Simplify without a calculator. Leave your answer as an improper fraction in reduce form.

One way to do this problem is shown below. There are other ways to get the same answer.

1. $\frac{36}{48} \cdot \frac{24}{27} = \frac{3}{4} \cdot \frac{8}{9} = \boxed{\frac{2}{3}}$

36 and 48 can be reduced by the common factor of 12

24 and 27 can be reduced by the common factor of 3

4 and 8 can be reduced by the common factor of 4

3 and 9 can be reduced by the common factor of 3

Simplify without a calculator. Leave your answer as an improper fraction in reduce form.

2. $\frac{15}{32} \div \frac{35}{64}$

Instead of dividing by 35/64 you multiply by its reciprocal so that you can cross cancel before you multiply.

$\frac{3\,15}{32} \cdot \frac{64^{2}}{35_{7}} = \boxed{\frac{6}{7}}$

32 and 64 can be reduced by the common factor of 32

15 and 35 can be reduced by dividing by the common factor of 5

Simplify without a calculator. Leave your answer as an improper fraction in reduce form.

3. $\frac{7}{24} + \frac{11}{28} = \frac{7}{4 \cdot 6} + \frac{11}{4 \cdot 7}$

you can first factor the denominators to see what they already have in common

This shows that the LCD will by $4 \cdot 6 \cdot 7$

you can then multiply each fraction by the "missing" factor of the Common Denominator

$= \frac{7}{7} \cdot \frac{7}{4 \cdot 6} + \frac{11}{4 \cdot 7} \cdot \frac{6}{6}$

$= \frac{49}{168} + \frac{66}{168}$

$= \frac{49 + 66}{168} = \boxed{\frac{115}{168}}$

4. Solve. Leave your answer as an improper fraction if necessary.

$24\left(\frac{7}{8} + \frac{11x}{24} - \frac{x}{12}\right) = \left(\frac{5}{6}\right)24$

$21 + 11x - 2x = 20$

$21 + 9x = 20$

$-21 \quad -21$

$\frac{9x}{9} = \frac{-1}{9}$

$\boxed{x = -\frac{1}{9}}$

5. Solve for Q. State restrictions on the variables.

$$\frac{RQ-K}{M}=E \qquad Q=\frac{EM+K}{R}$$

$R \neq 0$

$M \neq 0$

Remember, restrictions come from anywhere the problem has a denominator, from beginning to end.

6. Simplify.

Below are two methods for simplifying this compound fraction.

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

$$\frac{\frac{4}{x}}{x+2} \qquad \frac{4}{x}\cdot\frac{1}{x+2}=\frac{4}{x(x+2)}$$

7. Simplify this rational expression by factoring both numerator and denominator and canceling common factors. State restrictions on the variable.

$$\frac{8x^5-72x^3}{10x^3-20x^2-150x}=\frac{8x^3(x^2-9)}{10x(x^2-2x-15)}=\frac{8x^3(x+3)(x-3)}{10x(x+3)(x-5)}$$

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

$x \neq 5, -3, 0$

Rational Expressions:

The ratio of two polynomials.

A rational expression is in its simplest form when:

The denominator and numerator have no common factors.

Simplify: State restrictions on the variable.

$$\frac{8x^2+16x}{x^2+7x+10}$$

$$\frac{8x^2+16x}{x^2+7x+10} = \frac{8x(x+2)}{(x+5)(x+2)} = \frac{8x}{x+5}$$

$x \neq -2, -5$

This is NOT a Rational Function, why?

$$\frac{\sqrt{x^2-5x+3}}{2x-9}$$

The numerator is not a polynomial, therefore, this is not a rational function.