

Solve the following equations or inequalities for x :

1. $p + 2x = q - x$

5. $k(x + a) + b = m(x - c) + d$

2. $\frac{x}{a} + \frac{b}{c} = \frac{d}{e}$

6. $ax - b \leq cx + d$

3. $ax + b = cx + d$

7. $\frac{2x + 3}{5} \leq \frac{4 - 3x}{4}$

4. $\frac{kx + b}{m} = \frac{nx + c}{p}$

8. $ax + b > 2x - 5$

$$1. \quad p + 2x = q - x$$

$$p + 3x = q$$

$$3x = q - p$$

$$x = \frac{q - p}{3}$$

$$2. \quad \frac{x}{a} + \frac{b}{c} = \frac{d}{e}$$

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

$$\frac{x}{a} = \frac{dc - be}{ce}$$

$$x = \frac{a(dc - be)}{ce}$$

$$3. \quad ax + b = cx + d$$

$$ax - cx + b = d$$

$$(a - c)x = d - b$$

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

$$4. \quad \frac{kx + b}{m} = \frac{nx + c}{p}$$

$$p(kx + b) = m(nx + c)$$

$$pkx + pb = mnx + mc$$

$$pkx - mnx = mc - pb$$

$$x(pk - mn) = mc - pb$$

$$x = \frac{mc - pb}{pk - mn}$$

$$5. \quad k(x + a) + b = m(x - c) + d$$

$$kx + ka + b = mx - mc + d$$

$$kx - mx = d - b - ka - mc$$

$$x(k - m) = d - b - ka - mc$$

$$x = \frac{d - b - ka - mc}{k - m}$$

$$6. \quad ax - b \leq cx + d$$

$$ax - cx - b \leq d$$

$$(a - c)x - b \leq d$$

$$(a - c)x \leq d + b$$

$$x \leq \frac{d + b}{a - c} \quad (\text{assuming } a - c > 0)$$

$$7. \quad \frac{2x + 3}{5} \leq \frac{4 - 3x}{4}$$

$$4(2x + 3) \leq 5(4 - 3x)$$

$$8x + 12 \leq 20 - 15x$$

$$23x + 12 \leq 20$$

$$23x \leq 8$$

$$x \leq \frac{8}{23}$$

$$8. \quad ax + b > 2x - 5$$

$$ax - 2x + b > -5$$

$$(a - 2)x + b > -5$$

$$(a - 2)x > -5 - b$$

$$x > \frac{-5 - b}{a - 2} \quad (\text{assuming } a - 2 > 0)$$