

Math 3

Problems 1-4 on warm-up sheet handed to you.

$$1) 4x^4 - 16 \quad \sqrt{x^4} = x^2$$

$$4(x^4 - 4)$$

$$4(x^2 + 2)(x^2 - 2)$$

$$2) 4x^4 - 16x^3 - 48x^2$$

$$4x^2(x^2 - 4x - 12)$$

$$4x^2(x-6)(x+2)$$

$$\begin{array}{r} -12 \\ -6 \quad 2 \\ -4 \end{array}$$

$$3) 24x^2 - 2 - 47x$$

$$24x^2 - 47x - 2$$

$$(x-2)(24x+1)$$

$$\begin{array}{r} -48 \\ -48 \quad 1 \quad (24x+1) \\ -2 = \frac{-48}{24} \quad \frac{1}{24x^2} \\ -47 \end{array}$$

$$4) r^2 - 36$$

$$(r+6)(r-6)$$

4.4 Adding and Subtracting Rational Expressions

Adding Rational Expressions:

Step 1: Set each factor of the denominators equal to zero and solve for x.

Note: State these as your restrictions.

Step 2: Get a common denominator. $8\left(\frac{2}{3}\right) + \left(\frac{4}{8}\right)^3 = \frac{16}{24} + \frac{12}{24}$

Step 3: Combine the numerators by distributing and combining like terms.

Step 4: Simplify between top and bottom if possible.

Ex: $x \left(\frac{3}{x+2} \right) + \left(\frac{2}{x} \right) \begin{matrix} x \neq 0 \\ x \neq -2 \end{matrix}$ $\frac{2(x+2)}{2x+4}$ You Try: $y^{-3} \left(\frac{1}{y} \right) + \left(\frac{4}{y-3} \right) \begin{matrix} y \neq 3 \\ y \neq 0 \end{matrix}$

$$\frac{3x}{x(x+2)} + \frac{2x+4}{x(x+2)}$$

$$\frac{3x+2x+4}{x(x+2)} = \frac{5x+4}{x(x+2)}$$

$$\frac{y-3}{y(y-3)} + \frac{4y}{y(y-3)}$$

$$\frac{y-3+4y}{y(y-3)}$$

$$\frac{5y-3}{y(y-3)}$$

Subtracting Rational Expressions:

We will follow the same steps as adding rational expressions; however, we must be sure to distribute the "-" in the numerator.

$$7(x+4) = 7x + 28$$

Ex: $\left(\frac{7}{x}\right) - \left(\frac{5}{x+4}\right)$ $x \neq 0$
 $x \neq -4$

$$\frac{7x+28}{x(x+4)} - \frac{5x}{x(x+4)}$$

$$\frac{7x+28-5x}{x(x+4)} = \frac{2x+28}{x(x+4)}$$

$$\boxed{\frac{2(x+14)}{x(x+4)}}$$

You Try:

$x \neq 0$
 $x \neq 4$ $\left(\frac{2}{x-4}\right) - \left(\frac{4}{x}\right)$ $x \neq 4$
 $4(x-4) = 4x-16$

$$\frac{2x}{x(x-4)} - \frac{4x-16}{x(x-4)}$$

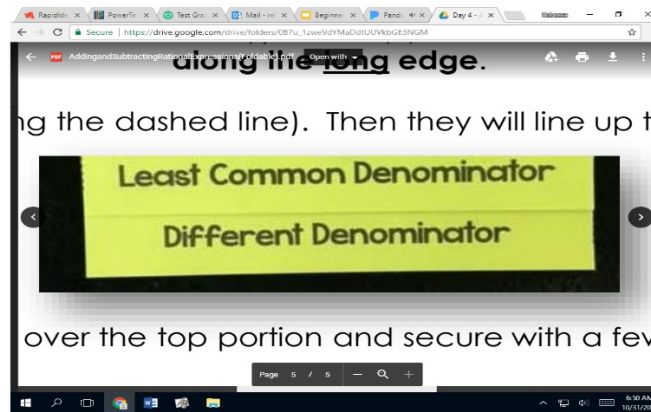
$$\frac{2x - (4x-16)}{x(x-4)}$$

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

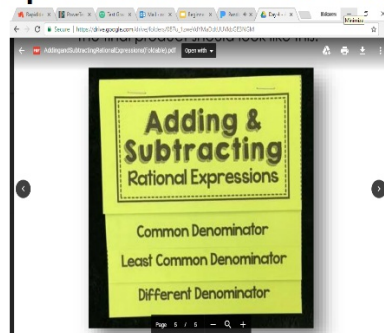
$$\frac{-2x+16}{x(x-4)} = \boxed{\frac{-2(x-8)}{x(x-4)}}$$

Foldable:

- cut the page along the dashed line.
- Line up the bottom of the two pieces as shown:



- Fold over the top part and secure with 2 staples. It should look like this:



$$3) 4 \left(\frac{2}{3x^3} \right), \left(\frac{x+1}{12x^2} \right) x \quad \boxed{12x^3}$$

$$\frac{2}{3} \quad \frac{1}{12}$$

$$3-3, 6, 9, 12$$

$$12-12$$

$$5) \frac{7}{\boxed{x^2-16}}, \frac{x}{x^2-x-12}$$

$$\begin{array}{r} -12 \\ -4 \quad 3 \\ -1 \end{array}$$

$$(x+4)(x-4) \quad (x-4)(x+3)$$

Math 3

-Warm-up Problems #5-8.

