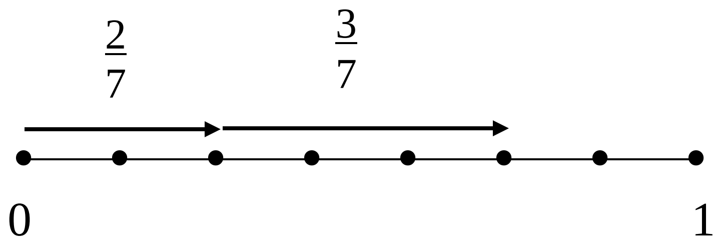
IMPORTANT IDEAS FOR ADDITION OF FRACTIONS.

This diagram clearly shows that : $\frac{2}{7} + \frac{3}{7} = \frac{5}{7}$



The diagram also shows that we can ONLY add fractions with the same denominators.

Clearly, we can add ANY fractions directly, as long as they have the SAME DENOMINATORS.
Consider these examples:

1.
$$\frac{5}{17} + \frac{6}{17}$$

$$= \frac{11}{17}$$

2.
$$\frac{a}{c} + \frac{b}{c}$$

$$= \frac{(a+b)}{c}$$

3.

$$\frac{x+5}{x+7} + \frac{x+3}{x+7}$$

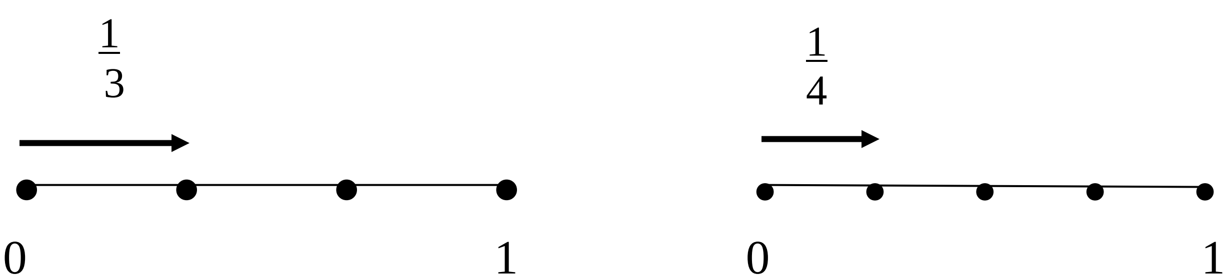
$$= \frac{2x+8}{x+7}$$

4.

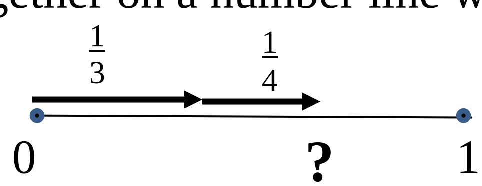
$$\frac{3x+4}{x-6} + \frac{5x-7}{x-6}$$

$$= \frac{8x-3}{x-6}$$

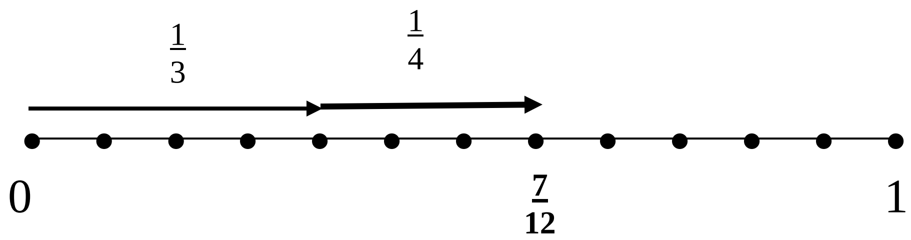
Now consider adding the fractions : $\frac{1}{3}$ and $\frac{1}{4}$



If we put these together on a number line we cannot tell what the result is:



We can only tell what the sum is when we divide the number line into 12ths :



NOTE : $\frac{1}{3} + \frac{1}{4} = \frac{4}{12} + \frac{3}{12} = \frac{7}{12}$

ADDING FRACTIONS WITH DIFFERENT DENOMINATORS!

(Clearly, we must make the denominators EQUAL)

Consider these examples:

1.

$$\frac{1}{3} + \frac{1}{4}$$

$$= \frac{1}{3}\left(\frac{4}{4}\right) + \frac{1}{4}\left(\frac{3}{3}\right)$$

note: multiplying by 1 in the form $\frac{3}{3}$ means that the fraction is still the same!

$$= \frac{4}{12} + \frac{3}{12} = \frac{7}{12}$$

2.

$$\frac{1}{b} + \frac{1}{c}$$

$$= \frac{1}{b}\frac{c}{c} + \frac{1}{c}\frac{b}{b}$$

$$= \frac{c + b}{bc}$$

3.

$$\frac{a}{b} + \frac{d}{c}$$

$$= \frac{a}{b}\frac{c}{c} + \frac{d}{c}\frac{b}{b}$$

$$= \frac{ac + db}{bc}$$

4.

$$\frac{4}{(x+2)} \quad + \quad \frac{3}{(x-5)}$$

$$= \frac{4}{(x+2)}\frac{(x-5)}{(x-5)} \quad + \quad \frac{3}{(x-5)}\frac{(x+2)}{(x+2)}$$

$$= \frac{4x-20}{(x+2)\,(x-5)} \quad + \quad \frac{3x+6}{(x-5)(x+2)}$$

$$= \frac{7x-14}{(x+2)\,(x-5)}$$

5.

$$\frac{x+3}{x-5} \quad + \quad \frac{x+4}{x-2}$$

$$= \frac{(x+3)}{(x-5)}\frac{(x-2)}{(x-2)} \quad + \quad \frac{(x+4)}{(x-2)}\frac{(x-5)}{(x-5)}$$

$$= \frac{(x^2+x-6)}{(x-5)\,(x-2)} \quad + \quad \frac{(x^2-x-20)}{(x-2)\,(x-5)}$$

$$= \frac{(2x^2-26)}{(x-5)(x-2)}$$