Lesson 5.7

Equations and Inequalities

with Rational Numbers

Goal: solve equations and inequalities by eliminating the fractions first.

Goal: to solve equations and inequalities in a variety of ways when fractions are involved.

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Solve:

$2x - 5 = 13$
$+5 \quad +5$
$\dfrac{2x}{2} = \dfrac{18}{2} \quad x = 9$

$-14 < 2 + x \qquad -16 < x$
$-2 \quad -2$

$\dfrac{2}{3}x + \dfrac{1}{6} \quad \dfrac{3}{6} \cdot \dfrac{1}{2} - \dfrac{1}{6}$
$-\dfrac{1}{6}$

$\dfrac{3}{2} \cdot \dfrac{2}{3}x = \dfrac{2}{6} \cdot \dfrac{3}{2} \qquad x = \dfrac{6}{12} = \dfrac{1}{2}$

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When working with fractions in equations, you can eliminate the fractions by multiplying through by the common denominator.

$\dfrac{10}{1}\left(\dfrac{1}{2}x + \dfrac{7}{10} = \dfrac{4}{5}\right)$

$\dfrac{10}{2}x + \dfrac{70}{10} = \dfrac{40}{5} \qquad 5x + 7 = 8$

$5x + 7 = 8$
$-7 \quad -7$
$\dfrac{5x}{5} = \dfrac{1}{5}$

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Solve:

$16\left(\dfrac{7}{16}x - \dfrac{3}{8} = \dfrac{3}{4}\right)$

$7x - 6 = 12$
$+6 \quad +6$
$\dfrac{7x}{7} = \dfrac{18}{7}$

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Solve:

$\dfrac{35}{1}\left(4w + \dfrac{2}{7} = \dfrac{-4}{5}\right)$

$140w + 10 = -28$
$-10 \quad -10$

$\dfrac{140w}{140} = \dfrac{-38}{140} \div 2 \quad \boxed{\dfrac{19}{70}}$
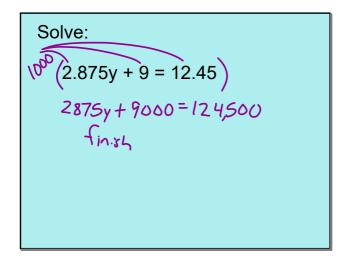$\div 2$

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You can also use multiplication to clear a decimal from a problem to make it easier to do.

Solve:

$100(2.20 - 3.64 = 8.46)$

$220b - 364 = 846$
$+364 \quad +364$

$\dfrac{220b}{220} = \dfrac{1210}{220} \div 11$
$\div 11$

$\boxed{b = \dfrac{11}{2}}$

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Solve:

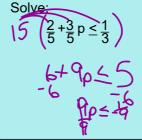$1000 \; (2.875y + 9 = 12.45)$

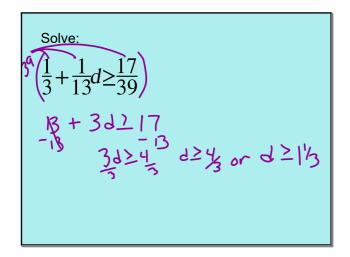$2875y + 9000 = 124,500$

finish

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Solving inequalities with fractions:

-Use the same methods that you have already learned for solving equations and inequalities by either clearing the fraction or using inverses.

Solve:

$15 \left(\dfrac{2}{5} + \dfrac{3}{5}p \leq \dfrac{1}{3} \right)$

$6 + 9p \leq 5$

$-6 \qquad\qquad -6$

$9p \leq \dfrac{-6}{9}$

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Solve:

$39 \left(\dfrac{1}{3} + \dfrac{1}{13}d \geq \dfrac{17}{39} \right)$

$13 + 3d \geq 17$

$-13 \qquad\qquad -13$

$\dfrac{3d}{3} \geq \dfrac{4}{3}$ $d \geq \dfrac{4}{3}$ or $d \geq 1\frac{1}{3}$

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Hwk: pg. 262 - 263

#16 - 24 evens, 31,

32 - 40 evens, 44, 45,

52, 56, 57

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