Quadratic Equations Ex 8.3 Q30

Answer :

We have been given

$$\frac{m}{n}x^2+\frac{n}{m}=1-2x$$

$$\frac{m^2x^2+n^2}{mn}=1-2x$$

$$m^2x^2+2mnx+\left(n^2-mn\right)=0$$

Now we solve the above quadratic equation using factorization method.

Therefore,

$$\left[m^2x^2+mnx+m\sqrt{mn}x\right]+\left[mnx-m\sqrt{mn}x+\left(n+\sqrt{mn}\right)\left(n-\sqrt{mn}\right)\right]=0$$

$$\left[m^2x^2+mnx+m\sqrt{mn}x\right]+\left[(mx)\left(n-\sqrt{mn}\right)+\left(n+\sqrt{mn}\right)\left(n-\sqrt{mn}\right)\right]=0$$

$$(mx)\left(mx+n+\sqrt{mn}\right)+\left(n-\sqrt{mn}\right)\left(mx+n+\sqrt{mn}\right)=0$$

$$\left(mx+n+\sqrt{mn}\right)\left(mx+n-\sqrt{mn}\right)=0$$

Now, one of the products must be equal to zero for the whole product to be zero. Hence we equate both the products to zero in order to find the value of x.

Therefore,

$$mx+n+\sqrt{mn}=0$$

$$mx=-n-\sqrt{mn}$$

$$x=\frac{-n-\sqrt{mn}}{m}$$

Or

$$mx+n-\sqrt{mn}=0$$

$$mx=-n+\sqrt{mn}$$

$$x=\frac{-n+\sqrt{mn}}{m}$$

Hence, $\boxed{x=\frac{-n-\sqrt{mn}}{m}}$ or $\boxed{x=\frac{-n+\sqrt{mn}}{m}}$.

Quadratic Equations Ex 8.3 Q31

Answer :

We have been given

$$\frac{x-a}{x-b}+\frac{x-b}{x-a}=\frac{a}{b}+\frac{b}{a}$$

$$\frac{x^2+a^2-2ax+x^2+b^2-2bx}{x^2-(a+b)x+ab}=\frac{a^2+b^2}{ab}$$

$$2abx^2-2(ab)(a+b)x+ab(a^2+b^2)=(a^2+b^2)x^2-(a+b)(a^2+b^2)x+ab(a^2+b^2)$$

$$(a-b)^2x^2-(a+b)(a-b)^2x=0$$

Now we solve the above quadratic equation by taking out the common terms.

Therefore,

$$x(a-b)^2(x-(a+b))=0$$

Now, one of the products must be equal to zero for the whole product to be zero. Hence we equate both the products to zero in order to find the value of x.

Therefore,

$$x(a-b)^2=0$$

$$x=0$$

Or

$$x-(a+b)=0$$

$$x=a+b$$

Hence, $\boxed{x=0}$ or $\boxed{x=a+b}$.

Quadratic Equations Ex 8.3 Q32

Answer :

We have been given,

$$\frac{1}{(x-1)(x-2)}+\frac{1}{(x-2)(x-3)}+\frac{1}{(x-3)(x-4)}=\frac{1}{6}$$

$$\frac{(x-3)(x-4)+(x-1)(x-4)+(x-1)(x-2)}{(x-1)(x-4)(x-2)(x-3)}=\frac{1}{6}$$

$$\frac{3(x^2-5x+6)}{(x^2-5x+4)(x^2-5x+6)}=\frac{1}{6}$$

$$18=x^2-5x+4$$

$$x^2-5x-14=0$$

Now we solve the above quadratic equation using factorization method.

Therefore,

$$x^2-7x+2x-14=0$$

$$x(x-7)+2(x-7)=0$$

$$(x+2)(x-7)=0$$

Now, one of the products must be equal to zero for the whole product to be zero. Hence we equate both the products to zero in order to find the value of x.

Therefore,

$$x+2=0$$

$$x=-2$$

Or

$$x-7=0$$

$$x=7$$

Hence, $\boxed{x=-2}$ or $\boxed{x=7}$.

********** END **********