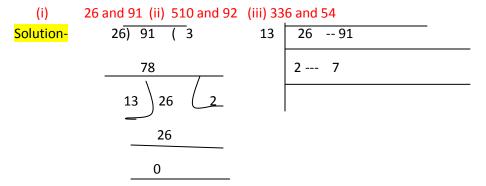
1. he LCM and HCF of the following pairs of integers and verify that LCM X HCF =product of integers



HCF= 13 LCM= 13 x2 x7 = 182

Ist number x 2<sup>nd</sup> number = HCF X LCM 26 X91= 13 X182= 2366

- 2. Find the LCM and HCF of the following integers by applying the prime factorization method
  - (i) 12,15 and 21 (ii) 17,23 and 29 (iii) 8,9 and 25 (iv) 40,36 and 126
     (v) 84,90 and 126 (vi) 24,15 and 36

Solution –(I) 12=2X2 X <mark>3 HCF</mark>=3

15=<mark>3</mark>X5 LCM=2X2X3X5X7=720

21=<mark>3</mark> X7

3. Find the greatest number of 6-digit exactly divisible by 24,15 and 36

Solution- The greatest 6-digit number is 999999

To find the LCM of 15,24,36

2	15,24,36
2	15,12,18
3	15,6,9
	5, 2, 3

LCM= 2 x2 x3x5x2x3=360

The greatest 6-digit number is 999999-360= 999720

4. A rectangular courtyard is 18m72cm long and 13m20cm broad . it is to be paved

With square tiles of same size .find the least possible numbers of such tiles

Solution- length=1872cm breadth= 1320cm

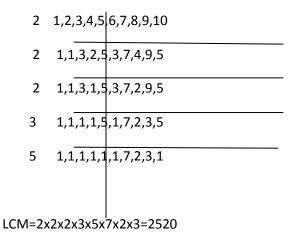
HCF of 1872 and 1320 is 24

No. of tiles =  $\frac{area \ of \ courtyard}{area \ of \ one \ tile} = \frac{1872 \ x \ 1320}{24} = 4290$ 

5. Find the least numbers that is divisible by all the numbers between 1 and 10

(both inclusive)

Solution- Find the LCM of 1,2,3,4,5,6,7,8,9,10



This is the required number

6. What is the smallest number that when divided by 35,56 and 91 leaves

remainders 7 of in each case?.

Solution- The LCM of 35,56and 91

LCM= 7 x 5 x 8 x13 = 3640

Hence required number is 3640+7=3647

7. In morning walk three persons step off together , their steps measure 80cm

,85cm and 90cm respectively . what is the minimum distance each shoud walk so

that he can cover the distance in complete steps?

 Solution The LCM of 80,85and 90

 2
 80,85,90

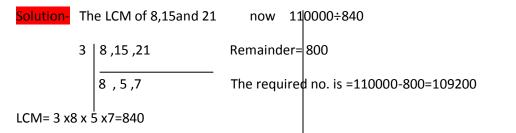
 5
 ,40,85,45

5, 17,9

LCM= 2x5x5x17x9=12240=122m40cm

8. Determine the number nearest to 110000 but greater than 100000 which is

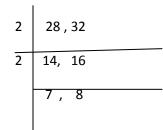
```
exactly divisible by 8,15 and 21
```



9. find the smallest number which leaves remainders 8 and 12 when divided by 28

and 32 respectively

Solution- The LCM of 28 and 32

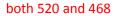


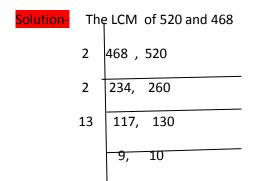
LCM= 2x2x7x8=224

But remainders are 8 and 12

So required number= 224-20=204

10. Find the smallest number which when increased by 17 is exactly divisible by





LCM= 2x2x13x9x10=4680

Required number = 4680-17=4663

- 11. A circular field has a circumference of 360km .Three cyclist starts together and can cycle 48,60 and 72km a day, round the field When will they meet again?
- 12. The LCM and HCF of two numbers are 180 and 6 respectively . If one of the numbers is 30, find the other number.

