

keep scrolling to  
get a sneak peek!

Help your Algebra students practice writing quadratic equations in vertex form given a point & vertex. Students will be eager to get the self-checking benefits from this circuit activity!

# WRITING QUADRATICS IN VERTEX FORM

Differentiated circuit worksheet

**WRITING QUADRATIC EQUATIONS IN VERTEX FORM**

**Directions:** A circuit is a route that starts and ends at the same place. Start in box 1 and solve the problem. Search through the remaining boxes for the answer to the problem you just solved. When you find the answer, complete that question. Continue until you have completed the original question. Record your path below.

1 → 8 → 3 → 4 → 2 → 10 → 7 → 6

Previous Answer:  $y = -(x+2)^2 + 6$  # 5

1. Write a quadratic equation in vertex form that goes through the point (4, 7) and has a vertex of (2, 3).  
 $7 = a(4-2)^2 + 3$   
 $7 = a(2)^2 + 3$   
 $7 = 4a + 3$   
 $-3 = -3$   
 $\frac{4 = 4a}{4} \quad a = 1$   
 $y = (x-2)^2 + 3$

2. Write a quadratic equation in vertex form that goes through the vertex of (-3, -1).  
 $3 = a(-1+3)^2 - 1$   
 $3 = a(2)^2 - 1$   
 $3 = 4a - 1$   
 $+1 = +1$   
 $\frac{4 = 4a}{4} \quad a = 1$

Previous Answer:  $y = (x-3)^2 + 4$  # 8

3. Write a quadratic equation in vertex form that goes through the vertex of (2, 3).



2 versions + answer key included

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Why do you need this?

# Writing Quadratic Equations in Vertex Form Circuit



It's self-checking! Your students will know if they are correct or not.



2 differentiated versions for all students practice this essential math skill.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## WRITING QUADRATIC EQUATIONS IN VERTEX FORM CIRCUIT

**Directions:** A circuit is a route that starts and ends at the same place. Start in the first box labeled 1 and solve the problem. Search through the remaining boxes for the answer you got for question 1. Now complete that question. Continue until you have completed the questions and you are back to the original question. Record your path below.

1 → \_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_

Previous Answer: $y = 2(x + 3)^2 - 2$ # _____	Previous Answer: _____	2. Write a quadratic equation in vertex form that goes through the point (3, 12) and has a vertex of (1, 4).	Previous Answer: _____
Previous Answer: $y = -4/3(x - 5)^2 + 3$ # _____	Previous Answer: _____	4. Write a quadratic equation in vertex form that goes through the point (2, 2) and has a vertex of (0, 6).	Previous Answer: _____
Previous Answer: $y = (x + 1)^2 + 4$ # _____	Previous Answer: _____	6. Write a quadratic equation in vertex form that goes through the point (-1, 6) and has a vertex of (-3, -2).	Previous Answer: _____
Previous Answer: $y = x^2 - 7$ # _____	Previous Answer: $y = (x - 2)^2 + 3$	7. Write a quadratic equation in vertex form that goes through the point (-3, -2) and has a vertex of (-5, 2).	8. Write a quadratic equation in vertex form that goes through the point (5, 8) and has a vertex of (3, 4).
Previous Answer: $y = (x - 4)^2 - 3$ # _____	Previous Answer: $y = (x + 3)^2 - 2$	9. Write a quadratic equation in vertex form that goes through the point (2, -4) and has a vertex of (1, -6).	10. Write a quadratic equation in vertex form that goes through the point (2, 2) and has a vertex of (0, -7).

**Toolbox:** Use these tools to help you solve the problems.

Vertex Form:  $y = a(x - h)^2 + k$   
Vertex: (h, k)

**Helpful steps:**

- 1) Substitute the given point into the equation.
- 2) Use the addition-subtraction method to solve for a.
- 3) Write the final equation using the given vertex and a.

# Quadratic Equations in Vertex Form *includes:*

Challenge: Given the equation  $y = a(x - 2)^2 + k$  and the points (0, 3), (2, 5), (4, 7), complete the equation by determining both  $a$  and  $k$ .

How are you feeling about this topic? Circle one:

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Vertex Form:  $y = a(x - h)^2 + k$   
Vertex: (h, k)  
Point: (x, y)

Helpful steps:  
1) Substitute the given vertex into the equation.  
2) Use the additional point to substitute into the equation & solve for  $a$ .  
3) Write the final quadratic equations using the given information and values that you found.

