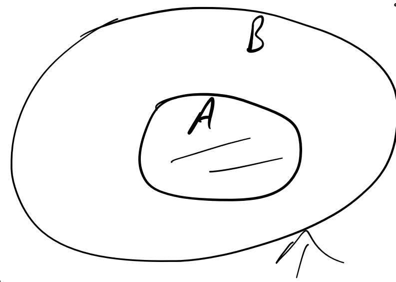
Notation for Writing in Our Class

” $\implies$ ” means ”implies” and is used to attach relationships like equations and inequalities.

$$x+2=5 \implies x=3$$



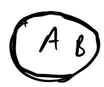
$$A \implies B$$

$$x-5 \geq 3x \implies -5 \geq 2x \implies -\frac{5}{2} \geq x$$

$$\underbrace{x=6}_{A} \implies \underbrace{0=0}_{B}$$

” $\iff$ ” means ”if and only if.” It again is used to attach relationships. It means both the relationships are true when the other is.

$$A \iff B$$



$$x+2=5 \iff x=3$$

” = ” means ”equal” and is used to attach equal expressions. It shows two numbers are equal.

$$2+6$$
$$=8$$

$$3x+8x+x^2$$
$$=11x+x^2$$

Write work (it really is a proof!) with proper notation to find all solutions to $\frac{1}{x} + \frac{x}{x-3} = \frac{3}{x(x-3)}$.

$LCD = x(x-3)$

$$\frac{1}{\cancel{x}} \cdot \frac{x(x-3)}{1} = x-3$$

$$\frac{x}{\cancel{x-3}} \cdot \frac{x\cancel{(x-3)}}{1} = x^2$$

$$\frac{1}{x} + \frac{x}{x-3} = \frac{3}{x(x-3)}$$

$$\overset{\cdot LCD}{\Longrightarrow} x-3+x^2 = 3 \; ; \quad x \neq 0,\ x \neq 3$$

$$\Longrightarrow x^2 + x - 6 = 0$$

$$\Longrightarrow (x+3)(x-2) = 0$$

$$\Longrightarrow (x+3) = 0 \quad \text{or} \quad (x-2) = 0$$

$$\Longrightarrow \boxed{x = -3 \quad \text{or} \quad x = 2}$$

Suppose the 6 in the quadratic is changed to 5. How would I solve this new equation?

$$ax^2 + bx + c = 0$$

$$\Longrightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x^2 + x - 5 = 0$$

$$\Longrightarrow x = \frac{-1 \pm \sqrt{1 - 4(1)(-5)}}{2(1)}$$

$$\Longrightarrow \boxed{x = \frac{-1 \pm \sqrt{21}}{2}}$$

Write work with proper notation to simplify $\frac{\frac{1}{x+h}-\frac{1}{x}}{h}$.

$$\frac{\left(\frac{1}{x+h}-\frac{1}{x}\right)}{h}\cdot\frac{x(x+h)}{x(x+h)}$$

$$=\frac{x-(x+h)}{hx(x+h)}=\frac{-h}{hx(x+h)}=\boxed{\frac{-1}{x(x+h)}}.$$

OR

$$\frac{\frac{x\cdot 1}{x(x+h)}-\frac{1(x+h)}{x(x+h)}}{h}=\frac{\left(\frac{x-(x+h)}{x(x+h)}\right)}{h}.$$

$$=\frac{-h}{x(x+h)}\cdot\frac{1}{h}$$

$$=\boxed{\frac{-1}{x(x+h)}}.$$