Solution- 1<sup>st</sup> no. x 2<sup>nd</sup> no.= LCMx HCF

$$2^{nd}$$
 no.= $\frac{180 x6}{30}$  = 36

13. The HCF of two numbers is 16 and their product is 3072 . Find their LCM

Solution-  $1^{st}$  no. x  $2^{nd}$  no. = LCM x HCF 3072 = LCM X 16 LCM=  $\frac{3072}{16}$  =192

14. The HCF of two numbers is 145 and their LCM is 2175. If one of the

numbers is 725, find the other number.

Solution-  
1<sup>st</sup> no. x 2<sup>nd</sup> no. = LCMx HCF  
725 X 2<sup>nd</sup> no. = 2175 X 145  
2<sup>nd</sup> no. = 
$$\frac{2175 \times 145}{725}$$
 = 435

15. Can two numbers have 16 as their HCF and 380 as their LCM? Give reason

Solution- No, because 380 is not divisible by 16

#### POLYNOMIALS

#### EXERCISE-2.1

$$u = \frac{-(co - efficient of x^{2})}{co - efficient of x^{2}} = \frac{-(-2)}{1} = 2$$

$$x^{2} \cdot 2x \cdot 8$$

$$x^{2} + (4 + 2)x \cdot 8$$

$$x^{2} + (4 + 2)x \cdot 8$$

$$(x^{2} - 4x) + (2x \cdot 8)$$

$$(x^{4} - 4x) + (2x \cdot 8)$$

$$(x + 4)(x + 2) = 0$$

$$x = 4 + (-2) = 2$$
Product =  $4 + (-2) = 2$ 
Product =

(vi) 
$$x^{2} - (\sqrt{3} + 1)x + \sqrt{3}$$
  
 $(X^{2} - \sqrt{3}x) - (x + \sqrt{3})$   
 $x(x - \sqrt{3}) - 1(x - \sqrt{3})$   
 $(x - \sqrt{3})(x - 1) = 0$   
 $x = \sqrt{3}, 1$   
Sum =  $\sqrt{3} + 1$   
Product =  $\sqrt{3}x1 = \sqrt{3}$ 

$$\operatorname{sum} = \frac{-(co-efficient \ of \ x)}{co-efficient \ of \ x^2} = \frac{-\{-(\sqrt{3}+1)\}}{1} = \sqrt{3}+1$$

product= 
$$\frac{constant \ term}{co-efficient \ of \ x^2} = \frac{\sqrt{3}}{1} = \sqrt{3}$$

(vii) 
$$a(x^{2}+1)-x(a^{2}+1)$$
  
 $ax^{2}+a-xa^{2}-x$   
 $ax^{2}-(a^{2}+1)x+a$   
 $(ax^{2}-xa^{2})-(x+a)$   
 $ax(x-a)-1(x-a)=0$   
 $(x-a)(ax-1)=0$   
 $x=a,\frac{1}{a}$   
Product= $a \times \frac{1}{a}=1$ 

Part no. (ii) (iii) and (iv) are similar

β α

Q2- if  $\alpha$  and  $\beta$  are the zeros of quadratic polynomials ax^2+bx+c then evaluate

(i) 
$$\alpha - \beta$$
  
(iii)  $\frac{1}{\alpha} - \frac{1}{\beta} - 2\alpha\beta$  (iv)  $\alpha^{2}\beta + \alpha\beta^{2}$  (v) $\alpha^{4} + \beta^{4}$  (vi)  $\frac{1}{a\alpha + b} + \frac{1}{a\beta + b}$   
(ii)  $\frac{1}{\alpha} - \frac{1}{\beta}$  (vii)  $\frac{\beta}{a\alpha + b} + \frac{\alpha}{a\beta + b}$ 

Solution- the zeros of quadratic polynomial is

$$\alpha = \frac{-b + \sqrt{b^2 - 4ac}}{2a} \qquad \beta = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

$$\alpha - \beta = \frac{-b + \sqrt{b^2 - 4ac}}{2a} - \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{(-b + \sqrt{b^2 - 4ac}) - (-b - \sqrt{b^2 - 4ac})}{2a}$$

$$= -\frac{b / + \sqrt{b^2 - 4ac} + b / + \sqrt{b^2 - 4ac}}{2a} = 2\sqrt{b^2 / - 4ac}$$

