**IMPORTANT IDEAS FOR ADDITION OF FRACTIONS.**

This diagram clearly shows that : 2 + 3 = 5

 7 7 7

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

 3

 7

 2

 7

. . . . . . . .

0 1

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

Consider these examples:

1.

5 + 6

17 17

= 11

 17

2.

 ***a + b***

 ***c c***

***= (a + b)***

 ***c***

***3.***

***x + 5 + x + 3***

***x + 7 x + 7***

***= 2x + 8***

 ***x + 7***

***4.***

 ***3x + 4 + 5x – 7***

 ***x – 6 x – 6***

***= 8x – 3***

 ***x – 6***

Now consider adding the fractions : 1 and 1

 3 4

 1

 3

 1

 4

 **. . . .** . . . . .

 0 1 0 1

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

 1

 4

 1

 3

 **?**

 0 1

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

 1

 4

 1

 3

 **. . . . . . . . . . . . .**

 **7**

 **12**

 0 1

NOTE : 1 + 1 = 4 + 3 = 7

 3 4 12 12 12

***ADDING FRACTIONS WITH DIFFERENT DENOMINATORS!***

 ***(Clearly, we must make the denominators EQUAL)***

***Consider these examples:***

***1.***

 ***1 + 1***

 ***3 4***

***= 1 4 + 1 3 note: multiplying by 1 in the form 3***

 ***3 4 4 3 3***

 ***means that the fraction is still the same!***

***= 4 + 3 = 7***

 ***12 12 12***

***2.***

 ***1 + 1***

 ***b c***

***= 1 c + 1 b***

 ***b c c b***

***= c + b***

 ***bc***

***3.***

 ***a + d***

 ***b c***

***= a c + d b***

 ***b c c b***

***= ac + db***

 ***bc***

***4.***

 ***4 + 3***

 ***(x + 2) (x – 5)***

***= 4 (x – 5) + 3 (x + 2)***

 ***(x + 2) (x – 5) (x – 5)(x + 2)***

***= 4x – 20 + 3x + 6***

 ***(x + 2) (x – 5) (x – 5)(x + 2)***

***= 7x – 14***

 ***(x + 2) (x – 5)***

***5.***

 ***x + 3 + x + 4***

 ***x – 5 x – 2***

***= (x + 3) (x – 2) + (x + 4) (x – 5)***

 ***(x – 5) (x – 2) (x – 2) (x – 5)***

***= (x2 + x – 6) + (x2 – x – 20 )***

 ***(x – 5) (x – 2) (x – 2) (x – 5)***

***= (2x2 – 26)***

 ***(x – 5)(x – 2)***