January 14, 2025 Equation and Inequalities Name: _____

Solve the following equations or inequalities for x or y:

1. $a(bx + c) = d(ex - f)$

2. $\frac{ay + b}{c} - \frac{dy + e}{f} = g$

3. $(ax + b) + k(cx + d) = e + m(fx + g)$

4. $p(qx - r) > s(tx + u)$

5. $\frac{ax + b}{c} + \frac{dx - e}{f} = \frac{g}{h}$

6. $\frac{kx + l}{m} \leq \frac{nx - o}{p} + q$

7. $a(bx - c) - d(ex + f) = g(hx - i) + j$

8. $m(nx + p) - q(rx - s) < t(ux + v) + w$

1. $a(bx+c) = d(ex-f)$
   $abx + ac = dex - df$
   $abx - dex = -df - ac$
   $x(ab-de) = -df - ac$
   $x = \dfrac{-df-ac}{ab-de}$

2. $\dfrac{ay+b}{c} - \dfrac{dy+e}{f} = g$
   $\dfrac{f(ay+b) - c(dy+e)}{cf} = g$
   $f(ay+b) - c(dy+e) = gcf$
   $fay + fb - cdy - ce = gcf$
   $(fa-cd)y = gcf - fb + ce$
   $y = \dfrac{gcf - fb + ce}{fa-cd}$

3. $(ax+b) + k(cx+d) = e + m(fx+g)$
   $ax + b + kcx + kd = e + mfx + mg$
   $(a + kc - mf)x = e + mg - b - kd$
   $x = \dfrac{e+mg-b-kd}{a+kc-mf}$

4. $p(qx-r) > s(tx+u)$
   $pqx - pr > stx + su$
   $pqx - stx > su + pr$
   $x(pq-st) > su + pr$
   $x > \dfrac{su+pr}{pq-st}$

5. $\dfrac{ax+b}{c} + \dfrac{dx-e}{f} = \dfrac{g}{h}$
   $\dfrac{f(ax+b) + c(dx-e)}{cf} = \dfrac{g}{h}$
   $f(ax+b) + c(dx-e) = \dfrac{gcf}{h}$
   $(af+cd)x = \dfrac{gcf}{h} - fb + ce$
   $x = \dfrac{\frac{gcf}{h} - fb + ce}{af+cd}$

6. $\dfrac{kx+l}{m} \leq \dfrac{nx-o}{p} + q$
   $\dfrac{p(kx+l)}{mp} \leq \dfrac{m(nx-o)}{mp} + \dfrac{mq}{mp}$
   $p(kx+l) \leq m(nx-o) + mpq$
   $(pk-mn)x \leq -pl - mo + mpq$
   $x \leq \dfrac{-pl-mo+mpq}{pk-mn}$

7. $a(bx-c) - d(ex+f) = g(hx-i) + j$
   $abx - ac - dex - df = ghx - gi + j$
   $(ab-de-gh)x = ac + df - gi + j$
   $x = \dfrac{ac+df-gi+j}{ab-de-gh}$

8. $m(nx+p) - q(rx-s) < t(ux+v) + w$
   $mnx + mp - qrx + qs < tux + tv + w$
   $(mn - qr - tu)x < tv + w - mp - qs$
   $x < \dfrac{tv+w-mp-qs}{mn-qr-tu}$