⑤ $x^2 - 9$

$(x-3)(x+3)$

⑥ $x^2 - 25$

$(x+5)(x-5)$

⑦ $4x^2 - 16 \rightarrow (2x-4)(2x+4)$

$4(x^2 - 4)$

$(2x-2)(2x+2)$

$4(x+2)(x-2)$

$4(x-2)(x+2)$

⑧ $x^2 - 4x - 12$

$(x-6)(x+2)$

~~$\begin{array}{r} -12 \\ -6 \quad 2 \\ \hline 4 \end{array}$~~

$$1.) \frac{1}{2x+3} + \frac{1}{x}$$

$$\frac{1}{(2x+3)} + \frac{1}{(x)}$$

$$\frac{1(x)}{(2x+3)(x)} + \frac{1(2x+3)}{(x)(2x+3)}$$

$$\frac{x+2x+3}{x(2x+3)} = \frac{3x+3}{x(2x+3)} = \frac{3(x+1)}{x(2x+3)}$$

$$2.) \frac{2}{w} + \frac{8}{w-5}$$

$$\frac{2w-10}{w(w-5)} + \frac{8w}{w(w-5)}$$

$$\frac{10w-10}{w(w-5)} = \frac{10(w-1)}{w(w-5)}$$

$$3.) \frac{11}{x} - \frac{9}{x-2}$$

~~$$\frac{11}{x(x-2)} - \frac{9}{x(x-2)}$$~~

$$\frac{11(x-2) - 9x}{x(x-2)} = \frac{2x-22}{x(x-2)}$$

$$\frac{2(x-11)}{x(x-2)}$$

$$4.) \left(\frac{3}{y+2}\right) + \left(\frac{1}{y}\right)y+2$$

$$\frac{3y}{y(y+2)} + \frac{y+2}{y(y+2)}$$

$$\frac{3y+y+2}{y(y+2)} = \frac{4y+2}{y(y+2)}$$

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

$$5.) \left(\frac{17}{t} \right) - \left(\frac{5}{t+1} \right) \quad H$$

~~176x~~

$$\frac{17t+17}{t(t+1)} - \frac{5t}{t(t+1)}$$

$$\frac{17t-5t+17}{t(t+1)} \Rightarrow \frac{12t+17}{t(t+1)} \Rightarrow \frac{12(t+1)}{t(t+1)}$$

$$6.) \frac{4}{z} + \frac{2}{z+6}$$

$$\frac{4(z+6) + 2z}{z(z+6)}$$

$$\frac{2(2(z+6) + z)}{z(z+6)}$$

$$\frac{2(2z+12+z)}{z(z+6)}$$

$$\frac{2((2z+z)+12)}{z(z+6)}$$

$$\frac{2(3z+12)}{z(z+6)}$$

$$\frac{2 \cdot 3(z+4)}{z(z+6)}$$

$$\frac{6(z+4)}{z(z+6)}$$

$$\frac{6(z+4)}{z(z+6)}$$

$$7.) \frac{12}{j+4} - \frac{13}{j}$$

$$\frac{12}{j+4} - \frac{13}{j} \times \frac{j-4}{j-4}$$

$$\frac{12j}{j(j+4)} - \frac{13j-52}{j(j+4)} = \frac{12j(13+52)}{j(j+4)}$$

$$\frac{12j-13j-52}{j(j+4)} = \frac{-j-52}{j(j+4)} = \frac{-1j-52}{j(j+4)}$$

$$8.) \frac{5}{g-1} - \frac{15}{g}$$

$$1.) \frac{b+4}{b^2-b-12} - \frac{2b}{4b}$$

$$\begin{array}{r} -12 \\ -4 \times 3 \\ \hline -1 \end{array}$$

$$\frac{2(b+4)}{(b-4)(b+3)} - \frac{1}{2}$$

$$\frac{2b+8}{2(b-4)(b+3)} - \frac{b^2-b-12}{2(b-4)(b+3)}$$

$$\frac{2b+8 - (b^2-b-12)}{2(b-4)(b+3)}$$

$$\frac{-b^2+3b+20}{2(b-4)(b+3)}$$

$$\frac{2b+8 - b^2 + b + 12}{2(b-4)(b+3)}$$

$$\frac{-b^2-3b-20}{2(b-4)(b+3)}$$

$$\textcircled{b} \quad \frac{-7}{1} + \frac{k-3}{k^2+8k+15}$$

$$\begin{array}{r} 15 \\ 5 \times 3 \\ \hline 8 \end{array}$$

$$k^2+8k+15 \quad \left(\frac{-7}{1} + \frac{k-3}{(k+5)(k+3)} \right)$$

$$\frac{-7k^2-56k-105}{(k+5)(k+3)} + \frac{k-3}{(k+5)(k+3)}$$

$$\frac{-7k^2 - 56k - 105 + k - 3}{(k+5)(k+3)}$$

$$\frac{-7k^2 - 55k - 108}{(k+5)(k+3)} = -\frac{7k^2 + 55k + 108}{(k+5)(k+3)}$$