Warm up

Solve for x.

① $5x-3=2x-27$

② $x+7x-12=-20$

③ $19-3x=14+2x$

④ $14+4(x-5)=6-2x$

$14+4x-20=6-2x$

$-20 \quad +2x \qquad +6 \quad +2x$

$-6+6x=12$

$+6 \qquad \frac{6x}{6}=\frac{12}{6}$

$x=2$

$-8, -1, 1, 2$

Notes #6 Solving Rational Equations

Rational means we are going to have **FRACTIONS**

We are going to get rid of the Fractions.

① $\frac{1}{x} + \frac{x+5}{5x} = \frac{1}{5x}$

What do you see in the denominator? $5x$

multiply each fraction by the denominator you found

excluded value: $\frac{5x}{5} = \frac{0}{5}$, $x = 0$

$5x\left(\frac{1}{x}\right) + 5x\left(\frac{x+5}{5x}\right) = 5x\left(\frac{1}{5x}\right)$

clean up: $5 + x + 5 = 1$

$x + 10 = 1$

$-10 \quad -10$

$x = -9$ ☺

② $8x\left(\frac{1}{8}\right) + 8x\left(\frac{x+2}{x}\right) = 8x\left(\frac{17}{8x}\right)$

denom? $8x$

$x + 8x + 16 = 17$

clean up: $9x + 16 = 17$

$-16 \quad -16$

$\frac{9x}{9} = \frac{1}{9}$

$x = \frac{1}{9}$

try this: $2x\left(\frac{1}{x}\right) + 2x\left(\frac{x-4}{x}\right) = 2x\left(\frac{1}{2x}\right)$

denom? $2x$

$2 + 2x - 8 = 1$

$2x - 6 = 1$

$+6 \quad +6$

$\frac{2x}{2} = \frac{7}{2}$

$x = \frac{7}{2}$

Another Style. Same Concept

① $\frac{5}{x^2-2x-24} + \frac{1}{x-6} = \frac{1}{x^2-2x-24}$

Factored Form

$\frac{(x-6)(x+4)(5)}{(x-6)(x+4)} + \frac{(x-6)(x+4)(1)}{x-6} = \frac{(1)(x-6)(x+4)}{(x-6)(x+4)}$

$5 + x + 4 = 1$

$x + 9 = 1$

$-9 \quad -9$

$x = -8$

can't see what is in the denom.

FACTOR

$(x-6)(x+4)$

excluded val.

$x \neq -4, 6$

② $\frac{x}{x^2+x-6} + \frac{x+2}{x^2+x-6} = \frac{5}{x+3}$

$3 \cdot -2 = -6$, $3 + -2 = 1$

$\frac{(x+3)(x-2)(x)}{(x+3)(x-2)} + \frac{x+2(x+3)(x-2)}{(x+3)(x-2)} = \frac{5(x+3)(x-2)}{x+3}$

$x + x + 2 = 5x - 10$

denom? $(x+3)(x-2)$

$2x + 2 = 5x - 10$

$-2x \quad -2x$

$2 = 3x - 10$

$+10 \quad +10$

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

$x = 4$