How are you feeling about this topic? Circle one:

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- ✓ 10 self-checking problems
- ✓ a detailed answer key
- ✓ a standard version with an extension question
- ✓ a basic version with helpful hints section
- ✓ student self assessment

# Quadratic Equations in Vertex Form

standards covered:

**CCSS:** HSA-CED.A.2, HSF-IF.C.7

**TEKs:** A1.7.A

**VA SOLs:** F.A.7.b, F.A.7.f

**WRITING QUADRATIC EQUATIONS IN VERTEX FORM CIRCUIT**

Previous Answer:  $y = -2(x - 6)^2 - 4$  # **10**

7. Write a quadratic equation in vertex form that goes through the point (3, 18) and has a vertex of (0, 0).  
 $18 = a(3 - 0)^2 + 0$   
 $18 = a(3)^2$   
 $\frac{18}{9} = \frac{9a}{9}$   
 $a = 2$   
 $y = 2x^2$

Previous Answer:  $y = 2(x - 1)^2 + 4$  # **1**

8. Write a quadratic equation in vertex form that goes through the point (2, -9) and has a vertex of (5, 3).  
 $-9 = a(2 - 5)^2 + 3$   
 $-9 = a(-3)^2 + 3$   
 $-9 = 9a + 3$   
 $-3 = 9a$   
 $\frac{-3}{9} = \frac{9a}{9}$   
 $a = -\frac{4}{3}$   
 $y = -\frac{4}{3}(x - 5)^2 + 3$

Previous Answer:  $y = -2(x - 2)^2 + 7$  # **6**

9. Write a quadratic equation in vertex form that goes through the point (-3, 8) and has a vertex of (-1, 4).  
 $8 = a(-3 + 1)^2 + 4$   
 $8 = a(-2)^2 + 4$   
 $8 = 4a + 4$   
 $-4 = 4a - 4$   
 $\frac{-4}{4} = \frac{4a}{4}$   
 $a = 1$   
 $y = (x + 1)^2 + 4$

Previous Answer:  $y = (x + 2)^2 - 5$  # **2**

10. Write a quadratic equation in vertex form that goes through the point (8, -12) and has a vertex of (6, -4).  
 $-12 = a(8 - 6)^2 - 4$   
 $-12 = a(2)^2 - 4$   
 $-12 = 4a - 4$   
 $+4 = 4a - 4$   
 $-8 = 4a$   
 $\frac{-8}{4} = \frac{4a}{4}$   
 $a = -2$   
 $y = -2(x - 6)^2 - 4$

Challenge: Given the equation  $y = a(x - 2)^2 + k$  and the points (0, 3), (2, 5), (4, 7), complete the equation by determining both  $a$  and  $k$ .

vertex: (2, k)  
one point is (2, 5)  
So, (2, 5) is  
pick either (0, 3) or (4, 7)

# how this circuit resource works

Then search for their answer on the worksheet. Once the answer is found, students complete the problem below it.

Students can track their path at the top.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

### WRITING QUADRATIC EQUATIONS IN VERTEX FORM CIRCUIT

Directions: A circuit is a route that starts and ends at the same place. Start in the first box labeled 1 and solve the problem. Search through the remaining boxes for the answer you got for question 1. Now complete that question. Continue until you have completed the questions and you are back to the original question. Record your path below.

1 → \_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_ → \_\_\_\_\_ → 1

Previous Answer: $y = -(x + 2)^2 + 6$ # _____	Previous Answer: $y = 2x^2$ # _____
1. Write a quadratic equation in vertex form that goes through the point (4, 7) and has a vertex of (2, 3).	2. Write a quadratic equation in vertex form that goes through the point (-1, 3) and has a vertex of (-3, -1).
Previous Answer: $y = (x - 3)^2 + 4$ # _____	Previous Answer: $y = 2(x - 1)^2 + 5$ # _____
3. Write a quadratic equation in vertex form that goes through the point (2, 7) and has a vertex of (1, 5).	4. Write a quadratic equation in vertex form that goes through the point (2, 8) and has a vertex of (0, 0).

Students start with the first question.

The last question they answer should lead back to problem #1 to “close” the circuit.

# how to use this resource

This is a great activity to use when reviewing how to write quadratic equations in vertex form.

