

keep scrolling to get a sneak peek!

Help your Algebra students practice applying various skills to **rational functions.**

This bundle of circuit worksheets will help your students review these skills throughout the unit, while also being able to self check their work!

RATIONAL FUNCTIONS DIFFERENTIATED CIRCUITS Unit Worksheet Bundle

SIMPLIFYING RATIONAL EXPRESSIONS

Previous Answer: $\frac{x-3}{x-1}$ # 1 Previous Answer: $\frac{x^2-4}{x^2-9}$

7. Simplify the rational expression.
$$\frac{x^3+2x^2-8x}{3x^3+2x^2-x}$$
$$\frac{x(x^2+2x-8)}{x(3x^2+2x-1)}$$
$$\frac{x(x+4)(x-2)}{x(3x-1)(x+1)}$$
$$\frac{(x+4)(x-2)}{(3x-1)(x+1)}$$

Previous Answer: $\frac{5(x+1)}{x+3}$ # 8 Previous Answer: $\frac{x^2-4}{x^2-9}$

9. Simplify the rational expression.
$$\frac{6x^2+9x}{3x^2-3x-18}$$
$$\frac{3x(2x+3)}{3(x-3)(x+2)}$$
$$\frac{2x+3}{(x-3)(x+2)}$$

Challenge: Simplify the rational expression.
$$\frac{(x^2+9x+18)(x^2+6x+8)}{(x^2+6x+8)(x^2+9x+14)}$$

8. Simplify the rational expression.
$$\frac{x^2-x-6}{x^2-9}$$
$$\frac{(x+4)(x-2)}{(x-3)(x+3)}$$

10. Simplify the rational expression.
$$\frac{x^2-1}{x^2-9}$$
$$\frac{(x-1)(x+1)}{(x-3)(x+3)}$$

ADDING & SUBTRACTING RATIONAL EXPRESSIONS

Directions: A circuit is a route that starts and ends at the same point and solve the problem. Search through the remaining boxes for the original question. Continue until you have completed the original question. Record your path below.
1 → 3 → 8 → 2 → 4 → 7 → 9

Previous Answer: $\frac{x-2}{x^2-4x+3}$ # 10 Previous Answer: $\frac{3x}{x^2+4x-4}$

1. Simplify the rational expression.
$$\frac{x+4}{x+4} + \frac{2x}{x^2-x-6} + \frac{2x}{x^2-9}$$
$$\frac{(x+4)(x+2)}{(x+4)(x+2)} + \frac{2x}{(x-3)(x+2)} + \frac{2x}{(x-3)(x+3)}$$
$$\frac{x^2+7x+12}{x^2+2x^2-9x-18} + \frac{2x}{x^2+2x^2-9x-18}$$
$$\frac{3x^2+11x+12}{x^2+2x^2-9x-18}$$

2. Simplify the rational expression.
$$\frac{3x}{x^2+4x-4} - \frac{2}{x^2+4x-4}$$
$$\frac{3x-2}{x^2+4x-4}$$

3. Simplify the rational expression.
$$\frac{3x^2+11x+12}{x^2+2x-9x-18}$$
$$\frac{3x^2+11x+12}{x^2+2x^2-9x-18}$$

4. Simplify the rational expression.
$$\frac{4x-8}{x^2-4x+4} - \frac{x}{x^2+4x+4}$$
$$\frac{4x-8-x^2-4x+4}{x^2-4x+4}$$
$$\frac{-x^2-4x-4}{x^2-4x+4}$$

ANG COMPLEX FRACTIONS CIRCUIT

Directions: A circuit is a route that starts and ends at the same point. Search through the remaining boxes for the answer you are looking for. Continue until you have completed the question. Record your path below.
→ 9 → 2 → 8 → 5 → 3 → 10

7 Previous Answer: $\frac{x^2+6x}{x}$

2. Simplify.
$$\frac{\frac{3}{x+1} + \frac{2x}{x(x+1)}}{\frac{5x+2}{x(x+1)}} \Rightarrow \frac{3(x+1)+2x}{x(x+1)} \cdot \frac{x(x+1)}{5x+2}$$
$$\frac{3x+3+2x}{x(x+1)} \cdot \frac{x(x+1)}{5x+2}$$
$$\frac{5x+3}{x(x+1)} \cdot \frac{x(x+1)}{5x+2}$$
$$\frac{5x+3}{5x+2}$$

5 Previous Answer: $\frac{3x}{x^2+4x}$

4. Simplify.
$$\frac{\frac{1}{x+1} + \frac{1}{x-1}}{\frac{1}{x+1} + \frac{1}{x-1}}$$
$$\frac{\frac{x-1}{(x+1)(x-1)} + \frac{x+1}{(x-1)(x+1)}}{\frac{x-1}{(x+1)(x-1)} + \frac{x+1}{(x-1)(x+1)}}$$
$$\frac{x-1+x+1}{x^2-1} \cdot \frac{x^2-1}{x-1+x+1}$$
$$\frac{2x}{2x}$$
$$1$$



5 TOPICS + 2 VERSIONS EACH + ANSWER KEYS

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Why do you need this?

