

# Section 6.6: cont'd

Thursday, November 14, 2013  
9:29 AM

Solve:

LCO:  $6x(x-5)$

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

$$6x^2 + 30(x-5) = 11x(x-5)$$

$$6x^2 + 30x - 150 = 11x^2 - 55x$$

divide both sides  $\rightarrow$   
by 5

$$0 = 5x^2 - 85x + 150$$

$$0 = x^2 - 17x + 30$$

ac = 30  
-2 -15

$$0 = (x-2)(x-15)$$

$$x = 2, 15$$

$$\{2, 15\}$$

check:  $x=2$

$$\frac{2}{-3} + \frac{5}{2} = \frac{11}{6}$$

$$\frac{-4}{6} + \frac{15}{6} = \frac{11}{6} \quad \checkmark$$

$x=15$

$$\frac{15}{10} + \frac{5}{15} = \frac{11}{6}$$

$$\frac{3}{2} + \frac{1}{3} = \frac{11}{6}$$

$$\frac{9}{1} + \frac{2}{6} = \frac{11}{1} \quad \checkmark$$

$$2(x-3) \left( \frac{x-3}{2} - \frac{1}{x-3} \right) = \left( \frac{8-3x}{x-3} \right) 2(x-3)$$

$$(x-3)^2 - 2 = 2(8-3x)$$

$$x^2 - 6x + 9 - 2 = 16 - 6x$$

$$x^2 - 9 = 0$$

$$(x+3)(x-3) = 0$$

$$x = \cancel{3}, -3$$

$$\{-3\}$$

check:

$$x = -3$$

$$\frac{x-3}{2} - \frac{1}{x-3} = \frac{8-3x}{x-3}$$

$$\frac{-6}{2} - \frac{1}{-6} = \frac{8+9}{-6}$$

$$-3 + \frac{1}{6} = -\frac{17}{6}$$

$$-\frac{18}{6} + \frac{1}{6} = -\frac{17}{6} \quad \checkmark$$

$$\cancel{x-3}$$

extraneous root

$$\frac{0}{2} - \frac{1}{0} = \frac{1}{0}$$

undefined

undefined

$$x(x-6) \left( \frac{x-2}{x-6} - \frac{4}{x} \right) = \left( \frac{24}{x^2-6x} \right) x(x-6)$$

LCD:  $x(x-6)$

$$x(x-2) - 4(x-6) = 24$$

$$x^2 - 2x - 4x + 24 = 24$$

$$x^2 - 6x = 0$$

$$x(x-6) = 0$$

$$x = \cancel{0}, \cancel{6}$$



Solve:

$$\frac{1}{x-2} - \frac{2}{x+3} = \frac{11}{x^2+x-6}$$

LCD:  $(x-2)(x+3)$

$$(x-2)(x+3) \left( \frac{1}{x-2} - \frac{2}{x+3} \right) = \frac{11}{(x+3)(x-2)} (x-2)(x+3)$$

$$x+3 - 2(x-2) = 11$$

$$x+3 - 2x + 4 = 11$$

$$-x = 4$$

$$x = -4$$

$\{-4\}$

extremes-means property (cross-multiplying)

if

$$\frac{a}{b} = \frac{c}{d}$$

then

$$ad = bc$$

note:  $(bd)\frac{a}{b} = \frac{c}{d}(bd)$   
 $ad = bc$

note: can only use this technique if you have a single fraction on left and a single fraction on the right

note also that you can just multiply both sides by LCD as before

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example: solve

$$\frac{x+5}{2} = \frac{3}{x}$$

$$x(x+5) = 6$$

$$x^2 + 5x - 6 = 0$$

$$(x-1)(x+6) = 0$$

$$x = 1, -6$$

$$\{-6, 1\}$$

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$$b(b+2)\left(\frac{3b}{b+2}\right) = \left(\frac{12}{b} - \frac{24}{b^2+2b}\right)b(b+2)$$

$$3b^2 = 12(b+2) - 24$$

$$3b^2 = 12b$$

$$3b^2 - 12b = 0$$

$$b^2 - 4b = 0$$

$$b(b-4) = 0$$

$$b = \cancel{0}, 4$$