Algebra 1: Unit 06 (Intro to quadratic functions) summative assessment Name: KEY.

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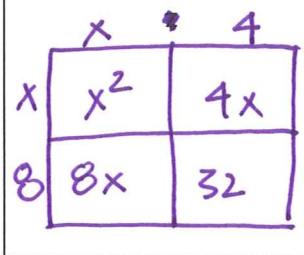
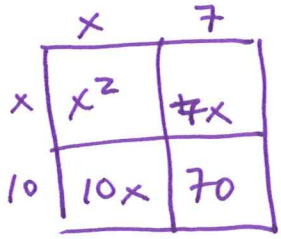
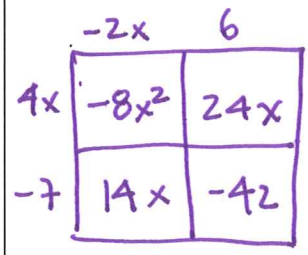
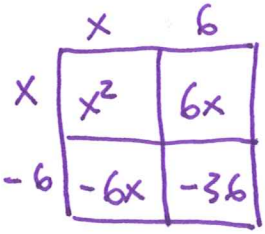
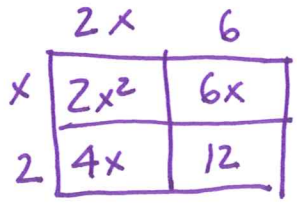
Part A: Forms of quadratic functions

Use the area model to convert between forms.

	Factored form	Area Model	Standard Form
1.	$(x+4)(x+8)$		$x^2+12x+32$
2.	$(x+7)(x+10)$		$x^2+17x+70$
3.	$(-2x+6)(4x-7)$		$-8x^2+38x-42$
4.	$(x+6)(x-6)$		x^2-36
5.	$(2x+6)(x+2)$ or $(x+3)(2x+4)$		$2x^2+10x+12$

2 EACH:

1: AREA MODEL

1: ANSWER

6. What is the standard form of $y=(3x-4)^2$?

a. $y=9x^2+16$

b. $y=9x^2-24x+16$

c. $y=9x^2-16$

d. $y=9x^2+8x+16$

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Part B: Critical features of parabolas

7. Which one of the parabolas opens down?

a. $y = (x - 4)(x + 5)$
b. $y = (2x - 9)(3x - 5)$
c. $y = (3x + 4)(-4x - 1)$
d. $y = (x + 2)(x - 1)$

2

8. What are the x-intercepts of the parabola given by: $y = (x - 2)(3x + 4)$

a. 2 and 0
b. 1 and 3
c. 2 and $-\frac{4}{3}$
d. 2 and $\frac{4}{3}$

2

9. What is the y-intercept of the parabola given by: $y = x^2 + 5x - 2$

a. -3
b. -2
c. 1
d. 5

2

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Part C: Solving quadratic equations

10. Solve the equation below for x. Then, check your solutions using substitution. *Show your work.*

Solve: $x^2 - x - 12 = 0$

	x	3
x	x^2	$3x$
-4	$-4x$	-12

$(x+3)(x-4)=0$

$x+3=0$

$x=-3$

$x-4=0$

$x=4$

3 { ½ : ATTEMP TO FACTOR; ½ : CORRECT FCTd FORM; 1 : 2 EQNS.; 1 : 2 SOLUTIONS

Check solution #1: $x^2 - x - 12 = 0$	Check solution #2: $x^2 - x - 12 = 0$

2 { 1 : SUBSTITUTES EACH SOLUTION SEPERATELY; 1 : 0=0 FOR BOTH CHECKS.

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Part D: Conceptual writing

Answer ONLY ONE of the questions below.

Check the box to the left of the question that you want to be graded.

☐ Check here to grade question 11

11. A student was given the following equation in factored form:

$$y = (x - 4)(x + 8)$$

a. Will the vertex of this parabola be a maximum or a minimum point? MINIMUM

b. Explain your answer using complete sentences.

