1. Simplify. $\frac{3}{10x^2-90} - \frac{7x}{4x^3-4x^2-24x} - \frac{2}{12x^3-36x^2}$

$10(x^2-9) \quad 4(x^2-x-6) \quad 12x^2(x-3)$

$10(x+3)(x-3) \quad 4(x-3)(x+2) \quad 12x^2(x-3)$

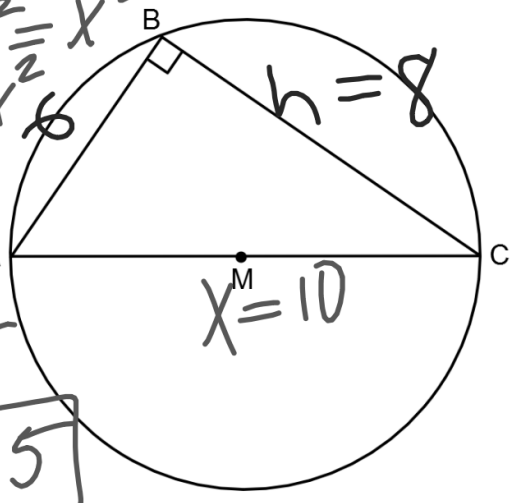
$\frac{6x^2(x+2)3}{6x^2(x+2)10(x+3)(x-3)} - \frac{7x \cdot 15x(x+3)2}{4x(x-3)(x+2)15x(x+3)12x^2(x-3)} \cdot \frac{5(x+3)(x+2)}{5(x+3)(x+2)}$

$18x^2(x+2) \quad -105x^2(x+3) \quad -10(x^2+5x+6)$

$= \frac{18x^3+36x^2-105x^3-315x^2-10x^2-50x-60}{60x^2(x+3)(x+2)}$

$= \frac{-87x^3-289x^2-50x-60}{60x^2(x+3)(x+2)}$

2. In the figure above $\triangle ABC$ is incsribed in Circle M. The area of $\triangle ABC = 24$ and $AB = 6$. Find the area of Circle M to the nearest tenth.



$A = 24$

$24 = \frac{1}{2}(6)(h)$

$3h = 24$

$h = 8$

$6^2+8^2 = x^2$

$100 = x^2$

$x = 10$

$h = 8$

$x = 10$

$A = \pi r^2$

$= \pi(5)^2$

$= 78.5$

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

$$\frac{\frac{5}{4} - 8}{2 - \frac{7}{6}}$$

Complex Fractions: (also known as Compound Fractions)

Fractions whose numerators and/or denominators also have fractions.

Fractions within fractions

Simplify: $\dfrac{\frac{5}{4} - 8}{2 - \frac{7}{6}}$

There are many methods to do this, I'll focus on two methods.

$$\frac{12\left(\frac{5}{4} - 8\right)}{12\left(2 - \frac{7}{6}\right)} = \frac{15 - 96}{24 - 14} = \frac{-81}{10}$$

One method:

Find LCM of all the denominators in the complex fraction.

Then multiply the numerator and denominator of the complex fraction by this LCM.

$$\frac{\frac{5}{4} - 8}{2 - \frac{7}{6}}$$

Another method:

Get ALL the "parts" of the complex fraction to have the LCD.
Then you can cancel all of the denominators.

Simplify:

$$\frac{\frac{11}{9} - \frac{7}{12}}{\frac{13}{24} - 5}$$

Simplify: $\dfrac{\dfrac{3}{x+2}}{\dfrac{1}{x+5}+\dfrac{10x}{x^2+7x+10}}$

$= \dfrac{\dfrac{3}{x+2}}{\dfrac{1}{x+5}+\dfrac{10x}{(x+2)(x+5)}}$ $(x+2)(x+5)$

$= \dfrac{3x+15}{x+2+10x} = \dfrac{3x+15}{11x+2}$

Simplify: $\dfrac{\dfrac{4x}{x^2+8x+7}}{\dfrac{5x}{x^2+6x-7}+\dfrac{6}{x^2-}}$

$= \dfrac{(x+7)(x+1)(x-1)\ \dfrac{4x}{(x+7)(x+1)}}{(x-1)(x+7)(x+1)\ \dfrac{5x}{(x+7)(x-1)} + \dfrac{6}{(x-1)(x+1)}}$

$= \dfrac{4x^2-4x}{5x^2+5x+6x+42} = \dfrac{4x^2-4x}{5x^2+11x+42}$

Simplify: $\dfrac{\frac{8}{x-4}}{\frac{x+5}{x^2-x-12}-\frac{2x}{x+3}}$

$= \dfrac{8}{x-4} \cdot \dfrac{(x-4)(x+3)}{\frac{x+5}{(x+3)(x-4)}-\frac{2x}{x+3}}$

$= \dfrac{8x+24}{x+5-2x^2+8x} = \dfrac{8x+24}{-2x^2+9x+5}$

Sec 9-6: Solving Rational Equations

Solve.

1. $\dfrac{2x}{9}+\dfrac{7}{6}=\dfrac{5}{3}$

1. Solve.

LCM = 18

$\frac{2x}{9} + \frac{7}{6} \cdot \frac{3}{3} \quad \frac{5}{3} \cdot \frac{6}{6}$

$\frac{4x}{18} + \frac{21}{18} = \frac{30}{18}$

$4x + 21 = 30$

$4x = 9$

$x = \frac{9}{4}$

Method 1:

1. Make ALL terms in the equation have the same denominator.
2. Cancel out all denominators.
3. Finish by solving the resulting equation for x.

1. Solve.

$18\left(\frac{2x}{9} + \frac{7}{6}\right) = 18\left(\frac{5}{3}\right)$

$4x + 21 = 30$

$x = \frac{9}{4}$

Method 2:

1. Find the LCM of ALL denominators in the equation
2. Eliminate ALL Denominators by multiplying both sides of the equation by this LCM.
3. Finish by solving the resulting equation

1. Solve.

$$\frac{2x}{9} + \frac{7}{6} = \frac{5}{3}$$

$\frac{2}{2}$ $\frac{3}{3}$

$$\frac{4x+21}{18} = \frac{5}{3}$$

$$3(4x+21) = 90$$

$$4x + 21 = 30$$

Method 3:

1. Simplify each side of the equation into a single fraction, creating a proportion.
2. Cross multiply.
3. Solve the resulting equation.

Solve.

2. $$\frac{4x}{x+1} = \frac{3}{7}$$

$$28x = 3(x+1)$$

$$28x = 3x + 3$$

$$25x = 3$$

$$x = 3/25$$

Solve.

3. $\frac{2x}{5} = \frac{8}{x+1}$

$2x^2 + 2x = 40$

$2x^2 + 2x - 40 = 0$

$x^2 + x - 20 = 0$

$2(x+5)(x-4) = 0$

$x = -5, 4$

-4 × -20/5 = 1

Solve.

4. $\left(\frac{6}{x} + \frac{7}{3}\right) = \left(\frac{9}{2x} - \frac{11}{12}\right)^{12x}$

$72 + 28x = 54 - 11x$

$72 + 39x = 54$

$39x = -18$

$x = \frac{-18}{39} = \frac{-6}{13}$

Solve.

5. $\frac{5x}{4} - \frac{x-3}{3x} = \frac{8x}{6}$

Hwk #11 Sec 9-6

Page 524

Problems 4, 6, 9, 14, 15, 21, 22