

Rational Expressions and Equations Step by Step

Grade 11 – Algebra 2 math · Test · Standards: A-APR.D.6, A-APR.D.7, A-REI.A.2

Name: _____ Date: _____ Class: _____

This test covers simplifying, combining, and solving with rational expressions, including graph reading and a work problem. Factor completely, state excluded values when asked, and check every solution of an equation. No calculator is needed. The test is worth 20 points.

Standards: A-APR.D.6, A-APR.D.7, A-REI.A.2 · **Level:** Grade 11 Algebra 2

Time: 45 minutes · 8 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Simplify with restrictions (2 points)

Simplify $\frac{(x^2 - 4x - 21)}{(x^2 - 49)}$ and state the excluded values.

Question 2 Divide and simplify (3 points)

Divide: $\frac{(x^2 - 6x + 8)}{(x^2 + x)} \div \frac{(x - 2)}{(x + 1)}$.

Question 3 Subtract rational expressions (3 points)

Subtract and simplify: $\frac{5}{(x + 4)} - \frac{3}{(x - 6)}$.

Question 4 Solve a rational equation (3 points)

Solve $\frac{2}{x} + \frac{5}{(x + 6)} = 1$. Check each solution.

Question 5 Extraneous solution (2 points)

Solve $\frac{x}{(x - 6)} = 3 + \frac{6}{(x - 6)}$. Explain the result.

Question 6 Working together (3 points)

A community garden has weeds to clear. Rosa alone needs 12 hours and Theo alone needs 20 hours. How long will they need together?

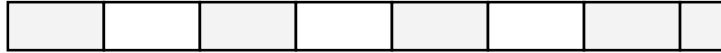
Rosa: $\frac{1}{12}$ per hour



Theo: $\frac{1}{20}$ per hour



Together: $\frac{2}{15}$ per hour

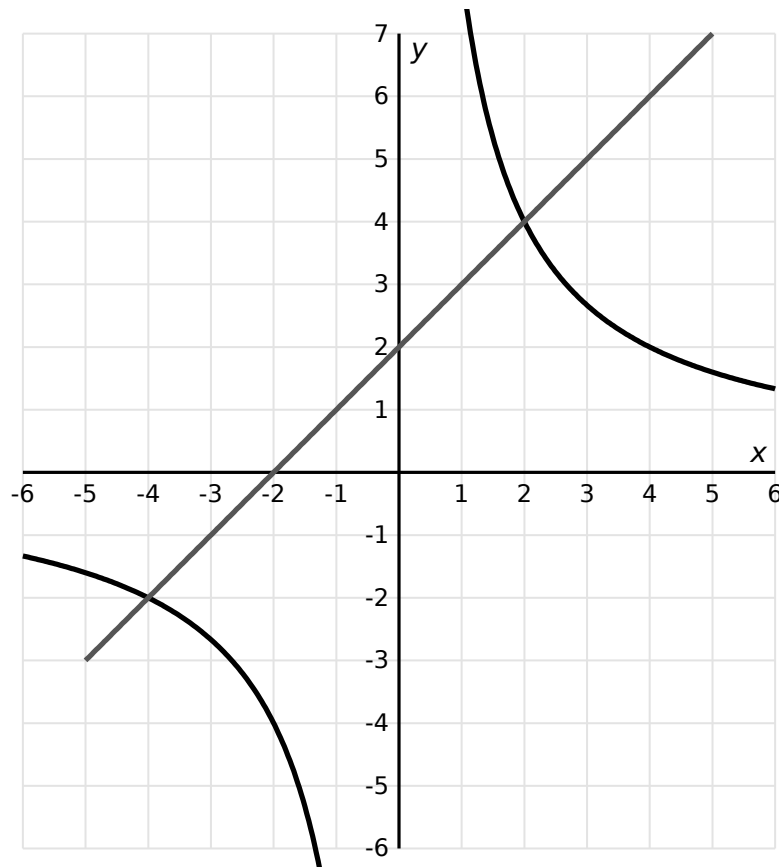


each bar = the whole job

Comparison bars.

Question 7 Solutions from a graph (2 points)

The graphs of $y = \frac{8}{x}$ and $y = x + 2$ are shown.



Two graphs.

- Use the graph to state the solutions of $\frac{8}{x} = x + 2$. (1 point)
- Verify one solution by substituting it. (1 point)

Question 8 Writing from excluded values (2 points)

The number line shows the excluded values of a rational expression whose numerator is 1. Write a possible expression with those excluded values.

