LINEAR EQUATIONS

One-Step Equations

Ex: $x + a = b$

$x + a - a = b - a$

$x = b - a$

Ex: $x - z = t$

$x - z + z = t + z$

$x = t + z$

Ex: $ax = b$

$\frac{a}{a}x = \frac{b}{a}$

$x = \frac{b}{a}$

Ex: $\frac{x}{p} = q$

$\frac{x}{p} \cdot p = q \cdot p$

$x = q \cdot p$

Two-step Equations

Ex: $ax+b=c$

$\frac{ax+b}{a} = \frac{c}{a}$ doesn't work

$ax+b-b=c-b$

$ax=c-b$

$\frac{ax}{a} = \frac{c-b}{a}$

$x = \frac{c-b}{a}$

Ex $\frac{a}{x}+b=c$

$\frac{a}{x}+b-b=c-b$

$\frac{a}{x}=c-b$

$\frac{a}{x}\cdot x = (c-b)\cdot x$

$a=(c-b)\cdot x$

$\frac{a}{c-b} = \frac{(c-b)}{c-b}x$

$\frac{a}{c-b} = x$

Ex: $\frac{4}{x-3} = \frac{2}{x-2} + \frac{5}{(x-3)(x-2)}$

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

$4(x-2) = 2(x-3) + 5$

$4x - 8 = 2x - 6 + 5$

$4x - 8 = 2x - 1$

$4x - 8 + 8 = 2x - 1 + 8$

$4x = 2x + 7$

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

$2x = 7$

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

Ex: $a = \frac{2x+1}{x-1}$

$a(x-1) = \frac{(2x+1)}{(x-1)}(x-1)$

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

$ax - a = 2x + 1$

$ax - a + a = 2x + 1 + a$

$ax = 2x + 1 + a$

$$ax - 2x = 2x + 1 + a - 2x$$

$$ax - 2x = 1 + a$$

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

$$\frac{(a-2)x}{(a-2)} = \frac{1+a}{a-2}$$

$$x = \frac{1+a}{a-2}$$