BOTH SLOPES ARE POSITIVE [1]
SO THE PARABOLA OPENS UP [1]
SO THE VERTEX IS A MINIMUM. [1]

☐ Check here to grade question 12

12. Explain your process for factoring $f(x) = x^2 + 3x - 10$

[2]: EXPLAIN PROCESS

Give two more examples of *different* quadratic functions in standard form where your process would also work.

1. (e.g.) x^2+3x+2

2. x^2+6x+7

[½] EACH: FACTORABLE OVER $\mathbb{Z}$

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Part E: Real-world problems

13. A cannon fires a cannonball off of a cliff into the ocean. The ball's height h, in meters, above the ocean is a function of time t in seconds, as shown in the following equation:

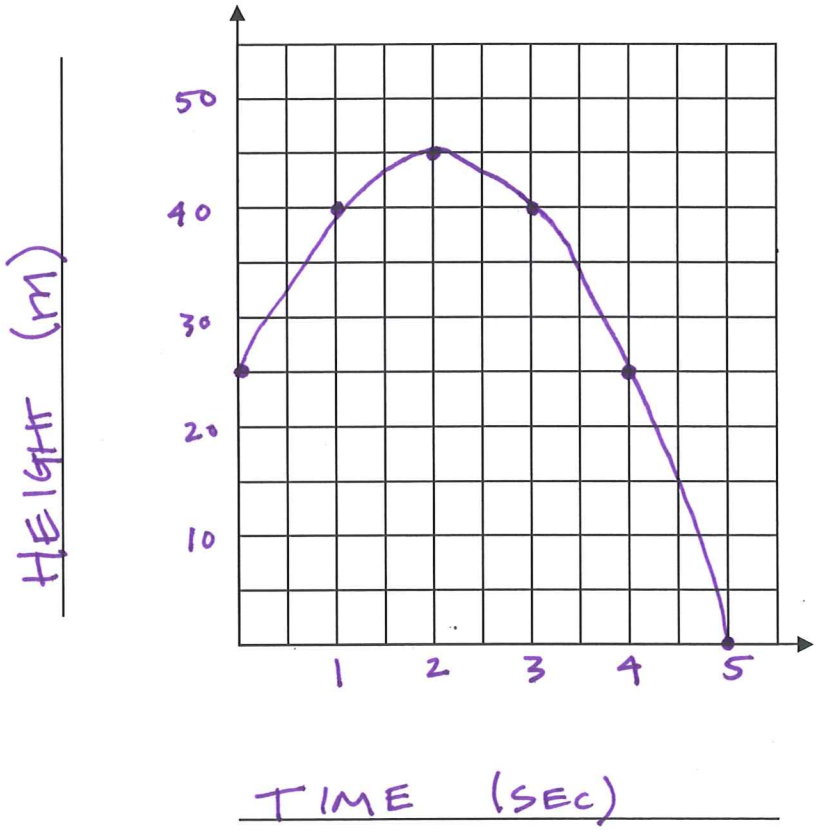
$$h(t) = -5t^2 + 20t + 25$$

a. On the grid, sketch a graph of $h(t)$

Show your work on this page.

CANNON BALL!

t	$h(t)$
0	25
1	40
2	45
3	40
4	25
5	0



3: 1: y-INT @ 0, 25
1: VERTEX @ 2, 45
1: x-INT @ 5, 0

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The questions below refer to the cannonball situation on the previous page.

> For each question, be sure to:
>
> - *use correct units in your answer*
> - *show your work or explain your reasoning*

b. Find $h(1)$. $h(1) =$ 40

Explain the meaning of $h(1)$ in the context of this problem:

AFTER 1 SEC
THE BALL IS 40 m ABOVE THE OCEAN.

c. How high is the cliff above the ocean?

25 m

THIS IS SHOWN BY THE y-INT.

d. Find the maximum height attained by the ball.

45 m.

THIS IS SHOWN IN THE VERTEX

1.5 EACH
1: ANS.
½: EXPLAIN.

e. How long does it take for the ball to hit the ocean?

5 SEC.

THIS IS SHOWN IN THE X-INTERCEPT.

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