$ vertex $(.5, -12.5)$ $x = \frac{-b}{2a}$ $\frac{1}{2(1)} = \frac{1}{2}$ $(x, \_)$	Factored form of the equation: ① $(x+3)(x-4)$ Graph of the equation: ② $x = .5$

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2. You get this:	Fill in this:
$y = x^2 - 6x + 3$ x ☐ -6 -3 $(x-3)^2 - 6$ $x^2 - 6x + 3$ $(x^2 - 6x + 9) + 3 - 9$ $\frac{-b}{2a}$ $(x-3)^2 - 6$	Vertex form of the equation: ③ $(x-3)^2 - 6$ right 3 down 6 Graph of the equation: ④

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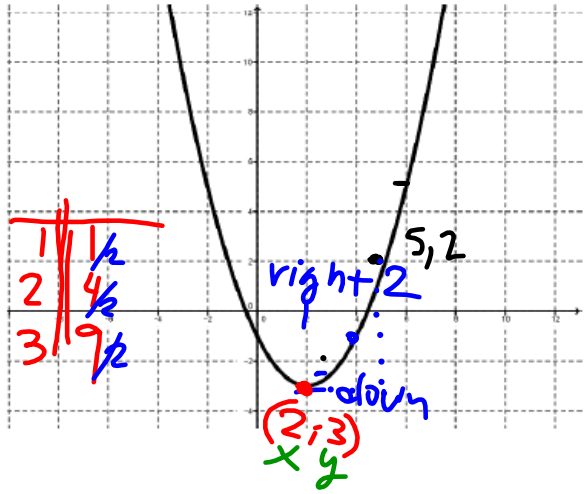
3. You get this:	Fill in this:
	Vertex form of the equation: (5) $\frac{1}{2}(x-2)^2-3=y$ $\frac{1}{2}(x-2)(x-2)-3$ $\frac{1}{2}(x^2-4x+4)-3$
	Standard form of the equation: (6) $\frac{1}{2}x^2-2x-1$

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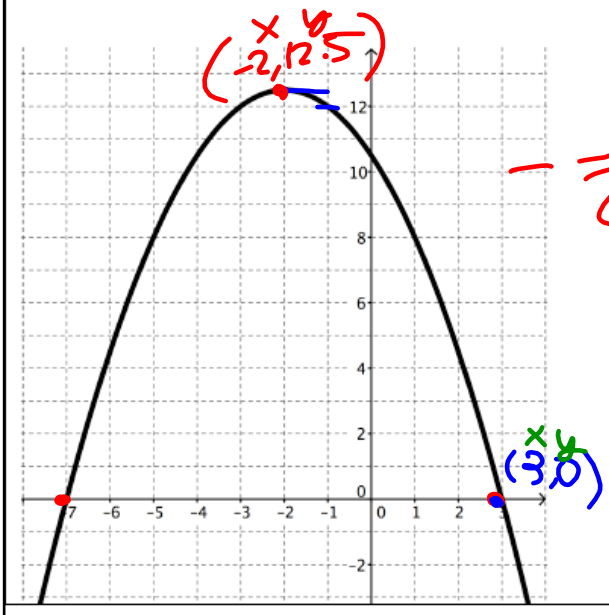
4. You get this:	Fill in this:
	Factored form of the equation: Rowan $-\frac{1}{2}(x+7)(x-3)$ $x^2-3x+7x-21$
	Standard form of the equation: Claire $-\frac{1}{2}(x^2+4x-21)$ $y=-\frac{1}{2}x^2-2x+10.5$ $12.5=a(-2+7)(-2-3)$ $(5)(-5)$ $\frac{12.5}{-25}=\frac{a(-25)}{-25}$ $-\frac{1}{2}=a$

