9-6 Solving Rational Equations and Inequalities
Day 1

Objective: To solve rational Equations (today) and Inequalities (tomorrow)

Ex 1) $\dfrac{5}{24} + \dfrac{2}{3-x} = \dfrac{1}{4}$ $\quad \dfrac{24(3-x)}{1}$

$\dfrac{5}{24} \cdot \dfrac{24(3-x)}{1} + \dfrac{2}{3-x} \cdot \dfrac{24(3-x)}{1} = \dfrac{1}{4} \cdot \dfrac{\overset{6}{24}(3-x)}{1}$

$5(3-x) + 48 = 6(3-x)$

$15 - 5x + 48 = 18 - 6x$

$\underline{\qquad +6x \qquad\qquad +6x}$

$63 + x = 18$

$\underline{-63 \qquad -63}$

$\boxed{x = -45}$

Ex 2) $\dfrac{9}{28} + \dfrac{3}{z+2} = \dfrac{3}{4}$ $\quad \dfrac{28(z+2)}{1}$

$\dfrac{9}{28} \cdot \dfrac{28(z+2)}{1} + \dfrac{3}{z+2} \cdot \dfrac{28(z+2)}{1} = \dfrac{3}{4} \cdot \dfrac{\overset{7}{28}(z+2)}{1}$

$9(z+2) + 84 = 21(z+2)$

$9z + 18 + 84 = 21z + 42$

$\underline{-9z \qquad\qquad -9z}$

$102 = 12z + 42$

$\underline{-42 \qquad -42}$

$60 = 12z$

$\boxed{5 = z}$

Ex 3) $\dfrac{p^2 - p + 1}{p + 1} = \dfrac{p^2 - 7}{p^2 - 1} + \dfrac{p}{1}$

$\dfrac{(p+1)(p-1)}{1}$

$(p+1)(p-1)$

$(p^2 - p + 1)(p - 1) = p^2 - 7 + p(p+1)(p-1)$

$(p^2 - 1)$

$p^3 - p^2 + p - p^2 + p - 1 = p^2 - 7 + p^3 - p$

$p^3 - 2p^2 + 2p - 1 = p^3 + p^2 - p - 7$

$\quad -p^2 \qquad\qquad\qquad -p^2$

$-3p^2 + 2p - 1 = -p - 7$

$\quad +p +7 \quad +p +7$

$-3p^2 + 3p + 6 = 0$

$-3(p^2 - 1p - 2) = 0$

$-3(p - 2)(p + 1) = 0$

$p - 2 = 0 \qquad p + 1 = 0$

$\boxed{p = 2} \qquad \cancel{p = -1}$

Now let me help you get started on your homework :)

④ $\left[\dfrac{2}{d} + \dfrac{1}{4} = \dfrac{11}{12}\right]\dfrac{12d}{1}$

$\dfrac{2}{d} \cdot \dfrac{12d}{1} + \dfrac{1}{4} \cdot \dfrac{\overset{3}{12}d}{1} = \dfrac{11}{12} \cdot \dfrac{12d}{1}$

$24 + 3d = 11d$

$\ -3d\ \ -3d$

$\overline{24 = 8d}$

$\boxed{d = 3}$

⑤ $\left[\dfrac{t}{1} + \dfrac{12}{t} - \dfrac{8}{1} = 0\right]\dfrac{t}{1}$

$t^2 + 12 - 8t = 0$

$t^2 - 8t + 12 = 0$

$(t - 6)(t - 2) = 0$

$\boxed{t = 6 \quad t = 2}$

⑥ $\left[\dfrac{1}{x-1} + \dfrac{2}{x} = 0\right]\dfrac{x(x-1)}{1}$

$x + 2(x - 1) = 0$

$x + 2x - 2 = 0$

$3x - 2 = 0$

$3x = 2$

$\boxed{x = \dfrac{2}{3}}$ ✓