

Algebra 2 · Rational Expressions and Equations

· Quiz

Common Core A-APR.D.6, A-APR.D.7, A-REI.A.2 · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

Answer these 10 multiple-choice questions on excluded values, simplifying, operations, rational equations, extraneous solutions, and work problems. Each question has exactly one correct answer, and the explanation after it names the key step.

Algebra 2 Common Core: **A-APR.D.6 · A-APR.D.7 · A-REI.A.2**

Questions

Question 1

For which values of x is $\frac{x+2}{x^2-25}$ undefined?

- A. $x = -2$ only
- B. $x = 5$ only
- C. $x = 5$ and $x = -5$
- D. $x = 2$ and $x = -2$

Question 2

Simplify $\frac{x^2-9}{x^2-6x+9}$.

- A. $\frac{x-3}{x+3}$
- B. $\frac{x+3}{x-3}$
- C. $\frac{x-3}{x+3}$
- D. $\frac{1}{x-3}$

Question 3

Multiply and simplify: $\frac{x}{x+2} \cdot \frac{x+2}{x-5}$.

- A. $\frac{x}{x+5}$
- B. $\frac{1}{x-5}$
- C. $\frac{x}{x+2}$

D. $\frac{x}{x-5}$

Question 4

What is the LCD of $\frac{1}{x^2-4}$ and $\frac{1}{x+2}$?

- A. $x+2$
- B. $(x-2)(x+2)^2$
- C. $(x-2)(x+2)$
- D. $x-2$

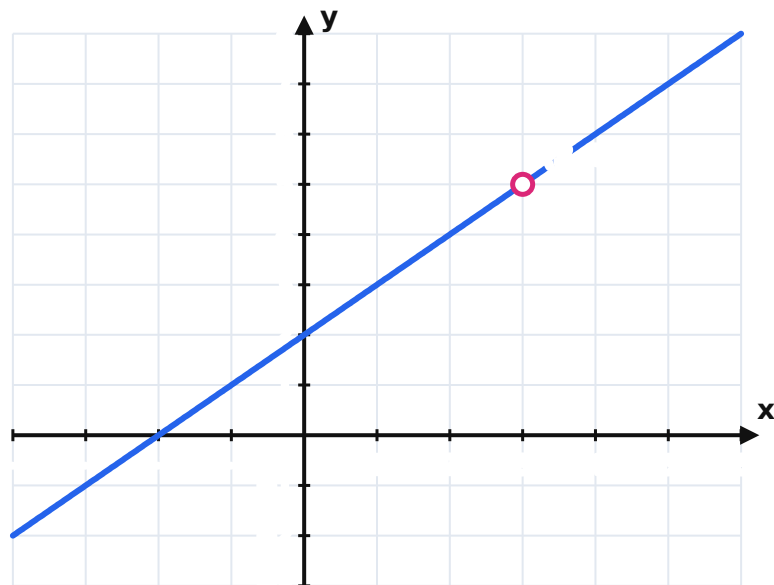
Question 5

Solve $\frac{4}{x+1} = \frac{2}{x}$.

- A. $x=1$
- B. $x=-2$
- C. $x=2$
- D. $x=-1$

Question 6

The graph is the line $y = x+2$ with a hole at $(3,5)$. Which expression has this graph?



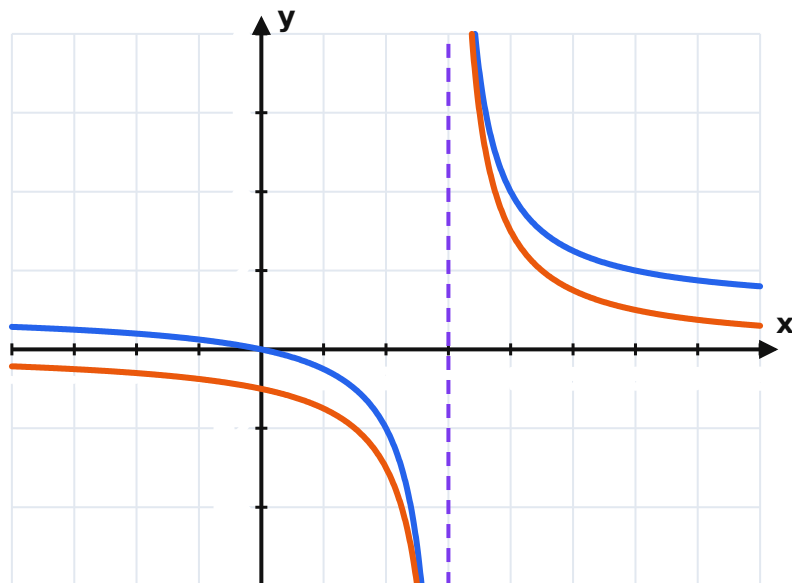
A line with a hole at $(3,5)$.

