POLYNOMIAL CLASS X
IMPORTANT MCQ BASED QUESTIONS

PREPARED BY : SUMEET SAHU

Which of the following is a polynomial?

A) $x^2 - 6\sqrt{x} + 2$ B) $\sqrt{x} + \frac{1}{\sqrt{x}}$ C) $x + \frac{1}{x}$ D) none of these

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$x^2 - 6\sqrt{x} + 2 = x^2 - 6\,x^{\frac{1}{2}} + 2$

The exponent of the second term $x^{\frac{1}{2}}$ is $\frac{1}{2}$ which is not a whole number

not a polynomial

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

The exponents of x are $\frac{1}{2}$ & $-\frac{1}{2}$ which is not a whole numbers

not a polynomial

$x + \frac{1}{x} = x + x^{-1}$

The exponent of the second term x^{-1} is -1 which is not a whole number

not a polynomial

Which of the following is not a polynomial?

A) $\sqrt{3}\,x^2 - 2\sqrt{3}x + 3$ B) $\frac{3}{2}x^3 - 5x^2 - \frac{1}{\sqrt{2}}x - 1$ C) $x + \frac{1}{x}$ D) $5x^2 - 3x + \sqrt{2}$

Which of the following is not a polynomial?

A) $\sqrt{3}\,x^2 - 2\sqrt{3}x + 3$ B) $\frac{3}{2}x^3 - 5x^2 - \frac{1}{\sqrt{2}}x - 1$ C) $x + \frac{1}{x}$ D) $5x^2 - 3x + \sqrt{2}$

$\sqrt{3}\,x^2 - 2\sqrt{3}x + 3$	3 terms	is a trinomial
$\frac{3}{2}x^3 - 5x^2 - \frac{1}{\sqrt{2}}x - 1$	4 terms	is a Multinomial
$5x^2 - 3x + \sqrt{2}$	3 terms	is a binomial

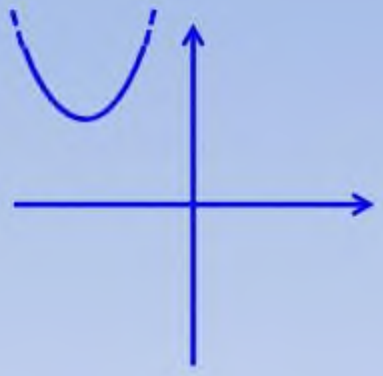
Every monomial, binomial, trinomial & multinomial is a polynomial.

$x + \frac{1}{x} = x + x^{-1}$ The exponent of the second term x^{-1} is -1

which is not a whole number

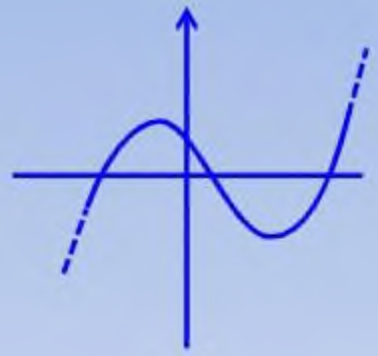
not a polynomial

Which of the following is not the graph of a quadratic polynomial?

A) 

B) 

C) 

D) 

The degree of the polynomial $(x + 1)(x^2 - x - x^4 + 1)$ is

A) 2

B) 3

C) 4

D) 5

The degree of the polynomial $(x + 1)(x^2 - x - x^4 + 1)$ is

A) 2 B) 3 C) 4 D) 5

$$(x + 1)(x^2 - x - x^4 + 1)$$

$$= (x + 1)(-x^4 + x^2 - x + 1)$$

$$= -x^5 + x^3 - x^2 + x - x^4 + x^2 - x + 1$$

$$= -x^5 - x^4 + x^3 + 1$$

$\therefore$ degree of polynomial = 5

If –4 is a zero of the polynomial $x^2 - x - (2 + 2k)$, then the value of k is

A) 3 B) 9 C) 6 D) –9

If -4 is a zero of the polynomial $x^2 - x - (2 + 2k)$, then the value of k is

A) 3 B) 9 C) 6 D) -9

let $p(x) = x^2 - x - (2 + 2k)$

given -4 is zero of $p(x)$

$p(-4) = 0 \Rightarrow (-4)^2 - (-4) - (2 + 2k) = 0$

$\Rightarrow 16 + 4 - 2 - 2k = 0$

$\Rightarrow 18 = 2k \Rightarrow 9 = k$

If one of the zeroes of the quadratic polynomial $(k - 1)x^2 + kx + 1$ is -3, then $k =$