$$= \sqrt{b^2 - 4ac}$$

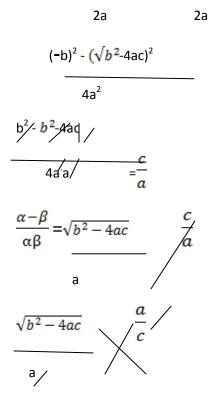
$$a$$

$$(ii) \frac{\alpha - \beta}{\alpha \beta}$$

$$\alpha - \beta = \sqrt{b^2 - 4ac}$$

$$a$$

 $\alpha\beta = -b + \sqrt{b^2 - 4ac} \qquad -b + \sqrt{b^2 - 4ac}$ 



(iii) 
$$\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta = \frac{\alpha + \beta}{\alpha\beta} - 2\alpha\beta = (-b)/a - 2\frac{c}{a} = -\left\{\frac{b}{c} + \frac{2c}{a}\right\}$$

(iv) 
$$\alpha^{2}\beta + \alpha\beta^{2} = \alpha\beta(\alpha + \beta) = \frac{c}{a} \times \frac{-b}{a} = \frac{-bc}{a^{2}}$$

(v)  $\alpha^4 + \beta^4$  Solve on page no.229 example 8 RDSAHARMA

$$(vi)\frac{1}{a\alpha+b} + \frac{1}{a\beta+b} = \frac{a\beta+b+a\alpha+b}{(a\alpha+b)(a\beta+b)} = \frac{a(\alpha+\beta)+2b}{a^2(\alpha\beta)+ab(\alpha+\beta)+b^2}$$
$$= \frac{a\left(\frac{-b}{a}\right)+2b}{a^2\left(\frac{c}{a}\right)+ab\left(\frac{-b}{a}\right)+b^2} = \frac{b}{ac} \left\{\alpha+\beta=\frac{-b}{a}, \alpha\beta=\frac{c}{a}\right\}$$

$$\frac{(\text{vii})}{a\alpha+b} \frac{\beta}{a\beta+b} = \frac{\beta(a\beta+b)+\alpha(a\alpha+b)}{(a\alpha+b)(a\beta+b)} = \frac{\beta(a\beta+b)+\alpha(a\alpha+b)}{(a\alpha+b)(a\beta+b)}$$
$$= \frac{a(\alpha^2+\beta^2)+b(\alpha+\beta)}{a^2(\alpha\beta)+ab(\alpha+\beta)+b^2}$$
$$= (\alpha^2+\beta^2)=(\alpha+\beta)^2-2\alpha\beta$$

$$=\frac{a(\alpha+\beta)^2-2\alpha\beta+b(\alpha+\beta)}{a^2(\alpha\beta)+ab(\alpha+\beta)+b^2}=\frac{a(\frac{-b}{a})^2-2\frac{c}{a}+b(\frac{-b}{a})}{a^2(\frac{c}{a})+ab(\frac{-b}{a})+b^2}=\frac{-2}{a^2}$$

Q3- 
$$6x^2+x-2$$
 evaluate  $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ 

Solution 
$$-\frac{\alpha}{\beta} + \frac{\beta}{\alpha} = \frac{\alpha^2 + \beta^2}{\alpha\beta} = \frac{(\alpha + \beta)^2 - 2\alpha\beta}{\alpha\beta}$$

 $sum = \frac{-(co-efficient \ of \ x)}{co-efficient \ of \ x^2} \quad , \ product = \frac{constant \ term}{co-efficient \ of \ x^2}$ 

$$\alpha + \beta = \frac{-1}{6} \qquad \alpha \beta = \frac{-2}{6} = \frac{-1}{3}$$
$$\frac{\left(\frac{-1}{6}\right)^2 - 2\left(\frac{-1}{3}\right)}{\frac{-1}{3}} = \frac{-25}{12}$$

Q4- x<sup>2</sup>-x-4, evaluate 
$$\frac{1}{\alpha} + \frac{1}{\beta} - \alpha\beta$$

$$\frac{1}{\alpha} + \frac{1}{\beta} - \alpha\beta$$

Solution-sum=
$$\frac{-(co-efficient of x)}{co-efficient of x^2} , \text{ product}=\frac{constant term}{co-efficient of x^2}$$
$$\alpha + \beta = \frac{-(-1)}{1} = 1 \qquad \alpha \beta = \frac{-4}{1} = -4$$
$$= \frac{1}{\alpha} + \frac{1}{\beta} - \alpha \beta$$

$$=\frac{\alpha+\beta}{\alpha\beta}-\alpha\beta = =\frac{1}{-4}-(-4)=\frac{15}{4}$$

