Solving RATIONAL EQUATIONS

A $\frac{8}{x+7} = \frac{3}{x-3}$

Check for extraneous solutions

$8(x-3) = 3(x+7)$

$8x-24 = 3x+21$

$-3x \quad -3x$

$5x-24 = 21$

$5x = 45$

$x = 9$

$9+7=16$ ✓

$9-3=6$ ✓

A $\frac{x}{x+7} - 3 = \frac{-1}{x+7}$ $(x+7)$

LCD: $(x+7)$

Check

$x-3(x+7) = -1$

$x-3x-21 = -1$

$-2x-21 = -1$

$x = -10$

$-10+7=-3$ ✓

A $\frac{x+6}{x^2-1} = \frac{3}{x+2}$ $(x+1)(x-1)(x+2)$

LCD: $(x+1)(x-1)$

$x+6 = 3(x-1)$

$x+6 = 3x-3$

$12 = 2x$

$6 = x$

Check

$6+2=8$ ✓

$6-2=4$ ✓

B $\frac{x}{3x-7} = \frac{-3}{x-5}$

$x(x-5) = -3(3x-7)$

$x^2-5x = -9x+21$

$+9x \quad +9x$

$x^2+4x = 21$

$-21 \quad -21$

$x^2+4x-21 = 0$

$x^2+4x-21=0$

$(x+7)(x-3)=0$

$x=-7 \quad x=3$

Check extraneous

$3(-7)-7=-28$ ✓

$-7-5=-12$ ✓

$3(3)-7=2$ ✓

$3-5=-2$ ✓

B $\frac{-2}{x-8} + x = \frac{7}{x-8}$ $(x-8)$

LCD: $(x-8)$

$-2+x(x-8) = 7$

$x^2-8x-2 = 7$

$x^2-8x-9 = 0$

$(x-9)(x+1)=0$

$x=9 \quad x=-1$

Check

$9-8=1$ ✓

$-1-8=-9$ ✓

B $\frac{1}{x+3} + 2 = \frac{x^2-3}{x^2+12x+27}$ $(x+3)(x+9)$

LCD: $(x+3)(x+9)$

$x+9+2(x^2+12x+27) = x^2-3$

$x+9+2x^2+24x+54 = x^2-3$

$2x^2+25x+63 = x^2-3$

$-x^2 \quad +3 \quad -x^2 \quad +3$

$x^2+25x+66 = 0$

$(x+3)(x+22)=0$

$x=-3$ $\quad x=-22$

Ext.

Check

-3 ext. $\quad -22$

$-3+3=0 \quad -22+3=-19$ ✓

$-3+9=6 \quad -22+9=-13$ ✓

BOOKS NEVER WRITTEN

Yours Forever by

	I			I	E								I		E				
$\frac{84}{5}$	$\frac{20}{3}$	$-\frac{3}{2}$	$-\frac{3}{2}$	$\frac{20}{3}$	$\frac{32}{3}$	-12	$\frac{11}{4}$	$\frac{12}{7}$	$\frac{84}{5}$	$\frac{20}{3}$	15	$\frac{32}{3}$

The Incompetent Bullfighter by

G	O			O		B		U			Y								
$\frac{5}{8}$	$\frac{33}{16}$	$-\frac{43}{4}$	$\frac{11}{4}$	$\frac{33}{16}$	-12	$\frac{38}{7}$	$-\frac{3}{2}$	21	$\frac{11}{4}$	$\frac{11}{4}$	$\frac{8}{9}$

ABOVE ARE THE TITLES OF TWO "BOOKS NEVER WRITTEN." TO DECODE THE NAMES OF THEIR AUTHORS, FOLLOW THESE DIRECTIONS:

Solve each equation below and find the solution in the code. Each time the solution appears, write the letter of that exercise above it.

(U) $\frac{x}{6}=\frac{7}{2}$ $2x=42$ $x=21$

(E) $\frac{a}{8}=\frac{4}{3}$ $3a=32$ $a=32/3$

(Y) $\frac{2}{9}=\frac{t}{4}$ $9t=8$ $t=8/9$

(O) $\frac{8}{11}=\frac{3}{2y}$ $16y=33$ $y=\frac{33}{16}$

(G) $\frac{1}{6x}=\frac{4}{15}$ $24x=15$ $x=15/24=5/8$

(I) $\frac{k+5}{7}=\frac{5}{3}$ $3k+15=35$ $3k=20$ $k=20/3$

(B) $\frac{x-4}{2}=\frac{x+1}{9}$ $9x-36=2x+2$ $x=38/7$

(N) $\frac{7}{d+5}=\frac{10}{d+2}$

(A) $\frac{x}{4}=\frac{2x+3}{15}$

(M) $\frac{21}{y-8}=3$

(R) $\frac{17-4x}{12}=5$

(T) $\frac{11u}{6}=u+14$

(D) $\frac{2n+3}{4}=\frac{5n-1}{6}$

(L) $\frac{15}{8x-3}=\frac{1}{2+2x}$

① $\frac{2}{x+3}+\frac{3}{x+4}=\frac{7}{x^2+7x+12}$

$2(x+4)+3(x+3)=7$

$2x+8+3x+9=7$

$5x+17=7$

$5x=-10$

$x=-2$

check

$-2+3=1$ ✓

$-2+4=2$ ✓

② $\frac{4}{x-5}+\frac{1}{x+2}=\frac{2x+7}{x^2-3x-10}$

$4(x+2)+x-5=2x+7$

$4x+8+x-5=2x+7$

$5x+3=2x+7$

$3x=4$

$x=4/3$

Check

$\frac{4}{3}+2=\frac{10}{3}$ ✓

$\frac{4}{3}-5=-\frac{11}{3}$ ✓

③ $\frac{a-30}{a^2+4a-21}=\frac{5}{a+7}-\frac{2}{a-3}$

$a-30=5(a-3)-2(a+7)$

$a-30=5a-15-2a-14$

$a-30=3a-29$

$-2a=1$

$a=-1/2$

check

$-1/2+7=6.5$ ✓

$-1/2-3=-3.5$ ✓

④ $\frac{x}{x+4}=\frac{3}{x-1}$

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

$3x+12=x^2-x$

$x^2-4x-12=0$

$(x-6)(x+2)=0$

$x=6 \quad x=-2$

check

$6+4=10$ $-2+4=2$

$6-1=5$ $-2-1=-3$