It can be used right after teaching the concept or as homework.

This is also a **substitute-friendly** assignment!

Name: **Answer Key** Date: \_\_\_\_\_

## WRITING QUADRATIC EQUATIONS IN VERTEX FORM CIRCUIT

**Directions:** A circuit is a route that starts and ends at the same place. Start in the first box labeled 1 and solve the problem. Search through the remaining boxes for the answer you got for question 1. Now complete that question. Continue until you have completed the questions and you are back to the original question. Record your path below.

1 → **8** → **3** → **4** → **2** → **10** → **7** → **6** → **9** → **5** → 1

Previous Answer: $y = -(x + 2)^2 + 6$ # <b>5</b>	Previous Answer: $y = 2x^2$ # <b>4</b>
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1. Write a quadratic equation in vertex form that goes through the point (4, 7) and has a vertex of (2, 3).

$$7 = a(4-2)^2 + 3$$

$$7 = a(2)^2 + 3$$

$$7 = 4a + 3$$

$$-3 \quad -3$$

$$\frac{4 = 4a}{4} \quad a = 1$$

**y =**

Previous Answer:  $y = (x - 3)^2$

3. Write a quadratic equation that goes through the point (2, 7) and has a vertex of (1, 5).

$$7 = a(2-1)^2 + 5$$

$$7 = a(1)^2 + 5$$

$$7 = a + 5$$

$$-5 \quad -5$$

$$a = 2$$

**y = 2**

Previous Answer:  $y = 2(x - 1)^2 + 4$  # **1**

8. Write a quadratic equation in vertex form that goes through the point (2, -9) and has a vertex of (5, 3).

$$-9 = a(2-5)^2 + 3$$

$$-9 = a(-3)^2 + 3$$

$$-9 = 9a + 3$$

$$-3 \quad -3$$

$$\frac{-12 = 9a}{9} \quad a = -4/3$$

**y = -4/3(x-5)^2 + 3**

Previous Answer:  $y = -2(x - 2)^2 + 7$  # **6**

9. Write a quadratic equation in vertex form that goes through the point (-3, 8) and has a vertex of (-1, 4).

$$8 = a(-3+1)^2 + 4$$

$$8 = a(-2)^2 + 4$$

$$8 = 4a + 4$$

$$-4 \quad -4$$

$$\frac{4 = 4a}{4} \quad a = 1$$

**y = (x+1)^2 + 4**

Previous Answer:  $y = (x + 2)^2 - 5$  # **2**

10. Write a quadratic equation in vertex form that goes through the point (8, -12) and has a vertex of (6, -4).

$$-12 = a(8-6)^2 - 4$$

$$-12 = a(2)^2 - 4$$

$$-12 = 4a - 4$$

$$-4 \quad +4$$

$$\frac{-8 = 4a}{4} \quad a = -2$$

**y = 2(x-6)^2 - 4**



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**Rational Expression Operations - Addition & Subtraction**

Directions: Answer each question and type the question number with the matching answer in the answer column to the right.

#	Question	Answer	Type the matching question numbers here
1	$\frac{5}{x} + \frac{3}{x+1}$	$\frac{2x+1}{x+2}$	
2	$\frac{2}{x+4} - \frac{x^2}{x^2-16}$	$-\frac{1}{x^2-1}$	
3	$\frac{x+2}{x^2+4x+4} + \frac{2x}{x+2}$	$\frac{2x^2+2x+5}{x^2+x-2}$	
4	$\frac{x}{x-2} + \frac{3}{x-1}$	$\frac{-x^2+2x-8}{x^2-16}$	
5	$\frac{x}{4x+8} - \frac{1}{x^2+2x}$	$\frac{8x+5}{x^2+1}$	
6	$\frac{x+2}{x-1} + \frac{x-1}{x+2}$	$\frac{x^2-3x+7}{x^2-4}$	
7	$\frac{2x+1}{x^2-4} + \frac{x-3}{x+2}$	$\frac{x^2+2x-6}{x^2-3x+2}$	
8	$\frac{x^2+2x}{x^2-1} - \frac{x+1}{x-1}$	$\frac{x-2}{4x}$	

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hey there!

My name is Malia and I'm passionate about making learning and practicing math fun. I love creating engaging math resources for my students and I hope your students enjoy this activity too!

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