Rational Functions Unit Circuit Worksheets



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.

SOLVING RATIONAL EQUATIONS CIRCUIT

Previous Answer: $x = -10$ # _____

7. Solve. $\frac{1}{x} = \frac{x}{12} + \frac{x+3}{3x}$

Previous Answer: $x = -4$ # _____

8. Solve. $4 = 2x + 1$

Name: _____

ADDING & SUBTRACTING RATIONAL EXPRESSIONS 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: $x = -2$ # _____

10. Solve. $\frac{2}{x+1} + \frac{2x}{x^2-1} = 0$

1. Simplify the rational expression. $\frac{x+4}{x^2-x-6} + \frac{2x}{x^2-9}$

Previous Answer: $\frac{2x-3x+4}{x^2-16}$

2. Simplify the rational expression. $\frac{3x}{x^2+x-6} - \frac{2}{x^2-4}$

Previous Answer: $\frac{3x^2+11x+12}{x^3+2x^2-9x-18}$ # _____

3. Simplify the rational expression. $\frac{x^2-1}{x^2-5x+6} + \frac{2x}{x^2-9}$

4. Simplify the rational expression. $\frac{3x^2+4x-6}{x^3+3x^2-4x} - \frac{2}{x^2+4x+4}$

Previous Answer: $\frac{-a}{x^2-3x}$ # _____

6. Simplify the rational expression. $\frac{-a}{5x} + \frac{2x}{x+2}$

Helpful Hints: Use these hints to help you solve the problem

- If each term of the equation has a common denominator and solve the numerators as if it were $\frac{x}{a} + \frac{y}{a} = \frac{z}{a} \gg x + y = z$
- If the denominators are different, find the LCD (Least Common Denominator) and eliminate the denominators.
- Always check for extraneous solutions!

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Each Rational Functions Circuit includes:

Challenge: Simplify the rational expression.

$$\frac{x^2-4}{x^2-9} + \frac{x-3}{x+3} - \frac{2}{x-1}$$

How are you feeling about this topic? Circle one:

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

- If each term of the equation has a common denominator, eliminate denominators and solve the numerators as if it were a linear equation.

$$\frac{x}{a} + \frac{y}{a} = \frac{z}{a} \gg x + y = z$$

- If the denominators are different, find the LCD (least common denominator) to eliminate the denominators.

- Always check for extraneous solutions!

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

Rational Functions Unit Circuit Worksheets

skills covered:

Simplifying Rational Expressions

Multiplying & Dividing

Adding & Subtracting

Simplifying Complex Fractions

Solving Rational Equations

Name: **Answer Key** Date: _____

MULTIPLYING & DIVIDING RATIONAL EXPRESSIONS 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 → **7** → **2** → **10** → **6** → **4** → **3** → **5** → **8** → **9** → 1

Previous Answer: $\frac{8(x-3)}{3(x+1)(x-4)}$ # 9	Previous Answer: $\frac{x(x+9)(x+1)}{(x+3)(x-2)}$ # 7
1. Simplify the rational expression. $\frac{2x^2-8}{x^2+5x+6} \cdot \frac{x+3}{2x-4}$ $\frac{2(x-2)(x+2)(x+3)}{(x+3)(x+2)(2)(x+2)}$ $\frac{1}{1}$	2. Simplify the rational expression. $\frac{3x^2+6x}{6x^2-12x} \cdot \frac{x^2-4}{x^2+2x-8}$ $\frac{3x(x+2)(x-2)(x+2)}{2x(x-2)(x+4)(x-2)}$ $\frac{(x+3)(x+2)}{2(x+4)(x-2)}$
Previous Answer: $\frac{(x-4)(x+2)}{2(x+3)(x-3)}$ # 4	Previous Answer: $\frac{2(2x-3)}{x-4}$ # 6
3. Simplify the rational expression. $\frac{4x^2-25}{2x^2-5x-3} + \frac{2x+5}{x-3}$ $\frac{(2x-5)(2x+5)}{(2x+1)(x-3)} + \frac{x-3}{2x+5}$ $\frac{2x-5}{2x+1}$	4. Simplify the rational expression. $\frac{x^2-x-12}{x^2-9} \cdot \frac{3x^2+6x}{6x^2+18x}$ $\frac{(x-4)(x+3)(x+3)(x+2)}{(x-3)(x+3)(2)(3)(x+3)}$ $\frac{(x-4)(x+2)}{2(x-3)(x+3)}$
Previous Answer: $\frac{2x+5}{2x+1}$ # 3	5. Simplify the rational expression. # 3

