

ANSWER KEYS

1. (1)	2. (2)	3. (4)	4. (3)	5. (2)	6. (3)	7. (1)	8. (3)	
9. (4)	10. (4)							

///
$$\alpha^{2015}$$
 hong ω^2 , β^{2015} at hong o /// mathong o /// mathong o /// mathong /// mathong

2. (2)

As we know if
$$lx^2 + mx + n = 0$$
 is identity, then $l = 0$, $m = 0$, $n = 0$

So, $a^2 - 3a + 2 = 0$

$$(a=3)(a=2)=0$$
 mathongo $(a=2)=0$ mathongo $(a=2)=$

$$^{\prime\prime\prime\prime}$$
 $a=3,\,2$ ngo $^{\prime\prime\prime\prime}$ mathongo $^{\prime\prime\prime\prime}$ mathongo $^{\prime\prime\prime\prime}$ mathongo $^{\prime\prime\prime\prime}$ mathongo $^{\prime\prime\prime\prime}$ mathongo $^{\prime\prime\prime\prime}$ mathongo $^{\prime\prime\prime\prime}$

$$a_{\mathrm{mathongo}}^{2}$$
 $a_{\mathrm{mathongo}}^{2}$ a_{mathongo^{2} a_{mathongo^{2} $a_{\mathrm{mathongo}}^{2}$ a_{mathongo^{2} a_{mathongo^{2}

$$(a-2)(a+2)=0$$
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 $\therefore a=2$

3. (4) Let
$$\alpha$$
, β and γ , δ are the roots of the equations /// mathongo /// mathongo /// mathongo ///

$$x^2 + ax + b = 0$$
 and $x^2 + bx + a = 0$ respectively. Moreover, mathons with mathons with mathons $\alpha + \beta = -a$, $\alpha + \beta = -a$, $\alpha + \delta = -b$, $\gamma + \delta = -a$.

Given
$$\alpha - \beta = \gamma - \delta \Rightarrow (\alpha - \beta)^2 = (\gamma - \delta)^2$$

$$\Rightarrow (\alpha + \beta)^2 - 4\alpha\beta = (\gamma + \delta)^2 - 4\gamma\delta$$

$$a^2-4b=b^2-4a\Rightarrow (a^2-b^2)+4(a-b)=0 \ \Rightarrow a+b+4=0. \ (\because a
eq b)$$
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Answer Kevs and Solutions

4. (3) athongo //. math									
Let $lpha$ and eta be the roots of the given equation. $x^2 + (4 - \lambda)x + 3 = \lambda$									

$$\Rightarrow x^2 + (4 - \lambda)x + 3 - \lambda = 0$$
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$$\Rightarrow lpha + eta = -(4 - \lambda) = \lambda - 4$$
 and $lpha eta = 3 - \lambda$

$$lpha^2+eta^2=\left(lpha+eta
ight)^2-2lphaeta = \left(\lambda-4
ight)^2-2(3-\lambda)$$
 mathongo wy matho

$$= (\lambda - 4)^{2} - 2(3 - \lambda)$$

$$= \lambda^{2} - 6\lambda + 10$$

$$= (\lambda - 3)^{2} + 1$$
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For least value
$$\lambda=3$$

For least value
$$\lambda = 3$$

5. (2) Since, 4 is a root of $x^2 + ax + 12 = 0$

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Let the roots of the equation
$$x^2 + ax + b = 0$$
 be α and α // mathongo /// mathongo /// mathongo ///

$$\frac{2\alpha = -a}{mathongo}$$
 ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo

$$\Rightarrow \alpha = \frac{7}{2}$$
///. mathongo ///.

$$\Rightarrow \left(\frac{7}{2}\right)^2 = b$$
 ///. mathongo ///.

$$\Rightarrow D < 0$$
 $\Rightarrow 4(1+3m)^2 - 4 \times (1+m^2)(1+8m) < 0$ hongo /// mathongo /// mathongo /// mathongo /// mathongo ///

$$\Rightarrow$$
 $(1 + 9m^2 + 6m) - (1 + 8m + m^2 + 8m^3) < 0$

$$\Rightarrow -2m(2m-1)^2 < 0$$
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 \Rightarrow root accepted $1 - \sqrt{2}$

Answer Keys and Solutions

Roots of the quadratic equation
$$\frac{-(-11)\pm\sqrt{11^2-4(6)(\alpha)}}{2\times6} = \frac{11\pm\sqrt{121-24\alpha}}{12}$$