Q5-p(x)=  $4x^2$ -5x-1 evaluate  $\alpha^2\beta + \alpha\beta^2$ 

Solution -  $\alpha^2 \beta + \alpha \beta^2 = \alpha \beta (\alpha + \beta)$ 

$$sum = \frac{-(co-efficient of x)}{co-efficient of x^{2}} , \text{ product} = \frac{constant term}{co-efficient of x^{2}}$$

$$\alpha + \beta = \frac{-(-5)}{4} \alpha \beta^{2} = \frac{-1}{4}$$

$$= \alpha\beta(\alpha + \beta) = \frac{5}{4}(\frac{-1}{4}) = \frac{-5}{16}$$

$$Q6-f(x) = x^{2} + x - 2 \text{ evaluate } \frac{1}{\alpha} - \frac{1}{\beta}$$

$$Solution - \frac{1}{\alpha} - \frac{1}{\beta} = \frac{\alpha - \beta}{\alpha\beta}$$

$$Sum = \frac{-(co-efficient of x)}{co-efficient of x^{2}}, \text{ product} = \frac{constant term}{co-efficient of x^{2}}$$

$$\alpha + \beta = \frac{-1}{1} = -1, \quad \alpha\beta = \frac{-2}{1} = -2$$

$$\alpha - \beta = \sqrt{(\alpha + \beta)^2 - 4\alpha\beta}$$

$$= \sqrt{(-1)^2 - 4X - 2}$$

$$= \sqrt{9} = 3$$

$$= \frac{\alpha - \beta}{\alpha\beta} = \frac{3}{-2}$$

$$07 \cdot x^2 = 5x + 4 \text{ evaluate} = \frac{1}{2} + \frac{1}{2} - 2$$

Q7-x<sup>2</sup>-5x+4 evaluate ,  $\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta$ 

Solution-
$$sum = \frac{-(co-efficient of x^{2})}{co-efficient of x^{2}}, \text{ product} = \frac{constant term}{co-efficient of x^{2}}$$
$$= \frac{\alpha + \beta}{\alpha \beta} - 2\alpha\beta$$
$$\alpha + \beta = \frac{-(-5)}{1} = 5 \quad \alpha\beta = \frac{4}{1} = 4$$
$$= \frac{5}{4} - 2(4) = \frac{-27}{4}$$
Q8-f(t)=t^{2}-4t+3 evaluate  $\alpha^{4}\beta^{3} + \alpha^{3}\beta^{4}$ Solution - sum =  $\frac{-(co-efficient of t)}{co-efficient of t^{2}}, \text{ product} = \frac{constant term}{co-efficient of t^{2}}$ 
$$\alpha + \beta = \frac{-(-4)}{1} = 4 \quad \alpha\beta = \frac{3}{1} = 3$$
$$= \alpha^{4}\beta^{3} + \alpha^{3}\beta^{4} = = \alpha^{3}\beta^{3}(\alpha + \beta) = (\alpha\beta)^{3}(\alpha + \beta)$$
$$= (4)^{3}(3) = 192$$
Q9- p(y)=5y<sup>2</sup>-7y+1 evaluate,  $\frac{1}{\alpha} + \frac{1}{\beta}$ Solution - sum =  $\frac{-(co-efficient of y^{2})}{co-efficient of y^{2}}, \text{ product} = \frac{constant term}{co-efficient of y^{2}}$ 
$$\alpha + \beta = \frac{-(-7)}{5} = \frac{7}{5} \quad \alpha\beta = \frac{1}{5}$$
$$\frac{\alpha + \beta}{\alpha \beta} = \frac{\frac{7}{5}}{\frac{1}{5}} = 7$$
Q10-p(s) 3s<sup>2</sup>-6s+4 evaluate,  $\frac{\alpha}{\beta} + \frac{\beta}{\alpha} + 2\left\{\frac{1}{\alpha} + \frac{1}{\beta}\right\} + 3\alpha\beta$ 