Rational Functions Unit Circuits Bundle

standards covered:

CCSS: HSA-SSE.B.3, HSA-REI.A.2

TEKs: A2.7.F, A2.6.I, A2.6.J

VA SOLs: EO.All.1.a, EI.All.3.c

SIMPLIFYING RATIONAL EXPRESSIONS CIRCUIT

<p>Previous Answer: $\frac{x-3}{x-1}$ # <u>1</u></p> <p>7. Simplify the rational expression. $\frac{x^3+2x^2-8x}{3x^3+2x^2-x}$ $\frac{x(x^2+2x-8)}{x(3x^2+2x-1)}$ $\frac{x(x+4)(x-2)}{x(3x-1)(x+1)}$ $\frac{(x+4)(x-2)}{(3x-1)(x+1)}$</p>	<p>Previous Answer: $\frac{(2x+5)(2x-5)}{2(x-3)(x-2)}$ # <u>5</u></p> <p>8. Simplify the rational expression. $\frac{5x^2-5}{x^2+2x-3}$ $\frac{5(x-1)(x+1)}{(x+3)(x-1)}$ $\frac{5(x+1)}{x+3}$</p>
<p>Previous Answer: $\frac{5(x+1)}{x+3}$ # <u>8</u></p> <p>9. Simplify the rational expression. $\frac{6x^2+9x}{3x^2-3x-18}$ x^2-x-6 $\frac{3x(2x+3)}{3(x-3)(x+2)}$ $\frac{2x+3}{(x-3)(x+2)}$</p>	<p>Previous Answer: $\frac{x}{7}$ # <u>2</u></p> <p>10. Simplify the rational expression. $\frac{4x^3-12x^2}{2x^2-5x-3}$ $\frac{4x^2(x-3)}{(2x+1)(x-3)}$ $\frac{4x^2}{2x+1}$</p>
<p>Challenge: Simplify the rational expression. $\frac{(x^2+9x+18)(x^2+2x-8)}{(x^2+6x+8)(x^2-3x-18)}$ $\frac{(x+3)(x+6)(x+4)(x-2)}{(x+4)(x+2)(x-6)(x+3)}$ $\frac{(x+6)(x-2)}{(x+2)(x-6)}$</p>	

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: _____

SIMPLIFYING COMPLEX FRACTIONS 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: $x^2 + x$ # _____	Previous Answer: $\frac{1}{x}$ # _____
1. Simplify. $\frac{\frac{x+1}{x}}{2}$	2. Simplify. $\frac{x+2}{\frac{1}{x}}$
Previous Answer: $\frac{x+4}{2x}$ # _____	Previous Answer: $\frac{x+1}{x-1}$ # _____
3. Simplify. $\frac{\frac{x+3}{x+1}}{\frac{1}{x+1}}$	4. Simplify. $\frac{\frac{1}{x} + \frac{1}{3}}{\frac{1}{x+3}}$

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

ADDING & SUBTRACTING RATIONAL EXPRESSIONS CIRCUIT

Previous Answer: $\frac{-x^2+x-12}{x^2-9}$ # <u>4</u>	Previous Answer: $\frac{3x+5}{x^2-4}$ # <u>3</u>
7. Simplify the rational expression. $\frac{\frac{x}{x-2} + \frac{x+3}{x^2-2x}}$ $\frac{4x + x + 3}{x^2 - 2x}$ $\frac{5x + 3}{x^2 - 2x}$	8. Simplify the rational expression. $\frac{x+3}{x^2+5x+6} - \frac{2}{x+2} \frac{(x+3)}{(x+3)}$ $\frac{x+3 - 2x - 6}{x^2+5x+6}$ $\frac{-x-3}{x^2+5x+6}$

Previous Answer: $\frac{5x+3}{x^2-2x}$	Name: _____ Date: _____
9. Simplify the rational expression. $\frac{\frac{x-3}{x-3} \frac{1}{x+3} + \frac{2x}{x^2-9}}$ $\frac{x-3 + 2x}{x^2-9}$ $\frac{3x-3}{x^2-9}$	<h3>SOLVING RATIONAL EQUATIONS CIRCUIT</h3> <p>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.</p> <p style="text-align: center;">1 → _____ → _____ → _____ → _____ → _____ → _____ → _____ → _____ → _____ → 1</p>
1. Solve. $\frac{x}{x+5} = \frac{1}{2}$	2. Solve. $\frac{x+7}{4} + \frac{4x-5}{2} = 0$
3. Solve. $\frac{1}{3x} + \frac{1}{8} = \frac{4}{3x}$	4. Solve. $\frac{2}{x+2} + \frac{5}{x-2} = \frac{6}{x^2-4}$

Helpful Hints: Use these hints

Helpful steps:
 1) Complete
 2) Find the
 3) Perform
 4) Write th

This is a great activity to use when reviewing and applying rational function skills.

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

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



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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