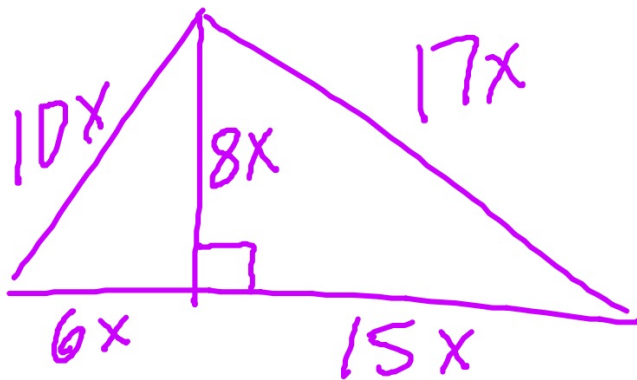


24.)

$$\frac{-x+1}{(x+7)(x-2)}$$

26.)

C



$$P = 10x + 17x + 6x + 15x = 48x$$

$$A = \frac{1}{2} (21x)(8x) = 84x^2$$

$$\frac{48x}{84x^2} = \frac{4}{7x}$$

$$x^2 - 25$$
$$(\cancel{x-5})(x+5)$$

x

~~x-5~~

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

$$21) \quad \frac{9}{x-3} + \frac{2x}{x+1}$$

$$\frac{9(x+1) + 2x(x-3)}{(x-3)(x+1)}$$

$$\frac{21}{28} = \frac{\cancel{7} \cdot 3}{\cancel{7} \cdot 4}$$

$$\frac{2x^2 + 3x + 9}{(x-3)(x+1)}$$

$$26.) \frac{2x(x-4)}{x+4(x-4)} - \frac{(x^2+4)}{(x+4)(x-4)}$$

$$\frac{2x^2 - 8x - x^2 - 4}{(x+4)(x-4)}$$

$$\frac{x^2 - 8x - 4}{(x+4)(x-4)}$$

$$27.) \quad \frac{X(x+3)}{(x+3)(x-3)(x+3)} + \frac{(x+1)(x-3)}{(x+3)(x+3)}$$

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

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

$$24.) \frac{x^2 - 5}{(x+7)(x-2)} - \frac{(x+3)(x-2)}{x+7}$$

$$\frac{x^2 - 5 - (x^2 + x - 6)}{(x+7)(x-2)}$$

$$\frac{-x + 1}{(x+7)(x-2)}$$

5.5 cont. Complex Fractions
5.6 Solving Rational Equations



HW:

A complex fraction is a fraction that contains a fraction in its numerator and or denominator.

ex: Simplify.

$$\begin{array}{l} \frac{2}{3} \\ \text{a) } \frac{\frac{3}{3}}{\frac{7}{7}} \div \end{array} \quad \begin{array}{l} \frac{2}{3} \div \frac{3}{7} \\ \frac{2}{3} \cdot \frac{7}{3} \\ \frac{14}{9} \end{array}$$

ex: Simplify.

$$\begin{aligned} \text{b) } \left(\frac{\frac{2}{3} - \frac{1}{5}}{\frac{3}{7} - \frac{5}{12}} \right) &= \frac{\frac{7}{15}}{\frac{3}{7}} = \frac{7}{15} \cdot \frac{7}{3} \\ &= \frac{49}{45} \end{aligned}$$

2 Methods For Simplifying Complex Fractions:

1. "stay-change-flip" - best for complex fractions containing ONE term in both the numerator and denominator.

$$\text{ex: } \frac{\frac{2}{3}}{\frac{7}{3}}$$

2. "LCM" - best for complex fractions containing MORE THAN ONE term in either the numerator or denominator.

$$\text{ex: } \frac{\frac{2}{3} - \frac{1}{5}}{\frac{5}{12}}$$

ex: Simplify.

Method #1

$$\frac{21}{28} = \frac{7 \cdot 3}{7 \cdot 4}$$

$$c) \frac{\left(1 + \frac{1}{x}\right)}{3 - \frac{1}{x}} = \frac{\frac{x+1}{x}}{\frac{3x-1}{x}}$$

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

ex: Simplify.

Method #2

$$\frac{x \cdot 1 + \frac{1}{x} \cdot x}{x \cdot 3 - \frac{1}{x} \cdot x}$$

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

LCD of
the
den.
(x)

ex: Simplify.

LCD: $3xy$

$$3xy \frac{1}{x} + \frac{1}{y} 3xy$$

d) $\frac{x}{y}$

$$3xy 2 - \frac{1}{3} 3xy$$

$$\frac{3y + 3x}{5xy}$$

ex: Simplify.

$$e) \frac{\frac{(x-2)(x+2)^3}{x-2} + \frac{4}{x+2} (x-2)(x+2)}{\frac{7}{x^2-4} (x-2)(x+2)}$$

$$\frac{3(x+2) + 4(x-2)}{\frac{(7x-2)}{7}}$$

ex: Simplify.

$$\text{f) } \frac{\frac{(x-1)(x+1)}{x-1} \left(1 + \frac{1}{x-1}\right) (x-1)(x+1)}{\frac{(x-1)(x+1)}{x+1} \left(1 + \frac{1}{x+1}\right) (x-1)(x+1)}$$

$$\frac{x^2 - 1 + x + 1}{x^2 - 1 + x - 1} = \frac{x^2 \checkmark + x \checkmark}{x^2 + x - 2} = \frac{x(x+1) \checkmark}{(x+2)(x-1)}$$

ex: Simplify.