Solution - sum= 
$$\frac{-(co-efficient \ of \ s)}{co-efficient \ of \ s^2}$$
, product=  $\frac{constant \ term}{co-efficient \ of \ s^2}$ 

$$\begin{aligned} \alpha + \beta &= \frac{-(-6)}{3} = 2 \quad \alpha \beta = \frac{4}{3} \\ &= \frac{\alpha^2 + \beta^2}{\alpha \beta} + 2\left\{\frac{\alpha + \beta}{\alpha \beta}\right\} + 3\alpha\beta \\ &= \frac{(\alpha + \beta)^2 - 2\alpha\beta}{\alpha \beta} + 2\left\{\frac{\alpha + \beta}{\alpha \beta}\right\} + 3\alpha\beta \qquad = \frac{(2)^2 - 2x_3^4}{\frac{4}{3}} + 2\left\{\frac{2}{\frac{4}{3}}\right\} + 3x_3^4 = 8 \\ \text{Q11- } x^2 - px + q \quad \text{prove that } \frac{\alpha^2}{\beta^2} + \frac{\beta^2}{\alpha^2} = \frac{p^4}{q^2} - \frac{4p^2}{q} + 2 \\ \text{Solution - sum} &= \frac{-(co - efficient \ of \ x)}{co - efficient \ of \ x^2} , \quad \text{product} = \frac{constant \ term}{co - efficient \ of \ x^2} \\ \alpha + \beta = \frac{-(-p)}{1} = p \quad \alpha \beta = \frac{q}{1} = q \\ \alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta = (p)^2 - 2q = p^2 - 2q \\ \alpha^2 \beta^2 = q^2 \\ &= \frac{\alpha^2}{\beta^2} + \frac{\beta^2}{\alpha^2} = \frac{\alpha^4 + \beta^4}{\alpha^2 \beta^2} = \frac{(\alpha^2 + \beta^2)^2 - 2\alpha^2 \beta^2}{\alpha^2 \beta^2} = \frac{(p^2 - 2q)^2 - 2q^2}{q^2} \\ &= \frac{(p^4 + 4q^2 - 4p^2q) - 2q^2}{q^2} = \frac{p^4}{q^2} - \frac{4p^2}{q} + 2 \end{aligned}$$

Q12-

Q13-if the sum of zeros of quadratic polynomials is  $f(t)=kt^2+2t+3k$  Is equal to their product, find the value of k

Solution - sum=
$$\frac{-(co-efficient of t)}{co-efficient of t^2}, \text{ product}=\frac{constant term}{co-efficient of t^2}$$
$$\alpha + \beta = \frac{-(2)}{k} = \frac{-2}{k} \quad \alpha\beta = \frac{3k}{k} = 3$$

According to statement

$$\alpha + \beta = \alpha\beta$$
$$\frac{-2}{k} = 3, \ k = \frac{-2}{3}$$

Q14-

Q15-if  $\alpha$  and  $\beta$  are zeros of quadratic polynomial f(x)=x<sup>2</sup>-1, find a quadratic polynomial whose zeros are  $\frac{2\alpha}{\beta}$  and  $\frac{2\beta}{\alpha}$ 

Solution - sum=
$$\frac{-(co-efficient of x)}{co-efficient of x^2}, \text{ product}=\frac{constant term}{co-efficient of x^2}$$
$$\alpha + \beta = \frac{-(0)}{1} = 0 \quad \alpha\beta = \frac{-1}{1} = -1$$
$$sum = \frac{2\alpha}{\beta} + \frac{2\beta}{\alpha} = \frac{2\alpha^2 + 2\beta^2}{\alpha\beta} = \frac{2(\alpha^2 + \beta^2)}{\alpha\beta} = \frac{2\left\{(\alpha + \beta)^2 - 2\alpha\beta\right\}}{\alpha\beta} = \frac{2\left\{(0)^2 - 2X - 1\right\}}{-1} = -4$$
$$product = \frac{2\alpha}{\beta} X \frac{2\beta}{\alpha} = 4$$