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5. You get this:	Fill in this:
$y = -x^2 - 6x + 16$ $-(x^2+6x-16)$ $-(x-2)(x+8)$ $2 \quad -8$ $-(x^2+6x+16)+9$ $(-x^2-6x+9)+16+9$ $+3 \quad +25$ $=+9$ $(x+3)^2+25$	Either form of the equation other than standard form. Nov. $(x+8)(-x+2)$ Vertex of the parabola Audrey $(-3, 25)$ x-intercepts and y-intercept Jimmy $x=2, -8$ $y=16$

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6. You get this:	Fill in this:
$y = 2x^2 + 12x + 13$ $2a$ 26 $2 \cdot 13$ $9 \quad 9$ 18 -5 $2(x+3)^2-5$ $x=\frac{-b}{2a}$ $(-3, -5)$ $0=2(x+3)^2-5$ ← sub $y=0$ $+5 \quad +5$ $\frac{5}{2}=\frac{2(x+3)^2}{2}$ $\pm\sqrt{2.5}=\sqrt{(x+3)^2}$ $+1.58114 = x+3$ $-3 \quad -3$ $-1.41886 = x$ $-1.58114 = x+3$ $-3 \quad -3$ $-4.58114 = x$	Either form of the equation other than standard form. Jake 12 $y=2(x+3)^2-5$ Vertex of the parabola Rachel $(-3, -5)$ x-intercepts and y-intercept Yuki Sub $x=0$ 0^2+0+13 $(0, 13)$

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7.	You get this:	Fill in this:
	$y = -2x^2 + 14x + 60$	Either form of the equation other than standard form.
		Vertex of the parabola
		x-intercepts and y-intercept

$-2(x-10)(x+3)$

$x = \frac{-b}{2a}$ $\frac{-14}{2(-2)}$ $\frac{-14}{-4} = 3.5$

$\left(\frac{-b}{2a}, y\right)$

$y = -2(3.5-10)(3.5+3)$

$-2(-6.5)(6.5)$

$y = 84.5$

$(3.5, 84.5)$

$\left(\frac{-b}{2a}, y\right)$

$y = ax^2 + bx + c$

$(10,0)$ $(-3,0)$ $(0,60)$

$-2\left(x^2 - 7x + \frac{49}{4}\right) + 60 + \frac{49}{2}$

$-2\left(x - \frac{7}{2}\right)^2 + \frac{169}{2}$

$120 + \frac{49}{2} = \frac{169}{2}$

$-b/2a$ $7/2$ $-7/2$ $49/4$

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SECONDARY MATH II // MODULE 2
STRUCTURES OF EXPRESSIONS – 2.10

2.10

READY, SET, GO! Name Period Date

READY

A golf-pro practices his swing by driving golf balls off the edge of a cliff into a lake. The height of the ball above the lake (measured in meters) as a function of time (measured in seconds and represented by the variable t) from the instant of impact with the golf club is

$58.8 + 19.6t - 4.9t^2$.

The expressions below are equivalent:

$-4.9t^2 + 19.6t + 58.8$	standard form
$-4.9(t-6)(t+2)$	factored form
$-4.9(t-2)^2 + 78.4$	vertex form

1. Which expression is the most useful for finding how many seconds it takes for the ball to hit the water? Why?

2. Which expression is the most useful for finding the maximum height of the ball? Justify your answer.

3. If you wanted to know the height of the ball at exactly 3.5 seconds, which expression would help the most to find the answer? Why?

4. If you wanted to know the height of the cliff above the lake, which expression would you use? Why?

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SET

Topic: Finding multiple representations of a quadratic

One form of a quadratic function is given. Fill-in the missing forms.

