C11 - 6.5 - Rational Equations Notes

Solve for x.

$$\frac{x}{2}+\frac{1}{4}=\frac{3}{4}$$
$$\frac{2}{2}\times\frac{x}{2}+\frac{1}{4}=\frac{3}{4}$$
$$\frac{2x}{4}+\frac{1}{4}=\frac{3}{4}$$

Get an LCD then Multiply by the LCD

$$\left(\frac{2x}{4}+\frac{1}{4}=\frac{3}{4}\right)\times LCD$$
$$2x+1=3$$
$$-1 \quad -1$$
$$2x=2$$
$$\frac{2x}{2}=\frac{2}{2}$$
$$\boxed{x=1}$$

OR!

$$\frac{x}{2}+\frac{1}{4}=\frac{3}{4}$$ Multiply by the $LCD=4$

$$\left(\frac{x}{2}+\frac{1}{4}=\frac{3}{4}\right)\times 4$$
$$\frac{4x}{2}+\frac{4}{4}=\frac{12}{4}$$
$$2x+1=3$$
$$-1 \quad -1$$
$$2x=2$$
$$\frac{2x}{2}=\frac{2}{2}$$
$$\boxed{x=1}$$

OR!

$$\left(\frac{x}{2}+\frac{1}{4}=\frac{3}{4}\right)\times LCD: 4$$
$$2x+1=3$$
$$2x=2$$
$$\boxed{x=1}$$

Instead of actually multiplying by the LCD we are going to multiply and simplify at the same time.

Or Add Fractions/Cross Multiply

$$\frac{2}{x+2}+3=\frac{11}{x+2}$$

OR!

$$\left(\frac{2}{x+2}+3=\frac{11}{x+2}\right)\times LCD=(x+2)$$
$$\frac{2(x+2)}{x+2}+3(x+2)=\frac{11(x+2)}{x+2}$$
$$2+3(x+2)=11$$
$$2+3x+6=11$$
$$3x=3$$
$$\boxed{x=1}$$

$$x+2\neq 0$$
$$\boxed{x\neq -2}$$

OR!

$$\left(\frac{2}{x+2}+3=\frac{11}{x+2}\right)\times LCD=(x+2)$$
$$2+3(x+2)=11$$
$$2+3x+6=11$$
$$3x=3$$
$$\boxed{x=1}$$

$$\frac{2}{x+2}=\frac{4}{x-3}$$

OR!

$$\left(\frac{2}{x+2}=\frac{4}{x-3}\right)\times LCD=(x+2)(x-3)$$
$$2(x-3)=4(x+2)$$
$$2x-6=4x+8$$
$$-14=2x$$
$$\boxed{x=-7}$$

$$x+2\neq 0$$
$$\boxed{x\neq -2}$$

$$x-3\neq 0$$
$$\boxed{x\neq 3}$$

$$\frac{2}{x+2}=\frac{4}{x-3}$$
$$2(x-3)=4(x+2)$$ Cross Multiply
$$2x-6=4x+8$$
$$-14=2x$$
$$\boxed{x=-7}$$

$$\frac{15}{x^2+5x+6}-\frac{2}{x+2}=\frac{1}{x+2}$$ Factor

$$\left(\frac{15}{(x+2)(x+3)}-\frac{2}{x+2}=\frac{1}{x+2}\right)\times LCD=(x+2)(x+3)$$
$$15-2(x+3)=1(x+3)$$
$$15-2x-6=x+3$$
$$6=3x$$
$$\boxed{x=2}$$

$$x+2\neq 0$$
$$\boxed{x\neq -2}$$

$$x+3\neq 0$$
$$\boxed{x\neq -3}$$

$$\frac{1}{x+1}+2=\frac{3}{x+2}$$

$$\left(\frac{1}{x+1}+2=\frac{3}{x+2}\right)\times LCD=(x+1)(x+2)$$
$$1(x+2)+2(x+1)(x+2)=3(x+1)$$
$$x+2+2x^2+6x+4=3x+3$$
$$2x^2+4x+3=0$$

$$x+1\neq 0$$
$$\boxed{x\neq -1}$$

$$x+2\neq 0$$
$$\boxed{x\neq -2}$$

Quadratic Formula: $\boxed{No\ Solution}$ $b^2-4ac<0$