Lesson 9

READY, SET, GO! Name Period Date

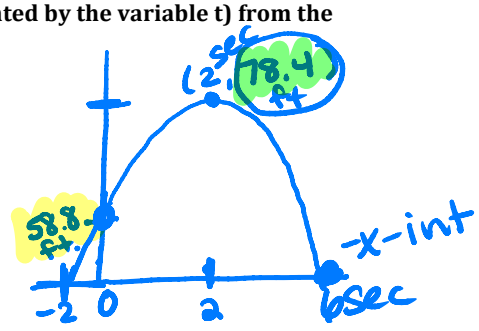
READY

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? Factored form gives the x-intercepts

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

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? Any form, plug in 3.5 for x and solve form g. (Factored form)

4. If you wanted to know the height of the cliff above the lake, which expression would you use? Why? Standard Form tells the y-intercept

SET

Topic: Finding multiple representations of a quadratic

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

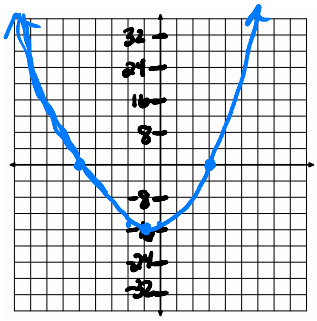
5 a. *Standard Form*	b. *Vertex Form*	c. *Factored Form*
$y = x^2 + 2x - 15$	$y = (x+1)^2 - 16$	$y = (x + 5)(x - 3)$

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

x	y
-5	0
-2	-15
-1	-16
0	-15
3	0

Show the first differences and the second differences.

e. *Graph*



x-int
(-5,0)
(3,0)
y-int
(0,-15)

$y = (x^2 + 2x + 1) - 15 - 1$

$(x+1)^2 - 16$

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

$y = -3x^2 + 6x - 3 + 3$

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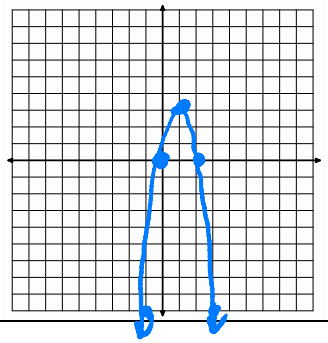
6 a. *Standard Form*	b. *Vertex Form*	c. *Factored Form*
$y = -3x^2 + 6x$	$y = -3(x-1)^2 + 3$	$y = -3x(x-2)$

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

x	y
0	0
1	3
2	0

Show the first differences and the second differences.

e. *Graph*



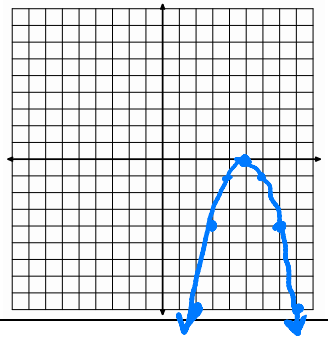
7 a. *Standard Form*	b. *Vertex Form*	c. *Factored Form*
$y = -x^2 + 10x - 25$	$y = -(x-5)^2$	$y = -(x-5)(x-5)$

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

x	y
5	0

Show the first differences and the second differences.

e. *Graph*



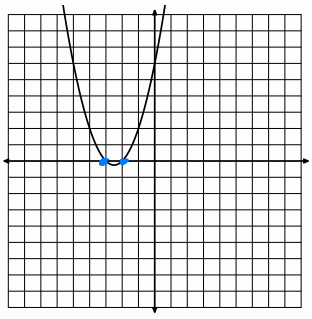
8 a. *Standard Form*	b. *Vertex Form*	c. *Factored Form*
$y = x^2 + 5x + 6$	$y = (x + \frac{5}{2})^2 - \frac{1}{4}$	$y = (x+2)(x+3)$

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*



$y = (x^2 + 5x + \frac{25}{4}) + 6 - \frac{25}{4}$

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

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$y = 2(x-3)^2 - 6$
$y = 2(x^2 - 6x + 9) - 6$
$y = 2x^2 - 12x + 18 - 6$
$y = 2x^2 - 12x + 12$

9 a. *Standard Form*	b. *Vertex Form*	c. *Factored Form*
$y = 2x^2 - 12x + 12$	$y = 2(x-3)^2 - 6$	Skip this for now

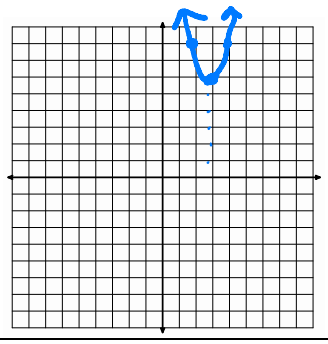
d. *Table*

x	y	
0	12	
1	2	
2	-4	
3	-6	
4	-4	+2
5	2	+6
6	12	+8

$y = 2(x-3)^2 - 6$

Show the first differences and the second differences.

e. *Graph*



GO

Topic: Factoring Quadratics

Verify each factorization by multiplying.

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

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

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

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

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

14. $x^2 - 5x + 6$
$(x-3)(x-2)$

15. $x^2 - 7x + 6$
$(x-6)(x-1)$

16. $x^2 - 5x - 36$
$(x-9)(x+4)$

17. $m^2 + 16m + 63$
$(m+7)(m+9)$

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

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

20. $x^2 + 14x + 49$
$(x+7)^2$

21. $x^2 - 9$
$(x+3)(x-3)$

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

23. Which quadratic expression above could represent the area of a square? Explain.
#20 factors are the same

24. Would any of the expressions above NOT be the side-lengths for a rectangle? Explain.
#18, #19, #22
They do not factor.