Math 60, Sections 3.2 and 3.3 Group Activity   Name: <u>Solutions</u>

Section 3.2 Linear Equations and Inequalities with Fractions

1. Use <u>Equivalent Equations</u> or <u>Clearing the Fractions</u> to write an equation without fractions and then solve it. State your solution set.

a. $\dfrac{7}{10} - \dfrac{1}{10}c = 8$ $\boxed{LCD = 10}$

$\dfrac{10}{1} \cdot \dfrac{7}{10} - \dfrac{10}{1} \cdot \dfrac{1}{10}c = \dfrac{10}{1} \cdot \dfrac{8}{1}$

$7 - c = 80$

$\dfrac{-c}{-1} = \dfrac{73}{-1}$

$c = -73$

$\{c \mid c = -73\}$ or $\{-73\}$ is the solution set.

b. $\dfrac{4}{5}B - 49 = -\dfrac{5}{6}B$ $\boxed{LCD = 5 \cdot 6 = 30.}$

$\dfrac{6\,\overset{30}{30}}{1} \cdot \dfrac{4}{5}B - 30 \cdot 49 = \dfrac{\overset{5}{30}}{1} \cdot \left(-\dfrac{5}{6}B\right)$

$24B - 1470 = -25B$

$49B - 1470 = 0$

$\dfrac{49B}{49} = \dfrac{1470}{49}$

$B = 30$ $\{30\}$ is the solution.

c. $\dfrac{1}{3}m - \dfrac{2}{5} = \dfrac{3}{4}m - \dfrac{7}{6}$ $LCD = 2^2 \cdot 3 \cdot 5 = 60$

$\dfrac{\overset{20}{60}}{1} \cdot \dfrac{1}{3}m - \dfrac{\overset{12}{60}}{1} \cdot \dfrac{2}{5} = \dfrac{\overset{15}{60}}{1} \cdot \dfrac{3}{4}m - \dfrac{\overset{10}{60}}{1} \cdot \dfrac{7}{6}$

$20m - 24 = 45m - 70$

$-24 = 45m - 20m - 70$

$-24 = 25m - 70$

$-24 + 70 = 25m$

$46 = 25m$

$\dfrac{46}{25} = m$ $\left\{\dfrac{46}{25}\right\}$ is the solution.

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2. Remove the fractions from the inequality and solve it. Show your solution as a number line graph, interval and solution set.

a. $\dfrac{x}{9} - 4 \le \dfrac{x}{5}$ $LCD : 45$

$$\overset{5}{\cancel{\dfrac{45}{1}}} \cdot \dfrac{x}{9} - 45 \cdot 4 \le \overset{9}{\cancel{\dfrac{45}{1}}} \cdot \dfrac{x}{5}$$

$$5x - 180 \le 9x$$

$$\dfrac{-180}{4} \le \dfrac{4x}{4}$$

$$-45 \le x$$

$\{x \mid x \ge -45\}$

$[-45, \infty)$

b. $\dfrac{y-10}{8} > \dfrac{y+9}{6}$ $LCD : 24$

$$\overset{3}{\cancel{\dfrac{24}{1}}} \cdot \dfrac{y-10}{8} > \overset{4}{\cancel{\dfrac{24}{1}}} \cdot \dfrac{y+9}{6}$$
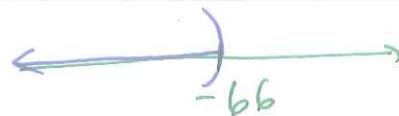
$$3(y-10) > 4(y+9)$$

$$3y - 30 > 4y + 36$$

$$3y > 4y + 66$$

$$-y > 66$$

$$y < -66$$

$\{y \mid y < -66\}$

$(-\infty, -66)$

3. Solve the following equations for the specified variable.

a. Solve for x: $\heartsuit x - \smiley = \house$

$\heartsuit x = \house + \smiley$

$x = \dfrac{\house + \smiley}{\heartsuit}$

b. Solve for w: $A = l \cdot w$

$\dfrac{A}{l} = w$

c. Solve for C: $F = \dfrac{9}{5}C + 32$

$\dfrac{5}{9}(F - 32) = \dfrac{9}{5}C \cdot \dfrac{5}{9}$

$\dfrac{5}{9}(F - 32) = C$

$\dfrac{5}{9}F - \dfrac{160}{9} = C$

More Practice

5. Clear the fractions and solve the equation or inequality.

a. $\frac{1}{2}w - 3 = \frac{11}{5} - \frac{3}{4}w$

$\overset{10}{\cancel{20}} \cdot 20 \quad \overset{4}{\cancel{20}} \cdot \overset{5}{\cancel{20}}$ $LCD = 20$

$10w - 60 = 44 - 15w$

$+15w \qquad\qquad +15w$

$25w - 60 = 44$
$+60 \quad +60$

$\frac{25w}{25} = \frac{104}{25}$

$w = \frac{104}{25}$

$\left\{ \frac{104}{25} \right\}$

b. $\frac{1}{2}t - \frac{3}{4} < -\frac{2}{5}t + \frac{3}{5}$

$\overset{10}{\cancel{20}} \cdot \overset{5}{\cancel{20}} \cdot \overset{4}{\cancel{20}} \cdot \overset{4}{\cancel{20}}$ $LCD = 20$

$10t - 15 < -8t + 12$

$+8t \qquad\qquad +8t$

$18t - 15 < 12$
$+15 \quad +15$

$\frac{18t}{18} < \frac{27 \div 9}{18 \div 9}$

$t < \frac{3}{2}$

$\left\{ t \,\middle|\, t < \frac{3}{2} \right\}$

$\left(-\infty, \frac{3}{2} \right)$
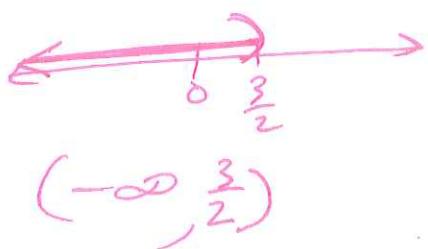
6. Solve each equation for the specified variable.

a. $C = \pi d$, for d

$$\frac{C}{\pi} = \frac{\pi d}{\pi}$$

$$\frac{C}{\pi} = d$$

or

$$d = \frac{C}{\pi}$$

b. $A = \frac{1}{2}bh$, for b

$$\frac{2A}{h} = \frac{bh}{h}$$

$$\frac{2A}{h} = b$$

c. $Ax + By = C$, for y

$$-Ax \qquad -Ax$$

$$\frac{By}{B} = \frac{C - Ax}{B}$$

$$y = \frac{C - Ax}{B}$$