$$g) \frac{\frac{7}{x^2-1} - \frac{x}{x^2-4x+3}}{\frac{2}{x+1}}$$

$$\cancel{(x-1)}\cancel{(x+1)}$$

$$(x-3)\cancel{(x-1)}$$

$$\cancel{(x+1)}$$

LCD

$$(x-1)(x+1)(x-3)$$

$$\frac{\cancel{(x+1)}\cancel{(x-1)}(x-3)}{(x+1)(x-1)} - \frac{x \cancel{(x+1)}(x-1)\cancel{(x-3)}}{(x-3)(x-1)}$$

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

$$\frac{7(x-3) - x(x+1)}{2(x-1)(x-3)} = \frac{-x^2 + 6x - 21}{2(x-1)(x-3)}$$

ex: Simplify.



$$h) \frac{x + (x^{-2})}{1 + 7x^{-1}}$$

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

$$3x^{-1} = \frac{3}{x}$$

$$(3x)^{-1} = \frac{1}{3x}$$

$$\frac{x + \frac{1}{x^2}}{1 + \frac{7}{x}} = \frac{\frac{x^3 + 1}{x^2}}{\frac{x+7}{x}} = \frac{x^3 + 1}{x^2} \cdot \frac{x}{x+7} = \frac{x^3 + 1}{x(x+7)}$$

ex: Simplify.

$$\text{i) } \frac{2x^{-1} + \frac{3}{x^{-2} - 1}}{1 + 4x^{-1}}$$

ex: Solve.

$$a) \frac{5}{x} + \frac{1}{3} = \frac{3}{4}$$

$$\frac{12 \cdot 5}{12 \cdot x} + \frac{1 \cdot 4x}{3 \cdot 4x} - \frac{3 \cdot 3x}{4 \cdot 3x} = 0$$

$$\frac{60 + 4x - 9x}{12x} = 0$$

$$\frac{60 - 5x}{12x} = \frac{0}{1}$$

1. Set equation = 0
2. Find LCD and simplify the equation.
3. Find the zeros.

$$\frac{3 \cdot 1}{3 \cdot 2} + \frac{1 \cdot 2}{3 \cdot 2}$$

$$\frac{\quad}{6}$$

$$60 - 5x = 0$$
$$x = 12$$

ex: Solve.

$$\text{LCD: } 18(x+3)$$

$$b) \frac{4}{x+3} + \frac{5}{6} = \frac{23}{18}$$

$$\frac{18 \cdot 4}{x+3} + \frac{5 \cdot 3(x+3)}{6} - \frac{23(x+3)}{18} = 0$$

$$\frac{72 + 15x + 45 - 23x - 69}{18(x+3)} = 0$$
$$\frac{-8x + 48}{18(x+3)} = 0 \quad \frac{-8(x-6)}{18(x+3)} = 0$$

$x=6$

ex: Solve.

$$c) \frac{2x}{x+5} - \frac{x^2 - x - 10}{x^2 + 8x + 15} = \frac{3}{x+3}$$

$$x \neq -5, -3$$

$$\frac{(x+3)2x}{(x+3)x+5} - \frac{(x^2 - x - 10)}{x^2 + 8x + 15} - \frac{3(x+5)}{x+3(x+5)} = 0$$

$$\frac{2x^2 + 6x - x^2 + x + 10 - 3x - 15}{(x+5)(x+3)} = 0$$

$$\frac{x^2 + 4x - 5}{(x+5)(x+3)} = 0$$

$$\frac{(x+5)(x-1)}{(x+5)(x+3)} = 0$$

$$x-1=0$$

$$x=1$$

ex: Solve.

$$x \neq 0,5$$

$$d) 1 - \frac{8}{x-5} = \frac{3}{x}$$

$$1 - \frac{8x}{x-5} - \frac{3(x-5)}{x} = 0$$

$$\frac{x^2 - 5x - 8x - 3x + 15}{x(x-5)} = 0$$

$$\frac{x^2 - 16x + 15}{x(x-5)} = 0$$

$$\frac{(x-15)(x-1)}{x(x-5)} = 0$$

$$x = 15, 1$$

ex: Solve.

$$e) \frac{2}{x+1} - \frac{1}{x-1} + \frac{2}{x^2-1} = 0$$

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

$$\frac{\cancel{x-1}}{(x+1)\cancel{(x-1)}} = 0$$

$$\frac{1}{x+1} = 0 \quad \text{---} \quad \emptyset$$

ex: Solve.

$$f) x - \frac{5}{x+1} = 2$$

$$\frac{x(x+1) - 5 - 2(x+1)}{x+1} = 0$$

$$\frac{x^2 - x - 7}{x+1} = 0$$

$$x = \frac{1 \pm \sqrt{29}}{2}$$

REVIEW

ex: Simplify.

$$\frac{3x^3 - x^2 + 15x - 5}{27x^3 - 1}$$

$$x^2 + 5$$

$$9x^2 + 3x + 1$$

REVIEW

ex: Perform the indicated operation.

$$\text{a) } \frac{4x^2 + 15x + 9}{8x^2 + 10x + 3} \div \frac{x^2 + 4x}{2x + 1}$$

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

REVIEW

ex: Perform the indicated operation.

$$\text{b) } \frac{x}{x^2 + 3x + 2} - \frac{x-1}{x+1}$$

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