RATIONAL EQUATIONS

STEP 1: FACTOR ALL DENOMINATORS

STEP 2: FIND THE LCM AND MULTIPLY EVERYTHING BY IT

STEP 3: SOLVE FOR X

STEP 4: SEMI-CHECK ANSWERS

① $m + \frac{48}{m} = 14$

$m(m) + m\left(\frac{48}{m}\right) = m(14)$

$m^2 + 48 = 14m$

$m^2 - 14m + 48 = 0$ (PSP)

$(m-8)(m-6) = 0$

$m-8=0 \quad m-6=0$

$m=8 \quad m=6$

② $\frac{5-x}{x-5} + 5 = \frac{8}{x}$

$x(x-5)\left(\frac{5-x}{x-5}\right) + 5x(x-5) = x(x-5)\left(\frac{8}{x}\right)$

$5x - x^2 + 5x^2 - 25x = 8x - 40$

$4x^2 - 20x = 8x - 40$

$4x^2 - 20x - 8x + 40 = 0$

$4x^2 - 28x + 40 = 0$

$4(x^2 - 7x + 10) = 0$ (GCF)

$4(x-5)(x-2) = 0$ (PSD)

$x-5=0 \quad x-2=0$

$x \neq 5 \quad x=2$

③ $\frac{3}{x-7} + \frac{2}{x-4} = \frac{9x-2}{x^2-11x+28}$ (PSD)

$\frac{3}{x-7} + \frac{2}{x-4} = \frac{9x-2}{(x-7)(x-4)}$

$(x-7)(x-4)\left(\frac{3}{x-7}\right) + (x-7)(x-4)\left(\frac{2}{x-4}\right) = (x-7)(x-4)\left(\frac{9x-2}{(x-7)(x-4)}\right)$

$3x - 12 + 2x - 14 = 9x - 2$

$5x - 26 = 9x - 2$

$5x - 9x = -2 + 26$

$-4x = 24$

$\frac{-4x}{-4} = \frac{24}{-4}$

$x = -6$

④ $\frac{9}{x-5} + \frac{7}{x-4} = \frac{x^2+22x-111}{x^2-9x+20}$ (PSD)

$\frac{9}{x-5} + \frac{7}{x-4} = \frac{x^2+22x-111}{(x-5)(x-4)}$

$(x-5)(x-4)\left(\frac{9}{x-5}\right) + (x-5)(x-4)\left(\frac{7}{x-4}\right) = (x-5)(x-4)\left(\frac{x^2+22x-111}{(x-5)(x-4)}\right)$

$9x - 36 + 7x - 35 = x^2 + 22x - 111$

$16x - 71 = x^2 + 22x - 111$

$0 = x^2 + 22x - 16x - 111 + 71$

$0 = x^2 + 6x - 40$ (PSD)

$0 = (x+10)(x-4)$

$x+10=0 \quad x-4=0$

$x = -10 \quad x \neq 4$