A) $\frac{4}{3}$ B) $\frac{-4}{3}$ C) $\frac{2}{3}$ D) $\frac{-2}{3}$

If one of the zeroes of the quadratic polynomial $(k - 1)x^2 + kx + 1$ is -3, then $k =$

A) $\frac{4}{3}$ ✓   B) $\frac{-4}{3}$ C) $\frac{2}{3}$ D) $\frac{-2}{3}$

Let $p(x) = (k - 1)x^2 + kx + 1$

given -3 is one zero of $p(x)$ $\Rightarrow$ $p(-3) = 0$

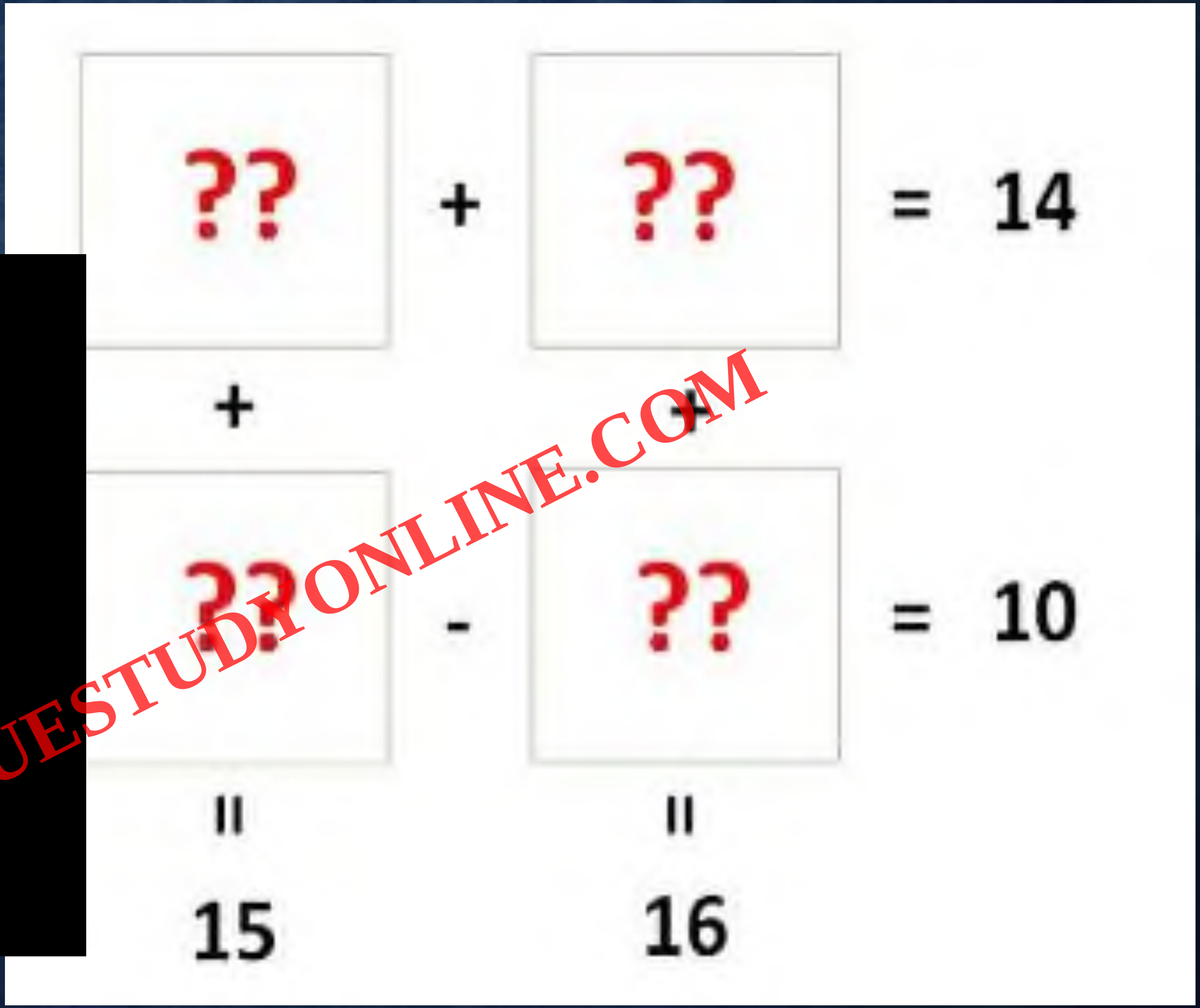
$\Rightarrow (k - 1)(-3)^2 + k(-3) + 1 = 0$

