

Algebra 2 - Rational Expressions - Worksheet

Common Core A-APR.D.7, A-SSE.A.2 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice rational expressions (Common Core A-APR.D.7 and A-SSE.A.2). The first problems check excluded values and simplifying by factoring, the middle problems add multiplying, dividing, adding and subtracting rational expressions, and the last six are word problems and multi-step tasks that need work rates, average speed, and average cost.

Work in order and show every step. Write each answer in simplest form, and open the answer key only after you have tried the problem yourself.

Algebra 2 · Common Core State Standards: **A-APR.D.7, A-SSE.A.2**

Exercise 1 - Excluded values

State the excluded values of $\frac{x+1}{x^2-5x+6}$.

Exercise 2 - Simplify a monomial quotient

Simplify $\frac{2x^2+6x}{4x}$ and state the excluded value.

Exercise 3 - Simplify, trinomial denominator

Simplify $\frac{x^2-9}{x^2+x-6}$ and state the excluded values.

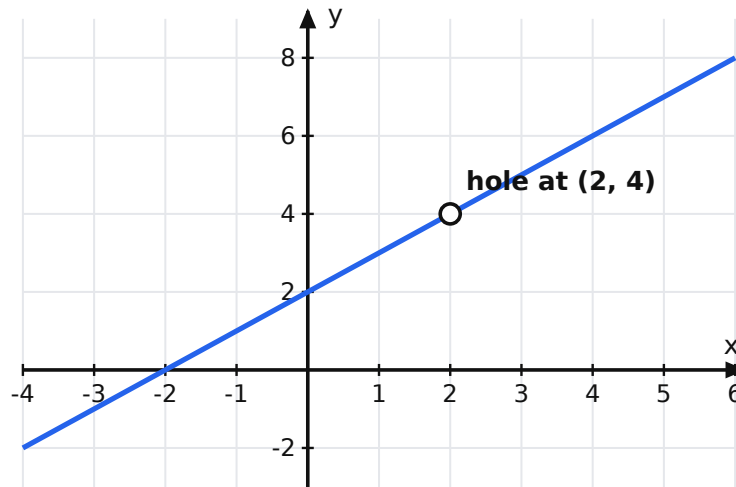
Exercise 4 - Simplify, common factor $x - 2$

Simplify $\frac{x^2-5x+6}{x^2-4}$.

Exercise 5 - Perfect square denominator

Simplify $\frac{x^2-16}{x^2+8x+16}$.

Exercise 6 - Hole in a graph



$y = (x^2 - 4)/(x - 2)$ is the line $y = x + 2$ with a hole at $x = 2$.

The graph of $f(x) = \frac{x^2-4}{x-2}$ is shown. Simplify $f(x)$ and explain the open circle at $x = 2$.

Exercise 7 - Multiply

Multiply and simplify: $\frac{x+3}{x-4} \cdot \frac{x^2-16}{x+3}$.

Exercise 8 - Multiply, factor first

Multiply and simplify: $\frac{x^2-1}{x+3} \cdot \frac{x^2+3x}{x+1}$.

Exercise 9 - Divide

Divide: $\frac{x^2-25}{x+1} \div \frac{x+5}{x^2-1}$.

Exercise 10 - Add, unlike denominators

Add: $\frac{3}{x+2} + \frac{5}{x-1}$.

Exercise 11 - Subtract

Subtract: $\frac{x}{x-3} - \frac{2}{x+3}$.

Exercise 12 - Add with a factorable denominator

Add: $\frac{1}{x^2-1} + \frac{1}{x-1}$.

Exercise 13 - Subtract and simplify

Subtract: $\frac{x}{x^2-4} - \frac{1}{x-2}$.

Exercise 14 - Complex fraction

Simplify $\frac{1-\frac{4}{x^2}}{1-\frac{2}{x}}$.

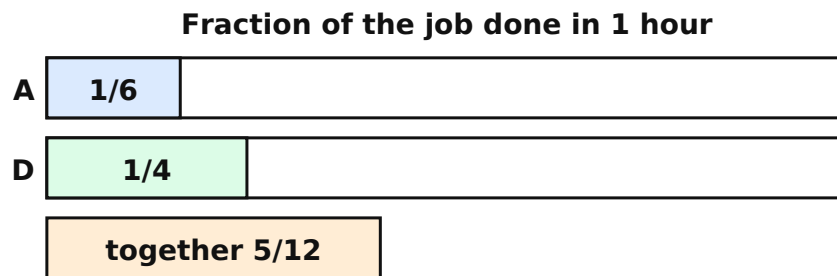
Exercise 15 - Use structure

Simplify $\frac{16x^4-81}{4x^2+9}$ by seeing $16x^4-81$ as a difference of squares.

Exercise 16 - Find the error

Mei simplified $\frac{x+3}{3}$ as $x+1$ by canceling the 3s. Explain the error and test it with $x=6$.

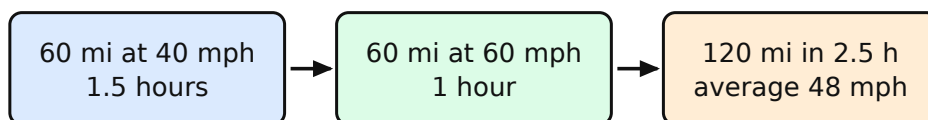
Exercise 17 - Painting together



Aisha paints $\frac{1}{6}$ of the fence per hour and Diego $\frac{1}{4}$ per hour: together $\frac{5}{12}$.

Aisha paints a fence in 6 hours and Diego paints the same fence in 4 hours. Write and add their rates and find how long they need together.

Exercise 18 - Average speed



A round trip with two speeds.

On a road trip, Ethan drives 60 miles at 40 mph and returns the same 60 miles at 60 mph. Find his average speed for the whole trip. Is it 50 mph?

Exercise 19 - Lens equation

The lens equation is $\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$. Find the focal length f when $d_o = 4$ cm and $d_i = 12$ cm.

Exercise 20 - Average cost

Items x	50	100	250
$A(x)$	?	?	?

Average cost per item.

A school makes pennants with a setup cost of \$500 and \$20 per pennant. The average cost per pennant is $A(x) = \frac{500+20x}{x}$. Evaluate $A(50)$, $A(100)$, and $A(250)$.

Exercise 21 - Equivalent expressions

x	1	2	4	5
$(x^2 - 9)/(x - 3)$	4	5	7	8
$x + 3$	4	5	7	8

The two expressions agree wherever both are defined.

The table compares $\frac{x^2-9}{x-3}$ and $x+3$. Show algebraically that they are equal for $x \neq 3$ and tell what happens at $x = 3$.