Algebra 2 – K/H Extension

Find the Error

For each exercise (#1 and #2), identify the error(s) in planning the solution or solving the problem. Then write the correct solution.

1. What is the sum $\frac{3x}{x^2-9}+\frac{3}{x^2-6x+9}$? State any restrictions on the variable.

$$\frac{3x}{x^2-9}+\frac{3}{x^2-6x+9}=\frac{3x}{(x+3)(x-3)}+\frac{3}{(x-3)^2}$$
$$=\frac{3x}{(x+3)(x-3)}+\frac{3(x+3)}{(x-3)^2(x+3)}$$
$$=\frac{6x+9}{(x-3)(x+3)}$$

The sum is $\frac{6x+9}{(x-3)(x+3)}$ for $x \neq 3$ and $x \neq -3$.

2. What is the difference $\frac{4x}{x^2-3x+2}-\frac{5}{6x-12}$? State any restrictions on the variable.

$$\frac{4x}{x^2-3x+2}-\frac{5}{6x-12}=\frac{4x}{(x-2)(x-1)}-\frac{5}{6(x-2)} \quad \text{The LCD is } 6(x-2)(x-1).$$
$$=\frac{(4x)(6)\cancel{(x-2)}\cancel{(x-1)}}{\cancel{(x-2)}\cancel{(x-1)}}-\frac{(5)(\cancel{6})\cancel{(x-2)}(x-1)}{\cancel{6}\cancel{(x-2)}}$$
$$=24x-5x+5$$
$$=19x+5$$

The sum is 19x + 5 for $x \neq 2$ and $x \neq -1$.

Apply What You Know

Example:

Quinn can refinish hardwood floors four times as fast as his apprentice, Jack. They are refinishing 100 ft^2 of flooring. Working together, Quinn and Jack can finish the job in 3 h. How long would it take each of them working alone to refinish the floor?

Let x be Jack's work rate in ft^2/h. Quinn's work rate is four times faster, or $4x$.

square feet refinished per hour by Jack and Quinn together	=	square feet of floor they refinish together	÷	hours worked together
ft^2/h	=	ft^2	÷	h

$x + 4x = \frac{100}{3}$ Their work rates sum to 100 ft^2 in 3 h.

$3(x) + 3(4x) = 3\left(\frac{100}{3}\right)$ They work for 3 h. Refinished floor area **=** rate × time.

$15x = 100$ Simplify.

$x \approx 6.67$ Divide each side by 15.

Jack works at the rate of 6.67 ft^2/h. Quinn works at the rate of 26.67 ft^2/h.

Let j be the number of hours Jack takes to refinish the floor alone, and let *q* be the number of hours Quinn takes to refinish the floor alone.

$6.67 = \frac{100}{j}$	$26.67 = \frac{100}{q}$
$j(6.67) = j\left(\frac{100}{j}\right)$	$q(26.67) = q\left(\frac{100}{q}\right)$
$6.67j = 100$	$26.67q = 100$
$j \approx 15$	$q \approx 3.75$

Jack would take 15 h and Quinn would take 3.75 h to refinish the floor alone.

Your Turn

3. An airplane flies from its home airport to a city and back in 5 h flying time. The plane travels the 720 mi to the city at 295 mi/h with no wind. How strong is the wind on the return fight? Is the wind a headwind or a tailwind?

4. Miguel can complete the decorations for a school dance in 5 days working alone. Nasim can do it alone in 3 days, and Denise can do it alone in 4 days. How long would it take the three students working together to decorate?