$\Rightarrow (k - 1)(9) - 3k + 1 = 0$

$\Rightarrow 9k - 9 - 3k + 1 = 0$

$\Rightarrow 6k - 8 = 0 \Rightarrow k = \frac{4}{3}$

BOOSTER 1



The factors of $\sqrt{3}x^2 + 11x + 6\sqrt{3}$ are

A) $(x - 3\sqrt{3})(\sqrt{3}x + 2)$

B) $(x - 3\sqrt{3})(\sqrt{3}x - 2)$

C) $(x + 3\sqrt{3})(\sqrt{3}x - 2)$

D) $(x + 3\sqrt{3})(\sqrt{3}x + 2)$

The factors of $\sqrt{3}x^2 + 11x + 6\sqrt{3}$ are

A) $(x - 3\sqrt{3})(\sqrt{3}x + 2)$

B) $(x - 3\sqrt{3})(\sqrt{3}x - 2)$

C) $(x + 3\sqrt{3})(\sqrt{3}x - 2)$

✓ D) $(x + 3\sqrt{3})(\sqrt{3}x + 2)$

$$\sqrt{3}x^2 + 11x + 6\sqrt{3} = \sqrt{3}x^2 + 9x + 2x + 6\sqrt{3}$$

$$= \sqrt{3}x^2 + 3\sqrt{3} \times \sqrt{3}x + 2x + 6\sqrt{3}$$

$$= \sqrt{3}x(x + 3\sqrt{3}) + 2(x + 3\sqrt{3})$$

$$= (x + 3\sqrt{3})(\sqrt{3}x + 2)$$

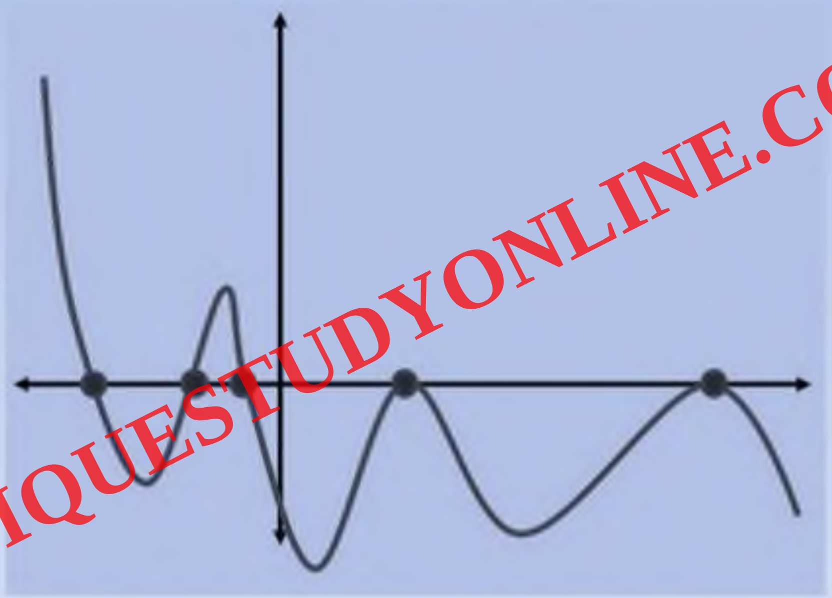
The graph of the polynomial p(x) cuts the X-axis at 3 places and touches it at 2 places. the number of zeroes of p(x) is

