



Why do you need this?

# Writing Polynomial Equations from Graphs 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 POLYNOMIAL EQUATIONS FROM GRAPHS

**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: $y = 1/4(x+2)^2(x-3)^2$ # _____	2. Write the polynomial equation in factored form given the graph.
1. Write the polynomial equation in factored form given the graph.	
Previous Answer: $y = -2x(x-4)(x+3)$ # _____	4. Write the polynomial equation in factored form given the graph.
3. Write the polynomial equation in factored form given the graph.	
Previous Answer: $y = -1/3x(x+5)^2(x+2)^2$ # _____	6. Write the polynomial equation in factored form given the graph.
5. Write the polynomial equation in factored form given the graph.	
Previous Answer: $y = (x+3)(x-2)^2$ # _____	8. Write the polynomial equation in factored form given the graph.
7. Write the polynomial equation in factored form given the graph.	
Previous Answer: $y = -(x+1)(x-2)^3$ # _____	10. Write the polynomial equation in factored form given the graph.
4. Write the polynomial equation in factored form given the graph.	

**Helpful Hints:** Use these hints to help you solve the problems.

- Multiplicity of 1 Degree of 1
- Multiplicity of 2 Degree of 2

**Helpful steps:**

- 1) Identify the roots/factors.
- 2) Identify the multiplicity of each root.
- 3) Write each factor with its corresponding multiplicity.

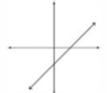
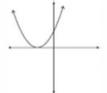
# Writing Polynomial Equations from Graphs *includes:*

Challenge: The graphs of two polynomials,  $f(x) = 4x^3 + 12x^2 - 2x$  and  $g(x) = -4x^2 - x + 4$ , intersect at a certain point(s). Identify the point(s) of intersection.

How are you feeling about this topic? Circle one:

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Helpful Hints: Use these hints to help you solve the problems.

 Multiplicity of 1 Degree of 1	 Multiplicity of 2 Degree of 2	<b>Helpful steps:</b> 1) Identify the roots & write them as factors. 2) Identify the multiplicity of each root. 3) Write each factor with their corresponding multiplicity. 4) Using the roots & another point, find the leading coefficient.
 Multiplicity of 3 Degree of 3		

How are you feeling about this topic? Circle one:

- ✓ 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

# Writing Polynomial Equations from Graphs

standards covered:

**CCSS:** HSA-APR.B.3, HSF-IF.C.8

**TEKs:** P2.1

**VA SOLs:** F.A11.8

## WRITING POLYNOMIAL EQUATIONS FROM GRAPHS

Previous Answer:  $y = -3/4(x-1)(x+2)(x-4)$  # **6**

7. Write the polynomial equation in factored form given the graph.

$12 = a(0+2)(0-1)(0-3)$   
 $12 = a(2)(-1)(-3)$   
 $12 = a(6)$   
 $a = 2$

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

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

8. Write the polynomial equation in factored form given the graph.

$9 = a(0+2)^2(0-3)^2$   
 $9 = a(4)(9)$   
 $9 = a(36)$   
 $36$   
 $a = 1/4$

$y = 1/4(x+2)^2(x-3)^2$

Previous Answer:  $y = 2(x+2)(x-1)(x-3)$  # **7**

9. Write the polynomial equation in factored form given the graph.

$4 = a(-3+5)^2(-3+2)^2(-3-0)$   
 $4 = a(2)^2(-1)^2(-3)$   
 $4 = a(-12)$   
 $-12$   
 $a = -1/3$

$y = -1/3x(x+5)^2(x+2)^2$

Previous Answer:  $y = 3x(x-3)^3$  # **4**

10. Write the polynomial equation in factored form given the graph.

$40 = a(2+3)(2-0)(2-4)$   
 $40 = a(5)(2)(-2)$   
 $40 = a(-20)$   
 $-20$   
 $a = -2$

$y = -2x(x+3)(x-4)$

Challenge: The graphs of two polynomials,  $f(x) = 4x^3 + 12x^2 - 2x$  and  $g(x) = -4x^2 - x + 4$ , intersect at a certain point(s). Identify the point(s) of intersection.

