

Why do you need this?

Writing Exponential Equations 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 EXPONENTIAL FUNCTIONS FROM POINTS 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: $y = 7 \cdot 3^x$	# _____	Previous
1. Write the exponential function given the points (0, 6) and (1, 18). Is it growth or decay?	2. Write points (
Previous Answer: $y = 2 \cdot 2^x$ <td># _____</td> <td>Previous</td>	# _____	Previous
3. Write the exponential function given the points (0, 36) and (1, 24). Is it growth or decay?	4. Write points (2	
Previous Answer: $y = 7.5 \cdot 2^x$ <td># _____</td> <td>Previous</td>	# _____	Previous
b. Write the exponential function given the points (0, 20) and (2, 45). Is it growth or decay?	b. Write points (1	

Previous Answer: $y = 7 \cdot 2^x$	# _____	Previous Answer: $y = 2 \cdot 2^x$
7. Write the exponential function given the points (0, 4) and (1, 6). Is it growth or decay? $a = \underline{\hspace{1cm}}$ $b = \underline{\hspace{1cm}}$ $y = \underline{\hspace{1cm}}$ Circle: Growth or Decay	8. Write the exponential function given the points (0, 10) and (3, 80). Is it growth or decay? $a = \underline{\hspace{1cm}}$ $b = \underline{\hspace{1cm}}$ $y = \underline{\hspace{1cm}}$ Circle: Growth or Decay	
Previous Answer: $y = 4 \cdot 3^x$ <td># _____<td>Previous Answer: $y = 5 \cdot 2^x$</td></td>	# _____ <td>Previous Answer: $y = 5 \cdot 2^x$</td>	Previous Answer: $y = 5 \cdot 2^x$
9. Write the exponential function given the points (0, 3) and (2, 108). Is it growth or decay? $a = \underline{\hspace{1cm}}$ $b = \underline{\hspace{1cm}}$ $y = \underline{\hspace{1cm}}$ Circle: Growth or Decay	10. Write the exponential function given the points (0, 8) and (2, 18). Is it growth or decay? $a = \underline{\hspace{1cm}}$ $b = \underline{\hspace{1cm}}$ $y = \underline{\hspace{1cm}}$ Circle: Growth or Decay	

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

Helpful Steps:
Step 1: Use the y-intercept to find the a-value.
Step 2: Take the a-value and the other point and plug into the $y = ab^x$ to find the b-value.
Step 3: Write the final equation in the form $y = ab^x$.

Writing Exponential Equations Circuit *includes:*

Challenge: Show all your work in the space below.

A certain population of bacteria is being studied in a lab. After measuring the number of bacteria at different times, the data shows two points on the graph: (1, 18) and (3, 162). Assume the situation can be modeled by an exponential function of the form $y = ab^x$ where y is the number of bacteria and x is the time in hours.

a) Write the exponential equation that models the situation.

b) Does this situation represent growth or decay? How do you know?

c) Use your equation to predict the amount of bacteria when $x = 0$. Explain what this value means in the context of the situation.

How are you feeling about this topic? Circle one: 😊 😐 😱 😞

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

Helpful Steps:

Step 1: Use the y-intercept to find the a-value.

Step 2: Take the a-value and the other point and plug into the equation $y = ab^x$ to find the b-value.

Step 3: Write the final equation in the form $y = ab^x$.

Reminders:

- a is the starting value.
- $b > 1$ means exponential growth
- $0 < b < 1$ means exponential decay

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 Exponential Equations Circuit

standards covered:

CCSS: HSA-CED.A.2

TEKs: A1.9.C

VA SOLs: F.A11.6.b

WRITING EXPONENTIAL FUNCTIONS FROM POINTS CIRCUIT

Previous Answer: $y = 7 \cdot 2^x$ # 5

7. Write the exponential function given the points (0, 4) and (1, 6). Is it growth or decay?

$\frac{6=4b}{4}$
 $3/2 = b$
 $a = 4$ $b = 3/2$ $y = 4(3/2)^x$
Circle: Growth or Decay