A) 2 B) 5 C) 4 D) 8

The graph of the polynomial p(x) cuts the X-axis at 3 places and touches it at 2 places. the number of zeroes of p(x) is

A) 2 B) 5 C) 4 D) 8

The graphs looks like



$\therefore$ Number of zeroes = number of times graph touches X-axis 6

= 3 + 2 = 5

The sum and product of the zeroes of a quadratic polynomial are 2 and −15 respectively. The quadratic polynomial is

A) $x^2 - 2x + 15$ B) $x^2 - 2x - 15$ C) $x^2 + 2x - 15$ D) $x^2 + 2x + 15$

The sum and product of the zeroes of a quadratic polynomial are 2 and –15 respectively. The quadratic polynomial is

A) $x^2 - 2x + 15$ B) $x^2 - 2x - 15$ C) $x^2 + 2x - 15$ D) $x^2 + 2x + 15$

given sum of the zeroes = 2

product of the zeroes = –15

$f(x) = x^2 - (\text{sum of the zeroes})x + \text{product of the zeroes} = x^2 - 2x - 15$

$= x^2 - (2)x + (-15)$

$= x^2 - 2x - 15$

If one zero of the quadratic polynomial $2x^2 - 8x - m$ is $\frac{5}{2}$, then the other zero is

A) $\frac{2}{3}$

B) $-\frac{2}{3}$

C) $\frac{3}{2}$

D) $\frac{-15}{2}$

If one zero of the quadratic polynomial $2x^2 - 8x - m$ is $\frac{5}{2}$, then the other zero is

A) $\frac{2}{3}$ B) $-\frac{2}{3}$ C) $\frac{3}{2}$ D) $\frac{-15}{2}$

Let α, β be two zeroes of $2x^2 - 8x - m$, where $\alpha = \frac{5}{2}$.

given one zero of the polynomial $2x^2 - 8x - m$ is $\alpha = \frac{5}{2}$

other zero $\beta = ?$

Sum of the zeroes $= \alpha + \beta = \frac{-\text{coefficient of } x}{\text{coefficient of } x^2}$

$\Rightarrow \frac{5}{2} + \beta = \frac{8}{2}$

$\Rightarrow \beta = \frac{8}{2} - \frac{5}{2} \Rightarrow \beta = \frac{8-5}{2} = \frac{3}{2}$

The value of k such that the quadratic polynomial $x^2 - (k + 6)x + 2(2k + 1)$ has sum of the zeroes as half of their product, is

A) 2

B) 3

C) –5

D) 5

The value of k such that the quadratic polynomial $x^2 - (k + 6)x + 2(2k + 1)$ has sum of the zeroes as half of their product, is

A) 2 B) 3 C) –5 D) 5

From the given equation $x^2 - (k + 6)x + 2(2k + 1)$ $a = 1, b = -(k + 6), c = 2(2k + 1)$

$$\alpha + \beta = \frac{-b}{a}$$

$$= \frac{-[-(k + 6)]}{1} = k + 6$$

$$\alpha\beta = \frac{c}{a}$$

$$= \frac{2(2k + 1)}{1} = 2(2k + 1)$$

given $\frac{\alpha\beta}{2} = \alpha + \beta$

$$\Rightarrow \frac{2(2k + 1)}{2} = k + 6$$

$$\Rightarrow 4k + 2 = 2k + 12$$

$$\Rightarrow 2k = 10 \Rightarrow k = 5$$

If one zero of the polynomial $f(x) = (k^2 + 4)x^2 + 13x + 4k$ is reciprocal of the other, then k =