Required polynomial is  $f(x)=k(x^2-sx+p)$ 

$$= k(x^{2}-(-4)x+4)$$
$$= k(x^{2}+4x+4)$$

Q16- if  $\alpha$  and  $\beta$  are zeros of quadratic polynomial f(x)=x<sup>2</sup>-3x-2, find a quadratic polynomial whose zeros

are  $\frac{1}{2\alpha + \beta}$ ,  $\frac{1}{2\beta + \alpha}$ Solution - sum=  $\frac{-(co - efficient \ of \ x)}{co - efficient \ of \ x^2}$ , product=  $\frac{constant \ term}{co - efficient \ of \ x^2}$   $\alpha + \beta = \frac{-(-3)}{1} = 3$   $\alpha\beta = \frac{-2}{1} = -2$ 1 1  $2\beta + \alpha + 2\alpha + \beta$   $3\alpha + 3\beta$ 

$$sum = \frac{1}{2\alpha + \beta} + \frac{1}{2\beta + \alpha} = \frac{2\beta + \alpha + 2\alpha + \beta}{(2\alpha + \beta)(2\beta + \alpha)} = \frac{3\alpha + 3\beta}{(4\alpha\beta + 2\beta^2 + 2\alpha^2 + \alpha\beta)} = \frac{3(\alpha + \beta)}{(5\alpha\beta + 2(\alpha^2 + \beta^2))}$$

$$\frac{3(\alpha+\beta)}{\left\{\left(5\alpha\beta+2(\alpha+\beta)^2-2\alpha\beta\right)\right\}^2} = \frac{3(3)}{\left\{\left(5X-2+2\left\{\left(3\right)^2-2X-2\right)\right\}\right\}^2} = \frac{9}{16}$$

$$\text{Product} = \frac{1}{2\alpha+\beta} X \frac{1}{2\beta+\alpha} = \frac{1}{(2\alpha+\beta)(2\beta+\alpha)} = \frac{1}{(4\alpha\beta+2\beta^2+2\alpha^2+\alpha\beta)} = \frac{3(\alpha+\beta)}{(5\alpha\beta+2(\alpha^2+\beta^2))}$$

$$= \frac{1}{\left\{\left(5\alpha\beta+2(\alpha+\beta)^2-2\alpha\beta\right)\right\}^2} = \frac{1}{\left\{\left(5X-2+2\left\{\left(3\right)^2-2X-2\right)\right\}\right\}^2} = \frac{1}{16}$$

Required polynomial is  $f(x)=k(x^2-\frac{9}{16}x+\frac{1}{16})$ 

Q17-- if  $\alpha$  and  $\beta$  are zeros of quadratic polynomial such that  $\alpha + \beta = 24$  and  $\alpha - \beta = 8$  find a quadratic polynomial whose zeros are  $\alpha$  and  $\beta$ 

Solution – 
$$\alpha + \beta = 24$$

$$\alpha - \beta = 8$$
  
2  $\alpha = 32$ ,  $\alpha = \frac{32}{2} = 16$ ,  $\beta = 24 - 16 = 8$ ,  $\alpha\beta = 16$  X8 = 128

Required polynomial is  $f(x)=k(x^2-sx+p)$ 

$$= k(x^2-24x+128)$$

Q18- if  $\alpha$  and  $\beta$  are zeros of quadratic polynomial f(x)=x<sup>2</sup>-p(x+1)-c then show that

$$(\alpha + 1)(\beta + 1) = 1 - c$$

Solution – x<sup>2</sup>-px-p-c

$$= x^2 - px - (p+c)$$

 $Sum = \frac{-(co-efficient \ of \ x)}{co-efficient \ of \ x^2} \ , \ \ product = \frac{constant \ term}{co-efficient \ of \ x^2}$ 

$$\alpha + \beta = \frac{-(-p)}{1} = p$$
,  $\alpha \beta = \frac{-(p+c)}{1} = -(p+c)$ 

$$(\alpha + 1)(\beta + 1) = (\alpha\beta + (\alpha + \beta) + 1) = (-(p + c) + (p) + 1) = 1-c$$

Q19- if  $\alpha$  and  $\beta$  are zeros of quadratic polynomial f(x)=x<sup>2</sup>-2x+3, find a quadratic polynomial whose zeros are (I)  $\alpha$  + 2,  $\beta$  + 2 (ii) $\frac{\alpha-1}{\alpha+1}$ ,  $\frac{\beta-1}{\beta+1}$ 

