$$\frac{7\left(x-6\right)}{4}=\frac{5\left(x+1\right)}{3}-3\left(x+2\right)$$

$$\frac{7x-42}{4}=\frac{5x+5}{3}-3x+6$$

$$\frac{7x-42}{4}-\frac{5x+5}{3}+3x-6=0$$

$$\frac{21x-126-20x-20+36x-72}{12}=0$$

$$12\ne 0$$

$$21x-126-20x-20+36x-72=0$$

$$37x-218=0$$

$$x=\frac{218}{37}$$

$$x=5\frac{33}{37}$$