A) 2   B) −2   C) 1   D) −1

If one zero of the polynomial $f(x) = (k^2 + 4)x^2 + 13x + 4k$ is reciprocal of the other, then k =

A) 2 B) −2 C) 1 D) −1

Let α and $\frac{1}{\alpha}$ be the roots of $f(x) = (k^2 + 4)x^2 + 13x + 4k$

Product of the roots $= \alpha \frac{1}{\alpha} = \frac{4k}{k^2 + 4}$

$\Rightarrow 1 = \frac{4k}{k^2 + 4}$ $\Rightarrow k^2 + 4 = 4k$

$\Rightarrow k^2 - 2k - 2k + 4 = 0$

$\Rightarrow k(k - 2) - 2(k - 2) = 0$

$\Rightarrow (k - 2)^2 = 0$ $\therefore k = 2$

If α, β are the zeroes of the polynomial $f(x) = x^2 - p(x + 1) - c$ such that $(\alpha + 1)(\beta + 1) = 0$, then $c =$

A) 1 B) 0 C) –1 D) 2

If α, β are the zeroes of the polynomial $f(x) = x^2 - p(x + 1) - c$ such that $(\alpha + 1)(\beta + 1) = 0$, then $c =$

A) 1 B) 0 C) −1 D) 2

From the given equation $x^2 - p(x + 1) - c = x^2 - px - p - c$

$a = 1,\ b = -p,\ c = -(p + c)$

$$\alpha + \beta = \frac{-b}{a} = \frac{-(-p)}{1} = p$$

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

$$(\alpha + 1)(\beta + 1) = 0 \Rightarrow \alpha\beta + \alpha + \beta + 1 = 0$$

$$\Rightarrow -(p + c) + p + 1 = 0$$

$$\Rightarrow -p - c + p + 1 = 0$$

$$\Rightarrow 1 - c = 0 \Rightarrow c = 1$$

If sum of squares of zeroes of the quadratic polynomial $f(x) = x^2 - 8x + k$ is 40, the value of k is

A) 10

B) 12

C) 14

D) 16

If sum of squares of zeroes of the quadratic polynomial $f(x) = x^2 - 8x + k$ is 40, the value of k is

A) 10 B) 12 C) 14 D) 16

$f(x) = x^2 - 8x + k$

Let α and β be the roots of $f(x)$

sum of the roots $= \alpha + \beta = 8$

product of the roots $= \alpha\beta = k$

given $\alpha^2 + \beta^2 = 40 \Rightarrow (\alpha + \beta)^2 - 2\alpha\beta = 40$

$\Rightarrow 8^2 - 2k = 40$

$\Rightarrow 64 - 40 = 2k \Rightarrow 2k = 24 \Rightarrow k = 12$

If the sum of the zeroes of the quadratic polynomial $f(t) = kt^2 + 2t + 3k$ is equal to their product, find the value of k.

A) $\frac{-2}{3}$ B) $\frac{2}{3}$ C) $\frac{1}{3}$ D) $\frac{-1}{3}$

If the sum of the zeroes of the quadratic polynomial $f(t) = kt^2 + 2t + 3k$ is equal to their product, find the value of k.

A) $\frac{-2}{3}$ B) $\frac{2}{3}$ C) $\frac{1}{3}$ D) $\frac{-1}{3}$ ✓

From the given equation $kt^2 + 2t + 3k$ $a = k, b = 2, c = 3k$

$$\alpha + \beta = \frac{-b}{a} = \frac{-2}{k}$$

$$\alpha\beta = \frac{c}{a} = \frac{3k}{k} = 3$$

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

$$\Rightarrow k = \frac{-2}{3}$$

The zeroes of the quadratic polynomial $100x^2 + 50x - 99$ are

A) both negative

B) both positive

C) one positive, one negative

D) both equal

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A) both negative

B) both positive

C) one positive, one negative

D) both equal

From the given equation $100x^2 + 50x - 99$ $\quad a = 100, b = 50, c = -99$

$$\alpha + \beta = \frac{-b}{a} = -\frac{50}{100}$$

$$\alpha\beta = \frac{c}{a} = -\frac{99}{100}$$

sum of zeroes are negative $\Rightarrow$ both zeroes are negative

product of the zeroes are negative $\Rightarrow$ one positive and one negative zeroes