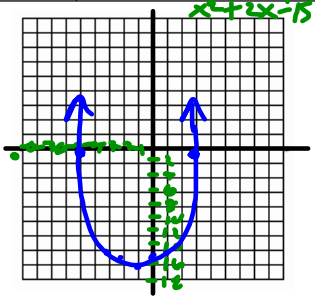
5 a. *Standard Form*	b. *Vertex Form*	c. *Factored Form*
$x^2+2x-15$	$y=(x+1)^2-16$	$y = (x+5)(x-3)$

d. *Table* (Include the vertex and at least 2 points on each side of the vertex.)

x	y
-3	-14
-2	-15
-1	-16
0	-15
1	-14

Show the first differences and the second differences.

e. *Graph*



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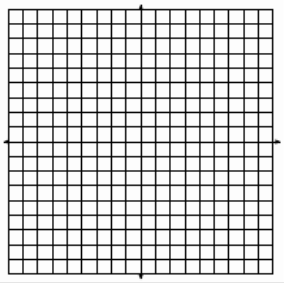
6 a. *Standard Form*	b. *Vertex Form* $y = -3(x-1)^2+3$	c. *Factored Form*

d. *Table* (Include the vertex and at least 2 points on each side of the vertex.)

x	y

Show the first differences and the second differences.

e. *Graph*



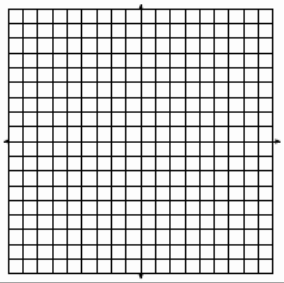
7 a. *Standard Form* $y = -x^2+10x-25$	b. *Vertex Form*	c. *Factored Form*

d. *Table* (Include the vertex and at least 2 points on each side of the vertex.)

x	y

Show the first differences and the second differences.

e. *Graph*



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8 a. *Standard Form*

b. *Vertex Form*

c. *Factored Form*

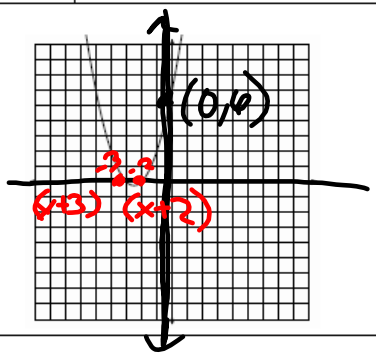
$a(x+3)(x+2)$

d. *Table* (Include the vertex and at least 2 points on each side of the vertex.)

x	y

Show the first differences and the second differences.

e. *Graph*



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9 a. *Standard Form*

x^2-6x+3

b. *Vertex Form*

$(x-3)^2-6$

c. *Factored Form*

Skip this for now

d. *Table*

x	y	
0	12	
1	2	−10
2	-4	−6
3	-6	−2
4	-4	+2
5	2	+6
6	12	+10

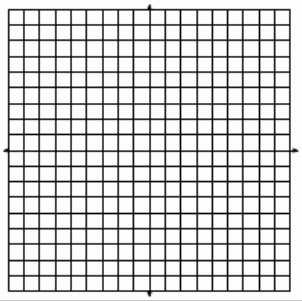
Show the first differences and the second differences.

$(x-3)(x-3)-6$

$x^2-3x-3x+9-6$

x^2-6x+3

e. *Graph*



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GO

Topic: Factoring Quadratics

Verify each factorization by multiplying.

10. $x^2 + 12x - 64 = (x + 16)(x - 4)$

11. $x^2 - 64 = (x + 8)(x - 8)$

12. $x^2 + 20x + 64 = (x + 16)(x + 4)$

13. $x^2 - 16x + 64 = (x - 8)(x - 8)$

Factor the following quadratic expressions, if possible. (Some will not factor.)

14. $x^2 - 5x + 6$

15. $x^2 - 7x + 6$

16. $x^2 - 5x - 36$

17. $m^2 + 16m + 63$

18. $s^2 - 3s - 1$

19. $x^2 + 7x + 2$

20. $x^2 + 14x + 49$

21. $x^2 - 9$

22. $c^2 + 11c + 3$

23. Which quadratic expression above could represent the area of a square? Explain.

24. Would any of the expressions above NOT be the side-lengths for a rectangle? Explain.

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