- A. $\frac{x^2-9}{x-3}$
- B. $\frac{x^2-2x-3}{x-3}$

- C. $\frac{x^2-x-6}{x+2}$
 D. $\frac{x^2-x-6}{x-3}$

Question 7

The graphs show both sides of $\frac{x}{x-3} = \frac{3}{x-3}$. How many solutions does the equation have?



The graphs of $y = \frac{x}{x-3}$ (blue) and $y = \frac{3}{x-3}$ (orange).

- A. 1: $x=3$
 B. 1: $x=0$
 C. 0: $x=3$ is extraneous
 D. 2: $x=3$ and $x=-3$

Question 8

Pipe A fills a tank in 3 hours and pipe B fills it in 6 hours. How long do they take together?

Pipe A	3 hours
Pipe B	6 hours

Time for each pipe to fill the tank alone.

- A. 4.5 hours
 B. 2 hours
 C. 9 hours
 D. 3 hours

Question 9

Rewrite $\frac{x+5}{x+2}$ as a constant plus a fraction.

- A. $1 + \frac{7}{x+2}$
- B. $1 - \frac{3}{x+2}$
- C. $1 + \frac{3}{x}$
- D. $1 + \frac{3}{x+2}$

Question 10

Add: $\frac{1}{x} + \frac{1}{x+1}$.

- A. $\frac{2x+1}{x(x+1)}$
- B. $\frac{2}{2x+1}$
- C. $\frac{x(x+1)}{x(x+1)}$
- D. $\frac{1}{x(x+1)}$

Answer key

1. **C** - The denominator $x^2-25=(x-5)(x+5)$ is zero at $x=5$ and $x=-5$. The numerator does not matter for excluded values.
2. **B** - Factor: $\frac{(x-3)(x+3)}{(x-3)^2} = \frac{x+3}{x-3}$. Only one factor of $x-3$ cancels.
3. **D** - The common factor $x+2$ cancels, leaving $\frac{x}{x-5}$. The x in the numerator is not a common factor of the denominator.
4. **C** - Since $x^2-4=(x-2)(x+2)$ already contains the factor $x+2$, the LCD is $(x-2)(x+2)$. A product of both denominators would repeat a factor.
5. **A** - Cross multiply: $4x=2(x+1)$, so $2x=2$ and $x=1$. Check: $\frac{4}{2}=2=\frac{2}{1}$. Forgetting to distribute the 2 gives wrong values.
6. **D** - The expression $\frac{(x-3)(x+2)}{x-3}$ simplifies to $x+2$ and is undefined at $x=3$. The others simplify to $x+3$, $x+1$, and $x-3$.
7. **C** - Clearing denominators gives $x=3$, but $x=3$ makes the denominator zero. The curves never meet, so there is no solution.
8. **B** - Add the rates: $\frac{1}{3}+\frac{1}{6}=\frac{1}{2}$ tank per hour, so 2 hours. Averaging the times (4.5) or adding them (9) are common mistakes.
9. **D** - Since $x+5=(x+2)+3$, the expression equals $\frac{x+2}{x+2}+\frac{3}{x+2}=1+\frac{3}{x+2}$.
10. **A** - The LCD is $x(x+1)$: $\frac{(x+1)+x}{x(x+1)} = \frac{2x+1}{x(x+1)}$. Adding the denominators ($2x+1$) is a common mistake.

Remember:

- Standards A-APR.D.6, A-APR.D.7, and A-REI.A.2: rewrite, operate on, and solve with rational expressions.
- Excluded values are the zeros of the denominator, and they remain even after canceling.
- Dividing means multiplying by the reciprocal; adding needs a common denominator.
- Always check solutions of a rational equation: an extraneous solution makes a denominator zero.
- Work problems add rates: $\frac{1}{a}+\frac{1}{b}=\frac{1}{c}$.