If one zero of the quadratic polynomial $x^2 + 3x + k$ is 2, then the value of k is

A) 10 B) −10 C) 5 D) −5

If one zero of the quadratic polynomial $x^2 + 3x + k$ is 2, then the value of k is

A) 10　　B) −10　　C) 5　　D) −5

Let $p(x) = x^2 + 3x + k$

given 2 is one zero of p(x) $\Rightarrow p(2) = 0$

$\Rightarrow (2)^2 + 3(2) + k = 0$

$\Rightarrow 4 + 6 + k = 0$

$\Rightarrow 10 + k = 0 \Rightarrow k = -10$

If the zeroes of the quadratic polynomial $x^2 + (a + 1)x + b$ are 2 and -3, then

A) $a = -7, b = -1$ B) $a = 5, b = -1$ C) $a = 2, b = -6$ D) $a = 0, b = -6$

If the zeroes of the quadratic polynomial $x^2 + (a + 1)x + b$ are 2 and −3, then

A) a = −7, b = −1 B) a = 5, b = −1 C) a = 2, b = −6 ✓D) a = 0, b = −6

Let $p(x) = x^2 + (a + 1)x + b$ $a = 1, b = (a + 1), c = b$

given $\alpha = 2$ and $\beta = -3$

sum of zeroes $= \alpha + \beta = \dfrac{-(a + 1)}{1}$

$\Rightarrow 2 - 3 = -a - 1$

$\Rightarrow -1 = -a - 1 \Rightarrow a = 0$

product of zeroes $= \alpha\beta = \dfrac{b}{1}$

$\Rightarrow (2)(-3) = \dfrac{b}{1} \Rightarrow \dfrac{b}{1} = -6$

$\Rightarrow b = -6$

If α, β are zeroes of $x^2 - 4x + 1$, then $\frac{1}{\alpha} + \frac{1}{\beta}$ is:

A) 4 B) 5 C) –5 D) –3

If α, β are zeroes of $x^2 - 4x + 1$, then $\frac{1}{\alpha} + \frac{1}{\beta}$ is :

A) 4

B) 5

C) –5

D) –3

α, β are zeroes of $x^2 - 4x + 1$

$$\alpha + \beta = \frac{-b}{a}$$

$$= \frac{-(-4)}{1} = 4$$

$$\alpha\beta = \frac{c}{a} = \frac{1}{1} = 1$$

$$\therefore \frac{1}{\alpha} + \frac{1}{\beta} = \frac{\beta + \alpha}{\alpha\beta}$$

$$= \frac{4}{1} = 4$$

If α and β are the zeroes of the polynomial $5x^2 - 7x + 2$, then sum of their reciprocals is

A) $\frac{7}{2}$ B) $\frac{7}{5}$ C) $\frac{2}{5}$ D) $\frac{14}{25}$

If α and β are the zeroes of the polynomial $5x^2 - 7x + 2$, then sum of their reciprocals is

A) $\frac{7}{2}$ B) $\frac{7}{5}$ C) $\frac{2}{5}$ D) $\frac{14}{25}$

α, β are zeroes of $5x^2 - 7x + 2$

$$\alpha + \beta = \frac{-b}{a}$$

$$= \frac{-(-7)}{5} = \frac{7}{5}$$

$$\alpha\beta = \frac{c}{a} = \frac{2}{5}$$

$$\therefore \frac{1}{\alpha} + \frac{1}{\beta} = \frac{\beta + \alpha}{\alpha\beta}$$

$$= \frac{7/5}{2/5} = \frac{7}{2}$$

If α and β are the zeroes of the quadratic polynomial $f(x) = x^2 - x - 4$, then the value of $\frac{1}{\alpha} + \frac{1}{\beta} - \alpha\beta$ is

