Math 1215 Hw9 Name.....Solutions.....

Simplify the following rational expressions.

1. $\frac{x-y}{y-x} = \frac{x-y}{-(x-y)} = -1$

2. $\frac{4x+8}{x+2} = \frac{4(x+2)}{x+2} = 4$

3. $\frac{x+5}{x^2-25} = \frac{x+5}{(x-5)(x+5)} = \frac{1}{x-5}$

4. $\frac{x^2-2x-15}{x^2+10x+21} = \frac{(x-5)(x+3)}{(x+3)(x+7)} = \frac{x-5}{x+7}$

5. $\frac{x^2-36}{x^2+12x+36} = \frac{(x-6)(x+6)}{(x+6)(x+6)} = \frac{x-6}{x+6}$

6. $\frac{6x^2-5x-1}{10x^2+9x-19} = \frac{(6x+1)(x-1)}{(10x+19)(x-1)} = \frac{6x+1}{10x+19}$

7. $\frac{6x-12}{x+3} \cdot \frac{4x+12}{3x-6} = \frac{6(x-2)}{x+3} \cdot \frac{4(x+3)}{3(x-2)} = \frac{6 \cdot 4}{3} = \frac{24}{3} = 8$

8. $\frac{x^2+x-6}{x^2+3x-4}\cdot\frac{x^2-6x+5}{x^2-2x-15}$ $= \frac{(x+3)(x-2)}{(x+4)(x-1)}\cdot\frac{(x-5)(x-1)}{(x-5)(x+3)} = \boxed{\frac{(x-2)}{(x+4)}}$

9. $\frac{x^2-x-2}{x^2+8x+15}\cdot\frac{x^2-x-12}{x^2-9x+14}$ $= \frac{(x-2)(x+1)}{(x+3)(x+5)}\cdot\frac{(x-4)(x+3)}{(x-7)(x-2)} = \boxed{\frac{(x+1)(x-4)}{(x+5)(x-7)}}$

10. $\frac{4x^2-9}{x^2-10x+25}\div\frac{2x-3}{x-5}$ $= \frac{(2x-3)(2x+3)}{(x-5)(x-5)}\cdot\frac{x-5}{2x-3} = \boxed{\frac{2x+3}{x-5}}$

11. $\frac{x^2-3x-10}{x^2-3x-28}\div\frac{x^2-x-6}{x^2+x-12}$ $= \frac{(x-5)(x+2)}{(x-7)(x+4)}\cdot\frac{(x-4)(x-3)}{(x-3)(x+2)} = \boxed{\frac{x-5}{x-7}}$

12. $\frac{x}{x+3}+\frac{4}{x-5}$ $= \frac{x}{x+3}\frac{(x-5)}{(x-5)} + \frac{4}{x-5}\frac{(x+3)}{(x+3)} = \frac{x^2-5x+4x+12}{(x+3)(x-5)}$

$= \boxed{\frac{x^2-x+12}{(x+3)(x-5)}}$

13. $\frac{x-4}{x+1}-\frac{x-2}{x-1}$ $= \frac{x-4}{x+1}\frac{(x-1)}{(x-1)} - \frac{(x-2)(x+1)}{(x-1)(x+1)} = \frac{x^2-5x+4-x^2+x+2}{(x+1)(x-1)}$

(x^2-5x+4, x^2-x-2)

$= \boxed{\frac{-4x+6}{(x+1)(x-1)}}$

Solve:

14. $\frac{5}{7}+\frac{9}{t+3}=2$ $\Rightarrow$ LCD $= 7(t+3)$

$t \neq -3$

$\Rightarrow 7(t+3)\frac{5}{7} + \frac{9}{t+3}\,7(t+3) = 2 \cdot 7(t+3)$

$\Rightarrow 5t+15+63 = 14t+42 \Rightarrow 5t+78 = 14t+42$ (subtract 42 from both sides)

$\Rightarrow 5t+36 = 14t$ (subtract $5t$)

$36 = 9t$

$t = \frac{36}{9} = 4$

15. $\frac{3}{x-1}+\frac{12}{5}=3$

$x \neq 1$

LCD $= 5(x-1)$

$5(x-1)\frac{3}{x-1} + \frac{12}{5}\,5(x-1) = 3 \cdot 5(x-1) \Rightarrow 15+12(x-1) = 15(x-1)$

$\Rightarrow 15+12x-12 = 15x-15$

$\Rightarrow 3+12x = 15x-15$ (subtract 3)

$12x = 15x-18 \Rightarrow -3x = -18$

$x = \frac{-18}{-3} = 6$

16. $\frac{7}{9}-\frac{x+8}{x+1}=-1$

$x \neq -1$

LCD $= 9(x+1)$

$\Rightarrow \frac{7}{9}\cdot 9(x+1) - \frac{(x+8)}{(x+1)}\,9(x+1) = -1 \cdot 9(x+1)$

$\Rightarrow 7(x+1) - 9(x+8) = -9(x+1)$

$\Rightarrow 7x+7-9x-72 = -9x-9$

$7x-65 = -9 \Rightarrow 7x = -9+65$

$7x = 56$

$x = \frac{56}{7} = 8$