① $8x = 5(x+3)$

$8x = 5x + 15$

$-5x \quad -5x$

$3x = 15$

$\frac{3x}{3} = \frac{15}{3}$

$x = 5$

$\frac{x}{5} = \frac{x+3}{8}$

no variables, so no restrictions

② $5x = 9x$

$-5x \quad -5x$

$0 = 4x$

$\frac{0}{4} = \frac{4x}{4}$

$x \neq 0$

extraneous

no real sol'n

$\frac{1}{5x} = \frac{1}{9x}$ $(x \neq 0)$

③ $4(x^2-1) = 12(3x+3)$

$4x^2 - 4 = 36x + 36$

$-36x-36 \quad -36x \quad -36$

$4x^2 - 36x - 40 = 0$

$\frac{4x^2 - 36x - 40}{4} = 0$

$x^2 - 9x - 10 = 0$

$(x-10)(x+1) = 0$

$x - 10 = 0 \qquad x + 1 = 0$

$x = 10 \qquad x \neq -1$ extraneous

$x = 10$

$\frac{4}{3(x+1)} = \frac{12}{(x+1)(x+1)}$ $(x \neq \pm 1)$

④ $2(3) = (x-1)(x+4)$

$6 = x^2 + 4x - x - 4$

$-6 \qquad -6$

$x^2 + 3x - 10 = 0$

$(x+5)(x-2) = 0$

$x + 5 = 0 \qquad x - 2 = 0$

$x = -5 \qquad x = 2$

$\frac{2}{x-1} = \frac{x+4}{3}$ $(x \neq 1)$

⑤ $3(x^2-1) = x+1$

$3x^2 - 3 = x + 1$

$-x-1 \quad -x-1$

$3x^2 - x - 4 = 0$

$3x^2 + 3x - 4x - 4 = 0$

$3x(x+1) - 4(x+1) = 0$

$(3x-4)(x+1) = 0$

$3x - 4 = 0 \qquad x + 1 = 0$

$3x = 4 \qquad x \neq -1$ extraneous

$x = 4/3$

$\frac{3}{x+1} = \frac{1}{x^2-1}$ $(x \neq \pm 1)$

⑥ $x(2x-3) = 4.5$

$2x^2 - 3x - 20 = 0$

$x - 4$

$2x$	$2x^2$	$-8x$
$+5$	$5x$	-20

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

$2x + 5 = 0 \qquad x - 4 = 0$

$2x = -5 \qquad x = 4$

$x = -5/2$

$\frac{4}{2x-3} = \frac{x}{5}$

$x \neq 3/2$

⑦ $3(x+7) = 12 \cdot x$

$3x + 21 = 12x$

$-3x \qquad -3x$

$9x = 21$

$\frac{9x}{9} = \frac{21}{9}$

$x = \frac{21}{9}$

$x = \frac{7}{3}$

$\frac{3}{x} = \frac{12}{x+7}$

$x \neq 0, -7$

⑧ $10(2x+9) = 6(6x+7)$

$20x + 90 = 36x + 42$

$-20x \qquad -20x$

$90 = 16x + 42$

$-42 \qquad -42$

$16x = 48$

$\frac{16x}{16} = \frac{48}{16}$

$x = 3$

$\frac{10}{6x+7} = \frac{6}{2x+9}$

$x \neq -7/6, -9/2$

⑨ $2(x-15) = 4(3x-5)$

$2x - 30 = 12x - 20$

$-2x \qquad -2x$

$-30 = 10x - 20$

$+20 \qquad +20$

$-10 = 10x$

$\frac{-10}{10} = \frac{10x}{10}$

$x = -1$

$\frac{2}{3x-5} = \frac{4}{x-15}$

$x \neq 5/3, 15$

Remember - you can also solve quadratic eqns (x^2) w/ the Q-formula too!