January 8, 2025 Equation and Inequalities Name: _____

Solve the following equations or inequalities for x:

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

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

3. $ax + b = cx + d$

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

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

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

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

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

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

   $p + 3x = q$

   $3x = q - p$

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

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

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

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

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

3. $ax + b = cx + d$

   $ax - cx + b = d$

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

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

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

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

   $pkx + pb = mnx + mc$

   $pkx - mnx = mc - pb$

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

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

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

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

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

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

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

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

   $ax - cx - b \leq d$

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

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

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

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

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

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

   $23x + 12 \leq 20$

   $23x \leq 8$

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

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

   $ax - 2x + b > -5$

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

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

   $x > \dfrac{-5-b}{a-2}$ (assuming $a - 2 > 0$)