Integrated Math 3
Unit 7: Modeling Rational Representations
7.5 Worksheet

Name: _____

Date: _____ Period: _____

Mixed Review

Simplify the expressions below, solve the equations or perform the indicated operations. Be sure to determine all and any excluded values.

1. $\frac{15}{x-6}+\frac{7x}{x-6}$ $= \frac{7x+15}{x-6}$

Exclude: $x=6$

2. $\frac{11x}{4x+9}-\frac{14}{4x+9}$ $= \frac{11x-14}{4x+9}$

Exclude: $x=-\frac{9}{4}$

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

$= \frac{16x-5(x^2+4x-5)}{4(x^2+4x-5)}$

$= \frac{16x-5x^2-20x+25}{4(x^2+4x-5)}$

$= \frac{-5x^2-4x+25}{4(x^2+4x-5)}$

$= \frac{-(5x^2+4x-25)}{4(x^2+4x-5)}$

Exclude: $x=-5, 1$

$4(x^2+4x-5)\neq 0$

$\frac{4}{4}(x+5)(x-1)\neq \frac{0}{4}$

$(x+5)(x-1)\neq 0$

$x\neq -5$ $\quad x\neq 1$

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

$= \frac{x+1}{x+3}$

Exclude: $x=-5, -3$

5. $\frac{x+3}{4} * \frac{3x-18}{3x+9} = \frac{x+3}{4}\cdot\frac{3(x-6)}{3(x+3)}$

$= \frac{x-6}{4}$

Exclude: $x=-3$

6. $\frac{3x}{7x}+\frac{1}{7}\cdot\frac{x}{x}$

$= \frac{3x+x}{7x} = \frac{4x}{7x} = \frac{4}{7}$

Exclude: $x=0$

7. $\frac{(x-7)(x+8)}{(x+8)(x-10)} \div \frac{1}{x-10}$

$= \frac{(x-7)(x+8)}{(x+8)(x-10)} \cdot \frac{x-10}{1}$

$= \boxed{x-7}$

Exclude: $x = -8, 10$

8. $\frac{2x}{3x} - \frac{5}{6}$ ·2 ·x ·2 ·x

$= \frac{4x}{6x} - \frac{5x}{6x}$

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

$= \boxed{\frac{-1}{6}}$

Exclude: $x = 0$

9. $\frac{18}{5x+10} + \frac{4}{5} = \frac{18}{5(x+2)} + \frac{4}{5}\frac{(x+2)}{(x+2)}$

$= \frac{18+4(x+2)}{5(x+2)} = \frac{18+4x+8}{5(x+2)}$

$= \boxed{\frac{4x+26}{5(x+2)} \text{ or } \frac{2(x+13)}{5(x+2)}}$

Exclude: $x = -2$

10. $\frac{x+3}{x+2} \div \frac{(x-1)(x+3)}{(x-1)^2} = \frac{x+3}{x+2} \cdot \frac{(x-1)(x-1)}{(x-1)(x+3)}$

$= \boxed{\frac{x-1}{x+2}}$

Exclude: $x = -3, -2, 1$

11. $\frac{4x}{x+3}\frac{(x+6)}{(x+6)} - \frac{4x}{x+6}\frac{(x+3)}{(x+3)}$

$= \frac{4x(x+6)-4x(x+3)}{(x+6)(x+3)}$

$= \frac{4x^2+24x-4x^2-12x}{(x+6)(x+3)}$

$= \boxed{\frac{12x}{(x+6)(x+3)}}$

Exclude: $x = -6, -3$

12. $-\frac{4x}{x-8} - \frac{11}{x-8} = \frac{-4x-11}{x-8}$

$= \boxed{\frac{-(4x+11)}{x-8}}$

Exclude: $x = 8$

13. $\frac{2x}{3x+3}\frac{(x+5)}{(x+5)} - \frac{2}{x+5}\frac{(3x+3)}{(3x+3)}$

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

$= \frac{2x^2+10x-6x-6}{(x+5)(3x+3)}$

$= \boxed{\frac{2x^2+4x-6}{(x+5)(3x+3)} \text{ or } \frac{2(x^2+2x-6)}{3(x+5)(x+1)} \text{ or } \frac{2(x+3)(x-1)}{3(x+5)(x+1)}}$

Exclude: $x = -5, -1$

14. $\frac{2}{v^2-12v+27} * \frac{v^2-12v+27}{3}$

$= \frac{2}{(v-9)(v-3)} \cdot \frac{(v-9)(v-3)}{3}$

$= \boxed{\frac{2}{3}}$

Exclude: $x = 3, 9$

15. $\frac{3}{6x}-\frac{9}{12}$ $\cdot\frac{x}{x}$ $= \frac{6}{12x}-\frac{9x}{12x}$

$= \frac{-9x+6}{12x}$

$= \frac{-3(3x-2)}{4\cdot 12x}$

$= \boxed{\frac{-(3x-2)}{4x}}$

Exclude: $x=0$

16. $\frac{3}{4}-\frac{2x}{4x-24}$ $= \frac{(x-6)}{(x-6)}\frac{3}{4}-\frac{2x}{4(x-6)}$

$= \frac{3(x-6)-2x}{4(x-6)} = \frac{3x-18-2x}{4(x-6)}$

$= \boxed{\frac{x-18}{4(x-6)}}$

Exclude: $x=6$

17. $\frac{x^2-2x-15}{x^2-6x+5} = \frac{(x-5)(x+3)}{(x-5)(x-1)}$

$= \boxed{\frac{x+3}{x-1}}$

Exclude: $x=1,5$

18. $\frac{x-8}{(x+6)(x-8)} * \frac{4x^2+40x}{x+10}$

$= \frac{x-8}{(x+6)(x-8)} \cdot \frac{4x(x+10)}{x+10}$

$= \boxed{\frac{4x}{x+6}}$

Exclude: $x=-10,-6,8$

19. $\frac{2}{5}-\frac{7}{x+6}$ $\cdot\frac{5(x+6)}{5(x+6)}$

$\frac{2(x+6)-35}{5(x+6)}$

$= \frac{2x+12-35}{5(x+6)}$

$= \boxed{\frac{2x-23}{5(x+6)}}$

Exclude: $x=-6$

20. $\frac{1}{7(x-3)}+\frac{4}{7}\frac{(x-3)}{(x-3)}$

$= \frac{1+4(x-3)}{7(x-3)}$

$= \frac{1+4x-12}{7(x-3)}$

$= \boxed{\frac{4x-11}{7(x-3)}}$

Exclude: $x=3$