Previous Answer: $y = 2 \cdot 2^x$ # 4

8. Write the exponential function given the points (0, 10) and (3, 80). Is it growth or decay?

$\frac{80=10b^3}{10}$
 $\sqrt[3]{8} = \sqrt[3]{b^3}$ $b=2$
 $a = 10$ $b = 2$ $y = 10 \cdot 2^x$
Circle: Growth or Decay

Previous Answer: $y = 4 \cdot 3^x$ # 3

9. Write the exponential function given the points (0, 3) and (2, 108). Is it growth or decay?

$\frac{108=3b^2}{3}$ $b=6$
 $\sqrt{36} = \sqrt{b^2}$
 $a = 3$ $b = 6$ $y = 3 \cdot 6^x$
Circle: Growth or Decay

Previous Answer: $y = 5 \cdot 2^x$ # 2

10. Write the exponential function given the points (0, 8) and (2, 18). Is it growth or decay?

$\frac{18=8 \cdot b^2}{8}$ $b=3/2$
 $\sqrt{9/4} = \sqrt{b^2}$
 $a = 8$ $b = 3/2$ $y = 8(3/2)^x$
Circle: Growth or Decay

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

Helpful Steps:
Step 1: Use the y-intercept to find the a-value.
Step 2: Take the a-value and the other point to find the b-value.

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 EXPONENTIAL FUNCTIONS FROM POINTS 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: $y = 4(3/2)^x$ # _____	Previous Answer: $y = 3 \cdot 6^x$ # _____
1. Write the exponential function given the points (0, 3) and (1, 6). Is it growth or decay? $a = \underline{\hspace{1cm}}$ $b = \underline{\hspace{1cm}}$ $y = \underline{\hspace{2cm}}$ Circle: Growth or Decay	2. Write the exponential function given the points (0, 5) and (2, 20). Is it growth or decay? $a = \underline{\hspace{1cm}}$ $b = \underline{\hspace{1cm}}$ $y = \underline{\hspace{2cm}}$ Circle: Growth or Decay
Previous Answer: $y = 4(1/2)^x$ # _____	Previous Answer: $y = 8(3/2)^x$ # _____
3. Write the exponential function given the points (0, 4) and (2, 36). Is it growth or decay? $a = \underline{\hspace{1cm}}$ $b = \underline{\hspace{1cm}}$ $y = \underline{\hspace{2cm}}$ Circle: Growth or Decay	4. Write the exponential function given the points (0, 2) and (3, 16). Is it growth or decay? $a = \underline{\hspace{1cm}}$ $b = \underline{\hspace{1cm}}$ $y = \underline{\hspace{2cm}}$ Circle: Growth or Decay

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

WRITING EXPONENTIAL FUNCTIONS FROM POINTS CIRCUIT

Previous Answer: $y = 7 \cdot 2^x$ # <u>5</u>	Previous Answer: $y = 2 \cdot 2^x$ # <u>4</u>
7. Write the exponential function given the points (0, 4) and (1, 6). Is it growth or decay? $\frac{6}{4} = \frac{ab}{a}$ $\frac{6}{4} = b$ $\frac{3}{2} = b$ $a = 4 \quad b = \frac{3}{2} \quad y = 4\left(\frac{3}{2}\right)^x$	8. Write the exponential function given the points (0, 10) and (3, 80). Is it growth or decay? $\frac{80}{10} = \frac{10b^3}{10}$ $\sqrt[3]{8} = \sqrt[3]{10^3} \quad b = 2$ $a = 10 \quad b = 2 \quad y = 10 \cdot 2^x$

Name: **Answer Key** Date: _____

WRITING EXPONENTIAL FUNCTIONS FROM POINTS 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 → 6 → 3 → 9 → 2 → 10 → 4 → 8 → 5 → 7 → 1

