

HONORS ALGEBRA 2
Chapter 9
Test A – KEY

Name _____
Date _____
Period _____

The solutions are in blue for each problem on the test. Calculators were allowed.

Simplify each expression.

1.
$$\frac{2a^2 - a - 10}{4a^2 - 8a} \div \frac{2a - 5}{8a^2 - 2a^4}$$
$$\Rightarrow \frac{2a^2 - a - 10}{4a^2 - 8a} \cdot \frac{8a^2 - 2a^4}{2a - 5}$$
$$\Rightarrow \frac{(2a - 5)(a + 2)}{4a(a - 2)} \cdot \frac{2a^2(2 - a)(2 + a)}{(2a - 5)}$$
$$\Rightarrow -\frac{a(a + 2)^2}{2}$$

2.
$$\frac{4z}{3(z - 4)} - \frac{2 + z}{6(z + 2)}$$
$$\Rightarrow \frac{4z}{3(z - 4)} - \frac{1}{6}$$
$$\Rightarrow \frac{2 \cdot 4z}{2 \cdot 3(z - 4)} - \frac{1 \cdot (z - 4)}{6 \cdot (z - 4)}$$
$$\Rightarrow \frac{8z - (z - 4)}{6(z - 4)}$$
$$\Rightarrow \frac{7z + 4}{6(z - 4)}$$

$$3. \quad \frac{2}{n^2 - 9} + \frac{n}{n^3 - 27}$$

$$\Rightarrow \frac{2}{(n-3)(n+3)} + \frac{n}{(n-3)(n^2 + 3n + 9)}$$

$$\Rightarrow \frac{2 \cdot (n^2 + 3n + 9)}{(n-3)(n+3) \cdot (n^2 + 3n + 9)} + \frac{n \cdot (n+3)}{(n-3)(n^2 + 3n + 9) \cdot (n+3)}$$

$$\Rightarrow \frac{(2n^2 + 6n + 18) + (n^2 + 3n)}{(n-3)(n+3) \cdot (n^2 + 3n + 9)}$$

$$\Rightarrow \frac{3n^2 + 9n + 18}{(n-3)(n+3) \cdot (n^2 + 3n + 9)}$$

$$4. \quad \frac{\frac{1}{x} + \frac{2}{y}}{\frac{3}{x} - \frac{4}{y}}$$

$$\Rightarrow \frac{\frac{1 \cdot y}{x \cdot y} + \frac{2 \cdot x}{y \cdot x}}{\frac{3 \cdot y}{x \cdot y} - \frac{4 \cdot x}{y \cdot x}}$$

$$\Rightarrow \frac{\frac{y + 2x}{xy}}{\frac{3y - 4x}{xy}}$$

$$\Rightarrow \frac{y + 2x}{3y - 4x}$$

Solve each equation.

$$5. \quad \frac{1}{x+2} + \frac{1}{x-2} = \frac{3}{x^2-4}$$

$$\begin{aligned} 1 \cdot (x-2) + 1 \cdot (x+2) &= 3 \\ 2x &= 3 \\ x &= 3/2 \end{aligned}$$

$$6. \quad \frac{x-1}{x-5} - \frac{3}{x+1} = \frac{4}{x-5}$$

$$\begin{aligned} (x-1) \cdot (x+1) - 3 \cdot (x-5) &= 4 \cdot (x+1) \\ x^2 - 1 - 3x + 15 &= 4x + 4 \\ x^2 - 7x + 10 &= 0 \\ (x-2)(x-5) &= 0 \\ x &= 2, 5 \\ x &= 2 \end{aligned}$$

Set up and solve a rational equation to answer the following.

7. Using a riding lawnmower, you can mow your yard in 30 minutes. Using a push mower, it takes 2 hours. How long would it take to mow your yard if you used the riding mower and someone else used the push mower?

$$\begin{aligned} \frac{x}{0.5} + \frac{x}{2} &= 1 \\ 4x + x &= 2 \\ 5x &= 2 \\ x &= 0.4 \end{aligned}$$

It would take 0.4 hours (or 24 minutes).

8. Mr. Deck has to go to Atlanta on Friday. He can usually maintain a constant speed for the 140 miles between Nashville and Chattanooga, but then average 8 miles per hour faster for the 110 miles between Chattanooga and Atlanta. If it takes him 4 hours for the entire trip, what will be Mr. Deck's speed (to the nearest whole number) for the first part of the trip?

$$\begin{aligned} \frac{140}{x} + \frac{110}{x+8} &= 4 \\ 140 \cdot (x+8) + 110 \cdot x &= 4 \cdot x(x+8) \\ 250x + 1120 &= 4x^2 + 32x \\ 4x^2 - 218x - 1120 &= 0 \\ x &= -4.728, 59.228 \end{aligned}$$

His speed would be about 59 mph.