A) $\frac{15}{4}$

B) $\frac{-15}{4}$

C) 4

D) 15

If α and β are the zeroes of the quadratic polynomial $f(x) = x^2 - x - 4$, then the value of $\frac{1}{\alpha} + \frac{1}{\beta} - \alpha\beta$ is

✓ A) $\frac{15}{4}$ B) $\frac{-15}{4}$ C) 4 D) 15

α, β are the zeroes of $f(x) = x^2 - x - 4$

$$\alpha + \beta = 1$$

$$\alpha\beta = -4$$

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

$$= -\frac{1}{4} + 4 = \frac{-1 + 16}{4} = \frac{15}{4}$$

If α and β are the zeroes of the quadratic polynomial $f(t) = t^2 - 4t + 3$, then the value of $\alpha^4\beta^3 + \alpha^3\beta^4$ is

A) 104 B) 108 C) 112 D) 5

If α and β are the zeroes of the quadratic polynomial $f(t) = t^2 - 4t + 3$, then the value of $\alpha^4\beta^3 + \alpha^3\beta^4$ is

A) 104 B) 108 C) 112 D) 5

From the given equation $t^2 - 4t + 3$ $a = 1, b = -4, c = 3$

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

$$\alpha\beta = \frac{c}{a} = \frac{3}{1} = 3$$

$$\alpha^4\beta^3 + \alpha^3\beta^4 = \alpha^3\beta^3(\alpha + \beta) = (\alpha\beta)^3(\alpha + \beta)$$

$$= (3)^3 \times 4$$

$$= 27 \times 4 = 108$$

The quadratic polynomial having zeroes are 1 and -2 is

A) $x^2 - x + 2$

B) $x^2 - x - 2$

C) $x^2 + x - 2$

D) $x^2 + x + 2$

The quadratic polynomial having zeroes are 1 and −2 is

A) $x^2 - x + 2$ B) $x^2 - x - 2$ C) $x^2 + x - 2$ D) $x^2 + x + 2$

given $\alpha = 1$ and $\beta = -2$

sum of the zeroes $= \alpha + \beta$

$= 1 - 2 = -1$

product of the zeroes $= \alpha\beta$

$= 1 \times (-2) = -2$

The quadratic polynomial having zeroes 1 & −2 is

$x^2 - (\text{sum of zeroes})x + \text{product of zeroes}$

$= x^2 - (1 - 2)x + (1)(-2)$

$= x^2 + x - 2$

A quadratic polynomial, whose zeroes are –3 and 4, is

A) $x^2 - x + 12$

B) $x^2 + x + 12$

C) $\frac{x^2}{2} - \frac{x}{2} - 6$

D) $2x^2 + 2x - 24$

A quadratic polynomial, whose zeroes are −3 and 4, is

A) $x^2 - x + 12$ B) $x^2 + x + 12$ C) $\frac{x^2}{2} - \frac{x}{2} - 6$ D) $2x^2 + 2x - 24$

let $\alpha = -3, \ \beta = 4$

$\therefore$ The polynomial having zeroes α and β is $k[x^2 - (\alpha + \beta)x + \alpha\beta]$

$= k\,[x^2 - (-3 + 4)x + (-3)(4)]$

$= k\,[x^2 - x - 12]$

put $k = 1$, $\Rightarrow$ $p(x) = 1(x^2 - x - 12)$ $= x^2 - x - 12$

put $k = \frac{1}{2}$ $\Rightarrow$ $p(x) = \frac{1}{2}(x^2 - x - 12)$ $= \frac{x^2}{2} - \frac{x}{2} - 6$

put $k = 2$ $\Rightarrow$ $p(x) = 2(x^2 - x - 12)$ $= 2x^2 - 2x - 24$