Previous Answer: $y = 7 \cdot 3^x$ # <u>7</u>	Previous Answer: $y = 18(1/2)^x$ # <u>9</u>
1. Write the exponential function given the points (0, 6) and (1, 18). Is it growth or decay? $a = 6 \quad \frac{18}{6} = \frac{6(b^1)}{6}$ $3 = b$ $y = 6 \cdot 3^x$ <p style="text-align: center;">growth</p>	2. Write the exponential function given the points (1, 8) and (3, 32). Is it growth or decay? $8 = ab^1 \quad 32 = \left(\frac{8}{b}\right)(b^3)$ $a = \frac{8}{b} \quad \frac{32}{8} = \frac{8b^2}{8}$ $a = \frac{8}{2} \quad \sqrt[2]{4} = \sqrt[2]{b^2} \quad y = 4 \cdot 2^x$ $a = 4 \quad b = 2$ <p style="text-align: center;">growth</p>
Previous Answer: $y = 2 \cdot 2^x$ # <u>6</u>	Previous Answer: $y = 4(5/2)^x$ # <u>10</u>
3. Write the exponential function given the points (0, 36) and (1, 24). Is it growth or decay? $a = 36 \quad \frac{24}{36} = \frac{36 \cdot b^1}{36}$ $b = \frac{2}{3}$	4. Write the exponential function given the points (2, 9) and (4, 1). Is it growth or decay? $9 = ab^2 \quad 1 = \left(\frac{9}{b^2}\right)(b^4)$ $\frac{9}{b^2} = \frac{9b^2}{b^2} \quad 1 = 9b^2$

Circle: Growth or Decay

Previous Answer: $y = 4 \cdot 3^x$

9. Write the exponential function given the points (0, 3) and (2, 108). Is it growth or decay?

$$\frac{108}{3} = \frac{3b^2}{3}$$

$$\sqrt[2]{36} = \sqrt[2]{b^2}$$

$$a = 3 \quad b = 6 \quad y = 3 \cdot 6^x$$

Circle: Growth or Decay

Helpful Hints: Use these hints

Helpful Steps:

- Step 1: Use the y-intercept to find a.
- Step 2: Take the ratio of the y-values and divide by the ratio of the x-values to find b.
- Step 3: Write the exponential function $y = ab^x$.

Reminders:

- a is the starting value.
- $b > 1$ means growth.
- $0 < b < 1$ means decay.

This is a great activity to use when reviewing how to write exponential equations given two points.

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

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

You may also enjoy...

WRITING EXPONENTIAL FUNCTIONS

Algebra 2 Guided Notes

WRITING EXPONENTIAL FUNCTIONS

Step 1: Write equations in the form $y = ab^x$ for each ordered pair.

Step 2: Solve one of the equations for a .

Step 3: Substitute a from step 2 into the other equation to find b .

Step 4: Plug b from step 3 into the equation from step 2 to solve for a .

Directions: Write an exponential function that passes through the given points.

1. (1, 2) & (2, 4)

2. (2, 24) & (3, 144)

3. (1, 64)

4. (1, 2) & (3, 60)

Answer key included

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CHARACTERISTICS OF EXPONENTIAL FUNCTIONS

Football Task Cards

CHARACTERISTICS OF EXPONENTIAL TASK CARDS

Directions: Identify the key characteristics of each graph in the box.

Name: **ANSWER KEY** Date: _____

Identify each characteristic of the graph.

Identify each characteristic of the graph.

Recording sheet & Answer key included

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EXPONENTIAL & LOGARITHMIC FUNCTIONS

Algebra 2 Guided Notes

TRANSFORMATIONS OF LOGARITHMIC FUNCTIONS

Step 1: Identify the value of your a and its base.

Step 2: Identify the a of the given function.

Step 3: Create a table of values.

Step 4: Plot the points.

GRAPHING EXPONENTIAL FUNCTIONS

Step 1: Identify the value of your $base$ to determine if your function represents $growth$ or $decay$.

Step 2: Create a $table$ of values.

Step 3: Plot your points.

Connect them with a $smooth$ curve.

TRANSFORMATIONS OF LOGARITHMIC FUNCTIONS

Step 1: Identify the $parent$ function and its base.

Step 2: Identify the $transformations$ of the given function.

Step 3: Create a $table$ of values.

Step 4: Plot the points on the graph and connect them with a $smooth$ curve.

EXPONENTIAL FUNCTIONS WITH BASE E

The Natural Base e

e is on number that was discovered by Jacob Bernoulli in 1683.

Natural base exponential function: $f(x) = e^x$

Exponential growth function: when $x > 0$ and $e > 1$

Exponential decay function: when $x < 0$ and $e < 1$

Answer key included

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check it out!

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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