January 13, 2025 Equation and Inequalities Name: _____

Solve the following equations or inequalities for x:

1. $a(2x-5)+3=4x+7$
2. $\dfrac{bx+2}{4}=\dfrac{5x+c}{3}$
3. $3(a+2)x-4=b(2x+3)$
4. $\dfrac{ax+1}{b}-\dfrac{3x-2}{4}=5$
5. $2x-\dfrac{3}{c}=\dfrac{ax}{5}+\dfrac{7}{2}$
6. $\dfrac{3}{a}(2x-5)>\dfrac{b}{4}(x+3)$
7. $\dfrac{b}{4}(3x-1)+\dfrac{5}{c}\leq 2ax-\dfrac{1}{6}$
8. $a(x-\dfrac{7}{2})+\dfrac{bx}{4}>\dfrac{5}{6}(2x+1)$
9. $\dfrac{cx+1}{3}-\dfrac{b}{4}\geq\dfrac{ax-2}{6}$
10. $\dfrac{a}{5}(x-1)+\dfrac{2x+b}{3}<\dfrac{7x-4}{c}$

1. $a(2x-5)+3=4x+7$

   $2ax-5a+3=4x+7$

   $2ax-4x=5a+4$

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

   $x=\dfrac{5a+4}{2a-4}$

2. $\dfrac{bx+2}{4}=\dfrac{5x+c}{3}$

   $3(bx+2)=4(5x+c)$

   $3bx+6=20x+4c$

   $3bx-20x=4c-6$

   $x(3b-20)=4c-6$

   $x=\dfrac{4c-6}{3b-20}$

3. $3(a+2)x-4=b(2x+3)$

   $3(a+2)x-4=2bx+3b$

   $3(a+2)x-2bx=3b+4$

   $x(3(a+2)-2b)=3b+4$

   $x=\dfrac{3b+4}{3(a+2)-2b}$

4. $\dfrac{ax+1}{b}-\dfrac{3x-2}{4}=5$

   $4(ax+1)-b(3x-2)=20b$

   $4ax+4-3bx+2b=20b$

   $(4a-3b)x=20b-4-2b$

   $(4a-3b)x=18b-4$

   $x=\dfrac{18b-4}{4a-3b}$

5. $2x-\dfrac{3}{c}=\dfrac{ax}{5}+\dfrac{7}{2}$

   $10x-15=ax+\dfrac{35c}{2}$

   $10x-ax=\dfrac{35c}{2}+15$

   $x(10-a)=\dfrac{35c}{2}+15$

   $x=\dfrac{\frac{35c}{2}+15}{10-a}$

6. $\dfrac{3}{a}(2x-5)>\dfrac{b}{4}(x+3)$

   $\dfrac{6x-15}{a}>\dfrac{bx+3b}{4}$

   $24(6x-15)>a(bx+3b)$

   $144x-360>abx+3ab$

   $144x-abx>360+3ab$

   $x(144-ab)>360+3ab$

   $x>\dfrac{360+3ab}{144-ab}$ (for $ab\neq 144$)

7. $\dfrac{b}{4}(3x-1)+\dfrac{5}{c}\leq 2ax-\dfrac{1}{6}$

   $\dfrac{3bx-b}{4}+\dfrac{5}{c}\leq 2ax-\dfrac{1}{6}$

   $3bcx-bc+20\leq 8acx-2a$

   $(3bc-8ac)x\leq 2a+bc-20$

   $x\leq\dfrac{2a+bc-20}{3bc-8ac}$ (for $3bc\neq 8ac$)

8. $a(x-\dfrac{7}{2})+\dfrac{bx}{4}>\dfrac{5}{6}(2x+1)$

   $ax-\dfrac{7a}{2}+\dfrac{bx}{4}>\dfrac{10x+5}{6}$

   $12ax-42a+3bx>20x+5$

   $(12a+3b)x>20x+42a+5$

   $x(12a+3b-20)>42a+5$

   $x>\dfrac{42a+5}{12a+3b-20}$ (for $12a+3b\neq 20$)

9. $\dfrac{cx+1}{3}-\dfrac{b}{4}\geq\dfrac{ax-2}{6}$

   $4(cx+1)-3b\geq 2(ax-2)$

   $4cx+4-3b\geq 2ax-4$

   $4cx-2ax\geq 3b-8$

   $x(4c-2a)\geq 3b-8$

   $x\geq\dfrac{3b-8}{4c-2a}$ (for $4c\neq 2a$)

10. $\dfrac{a}{5}(x-1)+\dfrac{2x+b}{3}<\dfrac{7x-4}{c}$

    $\dfrac{a(x-1)}{5}+\dfrac{2x+b}{3}<\dfrac{7x-4}{c}$

    $3a(x-1)+5(2x+b)<15(7x-4)$

    $3ax-3a+10x+5b<105x-60$

    $3ax-95x<-3a+5b-60$

    $x(3a-95)<-3a+5b-60$

    $x<\dfrac{-3a+5b-60}{3a-95}$ (for $3a\neq 95$)