$4x^3 + 12x^2 - 2x = -4x^2 - x + 4$   
 $+4x^2 + x - 4 + 4x^2 + x - 4$   
 $4x^3 + 16x^2 - x - 4 = 0$   
 $4x^2(x+4) - 1(x+4) = 0$   
 $(4x^2 - 1)(x+4) = 0$   
 $(2x-1)(2x+1)(x+4) = 0$   
 $x = 1/2, -1/2, -4$   
 $-4(-1/2)^2 - (-1/2) + 4 = -4(1/4) + 1/2 + 4 = -1 + 1/2 + 4 = 3 1/2$   
 $-4(1/2)^2 - (1/2) + 4 = -4(1/4) - 1/2 + 4 = -1 - 1/2 + 4 = 2 1/2$

# 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: \_\_\_\_\_

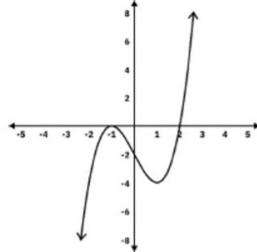
## WRITING POLYNOMIAL EQUATIONS FROM GRAPHS

**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

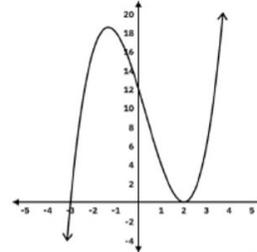
Previous Answer:  $y = -(x-4)^2(x+1)^2$  # \_\_\_\_\_

1. Write the polynomial equation in factored form given the graph.



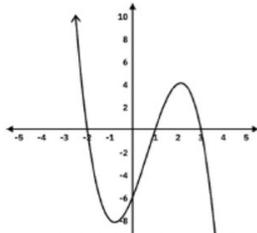
Previous Answer:  $y = (x+1)^2(x-2)^2$  # \_\_\_\_\_

2. Write the polynomial equation in factored form given the graph.



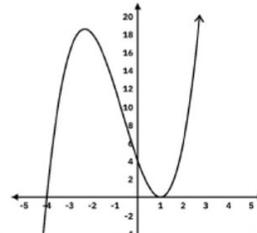
Previous Answer:  $y = (x-2)(x+1)^2(x-3)^2$  # \_\_\_\_\_

3. Write the polynomial equation in factored form given the graph.



Previous Answer:  $y = (x-2)(x+1)^2$  # \_\_\_\_\_

4. Write the polynomial equation in factored form given the graph.



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 polynomial equations given the graph.

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

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

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

## WRITING POLYNOMIAL EQUATIONS FROM GRAPHS

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

Previous Answer: $y = 1/4(x+2)^2(x-3)^2$ # <b>8</b>	Previous Answer: $y = x^3(x+3)^2$ # <b>5</b>
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1. Write the polynomial equation in factored form given the graph.

$0 = a(0+1)(0-2)(0-3)$   
 $0 = a(1)(-2)(-3)$   
 $0 = a(6)$   
 $a = 1$

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

Previous Answer:  $y = -2x(x-4)$

3. Write the polynomial equation in factored form given the graph.

$8 = a(0+1)(0-2)(0-4)$   
 $8 = a(1)(-2)(-4)$   
 $8 = a(8)$   
 $a = 1$

$y = (x+1)^2(x-2)(x-4)$

Previous Answer:  $y = -1/3x(x+2)$

5. Write the polynomial equation in factored form given the graph.

$-4 = a(-2+3)^2(-2-0)$   
 $-4 = a(1)(-3)$   
 $-4 = a(-3)$   
 $a = 1/3$

$y = 1/3x(x+3)(x+2)$

## WRITING POLYNOMIAL EQUATIONS FROM GRAPHS

Previous Answer: $y = -3/4(x-1)(x+2)(x-4)$ # <b>6</b>	Previous Answer: $y = -x(x-2)(x-4)^2$ # <b>2</b>
---	--

7. Write the polynomial equation in factored form given the graph.

$12 = a(0+2)(0-1)(0-3)$   
 $12 = a(2)(-1)(-3)$   
 $12 = a(6)$   
 $a = 2$

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

8. Write the polynomial equation in factored form given the graph.

$9 = a(0+2)^2(0-3)^2$   
 $9 = a(4)(9)$   
 $9 = a(36)$   
 $a = 1/4$

$y = 1/4(x+2)^2(x-3)^2$

Previous Answer: $y = 2(x+2)(x-1)(x-3)$ # <b>7</b>	Previous Answer: $y = 3x(x-3)^3$ # <b>4</b>
--	---

9. Write the polynomial equation in factored form given the graph.

$4 = a(-3+5)(-3+2)(-3-0)$   
 $4 = a(2)(-1)(-3)$   
 $4 = a(-12)$   
 $a = -1/3$

$y = -1/3x(x+5)(x+2)$

10. Write the polynomial equation in factored form given the graph.

$40 = a(2+3)(2-0)(2-4)$   
 $40 = a(5)(2)(-2)$   
 $40 = a(-20)$   
 $a = -2$

$y = -2x(x+3)(x-4)$

Challenge: The graphs of two polynomials  $f(x) = 11x^3 + 12x^2 - 2x$  and  $g(x) = -11x^2 - x + 11$  intersect at



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**Answer Key**  
**ADDING & SUBTRACTING RATIONAL EXPRESSIONS**  
 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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