Name _____ Class _____

Algebra 2 Practice – Multiplying, Dividing, Adding and Subtracting Fractions and Rational Expressions

Perform the indicated operation(s) and simplify.

1. $\frac{72}{35} \times \frac{70}{81}$ = Factor + Cancel $\frac{9 \cdot 8}{5 \cdot 7} \cdot \frac{7 \cdot 10}{9 \cdot 9} = \frac{8 \cdot 2 \cdot 5}{5 \cdot 9} = \boxed{\frac{16}{9}}$

2. $3\frac{5}{12} \div 11\frac{5}{7}$ Change to improper fractions first. Flip the second guy, then you multiply (by factoring and cancelling.)

$\frac{41}{12} \div \frac{82}{7} = \frac{41}{12} \cdot \frac{7}{82} = \frac{41 \cdot 7}{12 \cdot 41 \cdot 2} = \boxed{\frac{7}{24}}$

3. $\frac{x^2+2x-8}{x^2+4x+3} \times \frac{3x+3}{x-2}$ Factor + Cancel; Remember you cannot cancel anything with a + or − near it unless everything in the parenthesis cancels

$\frac{(x+4)(x-2)}{(x+3)(x+1)} \cdot \frac{3(x+1)}{(x-2)} = \boxed{\frac{3(x+4)}{(x+3)}}$

4. $\frac{a+2}{a+3} \div \frac{a^2+a-12}{a^2-9} = \frac{(a+2)}{(a+3)} \times \frac{(a^2-9)}{(a^2+a-12)} = \frac{(a+2)}{(a+3)} \cdot \frac{(a+3)(a-3)}{(a+4)(a-3)} = \boxed{\frac{a+2}{a+4}}$

5. $\frac{\frac{x^2}{x^2-25y^2}}{\frac{x}{5y-x}} = \frac{x^2}{(x^2-25y^2)} \div \frac{x}{(5y-x)} = \frac{x^2}{(x+5y)(x-5y)} \times \frac{-1(x-5y)}{x} = \boxed{\frac{-x}{x+5y}}$

Note: $\frac{-5}{5} = -1$ opposites cancel to −1

$5y-x = -1(-5y+x) = -1(x-5y)$

so $\frac{-1(x-5y)}{(x-5y)} = -1 = \frac{(5y-x)}{(x-5y)}$

6. $3\frac{3}{14} + 5\frac{3}{35}$ +/− Land of the: Common denominator

$3 + \frac{3}{14} + 5 + \frac{3}{35}$

$3 + 5 + \frac{3}{14} + \frac{3}{35}$

LCD $2 \cdot 7 \quad 5 \cdot 7$

$2 \cdot 5 \cdot 7$

70

$\rightarrow 8 + \frac{3 \cdot 5}{14 \cdot 5} + \frac{3}{35} \cdot \frac{2}{2} = 8 + \frac{15}{70} + \frac{6}{70}$

$= 8\frac{21}{70} = 8\frac{3 \cdot 7}{10 \cdot 7} = \boxed{8\frac{3}{10}}$

7. $12\frac{4}{9} - 6\frac{11}{12}$

$12 + \frac{4}{9} - \left(6 + \frac{11}{12}\right) = 12 + \frac{4}{9} - 6 - \frac{11}{12} = 12 - 6 + \frac{4}{9} - \frac{11}{12}$

LCD $3^2 \quad 2^2 \cdot 3$

$2^2 \cdot 3^2 = 36$

$\rightarrow 6 + \frac{4}{9} \cdot \frac{4}{4} - \frac{11}{12} \cdot \frac{3}{3}$

$6 + \frac{16}{36} - \frac{33}{36}$

$5 + \frac{36}{36} + \frac{16}{36} - \frac{33}{36}$

$= \boxed{5\frac{19}{36}}$

OR

$12\frac{4}{9} - {}^{12}6\frac{11}{12}$ LCD: 36

$\frac{4}{4} \cdot \frac{112}{9} - \frac{83}{12} \cdot \frac{3}{3}$

$\frac{448}{36} - \frac{249}{36} = \frac{199}{36} = \boxed{5\frac{19}{36}}$

8. $\frac{y}{y+3} - \frac{6y}{y^2-9}$ $\rightarrow$ $\frac{y}{(y+3)} \cdot \frac{(y-3)}{(y-3)} - \frac{6y}{(y+3)(y-3)}$

LCD: $(y+3)(y-3)$

9. $\frac{y+1}{y-1} + \frac{y+2}{y-2} + \frac{y}{y^2-3y+2}$ $\quad (y-1)(y-2)$

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

LCD: $(y-1)(y-2)$

10. $\frac{\frac{1}{b+2} + \frac{1}{b-5}}{\frac{2b^2-b-3}{b^2-3b-10}}$

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$\frac{(y+1)}{(y-1)}\frac{(y-2)}{(y-2)} + \frac{(y+2)}{(y-2)}\frac{(y-1)}{(y-1)} + \frac{y}{(y-1)(y-2)}$ FOIL FOIL

$\frac{y^2-2y+1y-2+y^2-1y+2y+y}{(y-1)(y-2)}$

$\boxed{\frac{2y^2+y-4}{(y-1)(y-2)}}$

10. Add first

$$\frac{\left(\frac{1}{b+2}+\frac{1}{b-5}\right)}{\frac{2b^2-b-3}{b^2-3b-10}} =$$

$$\frac{1}{(b+2)}+\frac{1}{(b-5)} = \frac{1}{(b+2)}\frac{(b-5)}{(b-5)}+\frac{1}{(b-5)}\frac{(b+2}{(b+}$$

LCD: $(b+2)(b-5)$

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

$$\frac{\frac{2b-3}{(b+2)(b-5)}}{\frac{2b^2-b-3}{b^2-3b-10}} = \frac{(2b-3)}{(b+2)(b-5)} \div \frac{(2b^2-b-3)}{(b^2-3b-10)}$$

$$\downarrow$$

$$\frac{(2b-3)}{(b+2)(b-5)} \times \frac{(b^2-3b-10)}{(2b^2-b-3)}$$

$$\frac{(2b-3)}{(b+2)(b-5)} \cdot \frac{(b-5)(b+2)}{(2b-3)(b+1)} = \boxed{\frac{1}{b+1}}$$