Solution – Sum=
$$\frac{-(co-efficient \ of \ x)}{co-efficient \ of \ x^2}$$
, product= $\frac{constant \ term}{co-efficient \ of \ x^2}$ 

$$\alpha + \beta = \frac{-(-2)}{1} = 2 , \quad \alpha \beta = \frac{3}{1} = 3$$
  
(i) sum =  $\alpha + 2 + \beta + 2 = (\alpha + \beta) + 4 = 2 + 4 = 6$   
product =  $(\alpha + 2)(\beta + 2) = \alpha\beta + 2(\alpha + \beta) + 4 = 3 + 2(2) + 4 = 11$ 

Required polynomial is  $f(x)=k(x^2-sx+p)$ 

 $=k(x^{2}-6x+11)$ 

(ii) 
$$\frac{\alpha - 1}{\alpha + 1}$$
,  $\frac{\beta - 1}{\beta + 1}$   
Sum=  $\frac{\alpha - 1}{\alpha + 1}$  +  $\frac{\beta - 1}{\beta + 1}$  =  $\frac{(\alpha - 1)(\beta + 1) + (\alpha + 1)(\beta - 1)}{(\alpha + 1)(\beta + 1)}$  =  $\frac{\alpha \beta - \beta + \alpha / - 1 / \alpha \beta + \beta - \alpha / - 1}{(\alpha \beta + (\alpha + \beta) + 1)}$   
=  $\frac{2\alpha \beta - 2}{(\alpha \beta + (\alpha + \beta) + 1)}$  =  $\frac{2X3 - 2}{(2 + (3) + 1)} = \frac{4}{6} = \frac{2}{3}$   
Product =  $\frac{\alpha - 1}{\alpha + 1}$  X  $\frac{\beta - 1}{\beta + 1}$  =  $\frac{(\alpha - 1)(\beta - 1)}{(\alpha + 1)(\beta + 1)} = \frac{(\alpha \beta - \beta - \alpha - 1)}{(\alpha \beta + \beta + \alpha + 1)} = \frac{(\alpha \beta - \{\beta + \alpha\} - 1)}{(\alpha \beta + \{\beta + \alpha\} + 1)} = \frac{(3 - \{2\} + 1)}{(3 + \{2\} + 1)}$   
2 1

<u>6</u>3

Required polynomial is  $f(x)=k(x^2-\frac{2}{3}x+\frac{1}{3})$ 

Q20- if  $\alpha$  and  $\beta$  are zeros of quadratic polynomial f(x)=x<sup>2</sup>+px+q, find a quadratic polynomial whose zeros are (I)  $(\alpha + \beta)^2$ ,  $(\alpha - \beta)^2$ 

Solution – Sum=
$$\frac{-(co-efficient of x)}{co-efficient of x^2}, \text{ product}=\frac{constant term}{co-efficient of x^2}$$

$$\alpha + \beta = \frac{-(p)}{1} = -p, \quad \alpha\beta = \frac{q}{1} = q$$
sum =  $(\alpha + \beta)^2 + (\alpha - \beta)^2 = (\alpha^2 + \beta^2 + 2\alpha\beta) \neq \alpha^2 + \beta^2 - 2\alpha\beta) \neq 2(\alpha^2 + \beta^2) = 2\{(\alpha + \beta)^2 - 2\alpha\beta\}$ 

$$= 2\{p^2 - 2q\}$$
Product =  $(\alpha + \beta)^2 \times (\alpha - \beta)^2 = (\alpha^2 + \beta^2 + 2\alpha\beta)(\alpha^2 + \beta^2 - 2\alpha\beta)$ 

$$= \{(\alpha + \beta)^2 - 2\alpha\beta + 2\alpha\beta\}\{(\alpha + \beta)^2 - 2\alpha\beta - 2\alpha\beta\}$$

$$= \{(\alpha + \beta)^2\}\{(\alpha + \beta)^2 - 4\alpha\beta\}$$

$$= \{(-p)^2\}\{(-p)^2 - 4q\}$$

$$= k\{x^2 - 2(p^2 - 2q) x + p^2(p^2 - 4q)\}$$

### JANAK RAJ KALIA (TGT MATHS )

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### IF YOU WANT WHOLE SA-1 UNSOLVED EXERCISE OF SA-1

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