Let
$$121-24\alpha=k^2$$

///.
$$mat | 121 - 24 \alpha \ge 0 \Rightarrow \alpha \le \frac{121}{24}$$
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Since, we have to find positive integral values for
$$\alpha$$
, range of α is $0 < \alpha < \frac{121}{24}$

mat The positive integral values in the above range are
$$1, 2, 3, 4, 5$$
. The positive integral values in the above range are $1, 2, 3, 4, 5$. The positive integral values in the above range are $1, 2, 3, 4, 5$. The positive integral values in the above range are $1, 2, 3, 4, 5$. The positive integral values in the above range are $1, 2, 3, 4, 5$. The positive integral values in the above range are $1, 2, 3, 4, 5$. The positive integral values in the above range are $1, 2, 3, 4, 5$. The positive integral values in the above range are $1, 2, 3, 4, 5$. The positive integral values in the above range are $1, 2, 3, 4, 5$. The positive integral values in the above range are $1, 2, 3, 4, 5$. The positive integral values in the above range are $1, 2, 3, 4, 5$. The positive integral values in the above range are $1, 2, 3, 4, 5$. The positive integral values in the above range are $1, 2, 3, 4, 5$. The positive integral values in the above range are $1, 2, 3, 4, 5$. The positive integral values in the above range are $1, 2, 3, 4, 5$. The positive integral values in the above range are $1, 2, 3, 4, 5$. The positive integral values in the above range are $1, 2, 3, 4, 5$. The positive integral values in the above range are $1, 2, 3, 4, 5$. The positive range are $1, 2, 3, 4, 5$. The positive range are $1, 2, 3, 4, 5$. The positive range are $1, 2, 3, 4, 5$. The positive range are $1, 2, 3, 4, 5$ and $1, 4, 5$ and $1, 4, 4,$

$$lpha=2\Rightarrow 121-24lpha=121-24(2)=73$$
, not a perfect square. $lpha=3\Rightarrow 121-24lpha=121-24(3)=49$, is a perfect square.

$$lpha=4\Rightarrow 121-24lpha=121-24(4)=25$$
, is a perfect square. $lpha=5\Rightarrow 121-24lpha=121-24(5)=1$, is a perfect square.

So, possible value of
$$\alpha = 3, 4, 5$$

Hence, there are 3 positive integral values for
$$\alpha$$
 for which the roots are rational. The mathon α mathon

8. (3) Given Equation :
$$x^2 + |2x - 3| - 4 = 0$$
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$$x < \frac{3}{2} \Rightarrow x^2 - (2x - 3) - 4 = 0$$
 ///// mathongo ///// mathongo ///// mathongo ///// mathongo ///// mathongo //////////

$$\Rightarrow x^2 - 2x - 1 = 0$$
4 mathongo /// mathongo // mathongo /// mathongo // ma

Roots
$$\alpha,\beta=\frac{2\pm\sqrt{4+4}}{2}=1\pm\sqrt{2}$$
 // mathongo /// mathongo // mathongo

root
$$1+\sqrt{2}>\frac{3}{2}$$
, hence rejected mathongo /// mathongo // mathong

$$mathongo = \frac{7}{2}$$
 mathongo $\frac{7}{2}$ mathongo

Roots
$$\gamma,\delta=rac{-2\pm\sqrt{4+4 imes7}}{2}-1\pm2\sqrt{2}$$
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$$^{\prime\prime\prime\prime}$$
 root $=1-2\sqrt{2}<rac{3}{2}$, hence rejected $^{\prime\prime\prime\prime}$ mathongo $^{\prime\prime\prime\prime}$ mathongo $^{\prime\prime\prime\prime}$ mathongo $^{\prime\prime\prime\prime}$ mathongo $^{\prime\prime\prime\prime}$ mathongo $^{\prime\prime\prime\prime}$

$$///$$
 \Rightarrow root accepted $-1+2\sqrt{2}$ ongo $///$ mathongo $///$ mathongo $///$ mathongo $///$ mathongo $///$ mathongo $///$

Sum of roots
$$=$$
 $\left(1-\sqrt{2}\right)+\left(-1+2\sqrt{2}\right)=\sqrt{2}$ mathongo we mathongo we mathongo we mathongo with mathon with mathon



Answer Keys and Solutions

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9. (4) Let α , β be roots $x^2 - 5x + 3 = 0$.		
$lpha+eta=5, \ lphaeta=3$ Now $rac{lpha}{eta}+rac{eta}{lpha}=rac{lpha^2+eta^2}{lphaeta}=rac{(lpha+eta)^2-2lphaeta}{lphaeta}=rac{25-6}{3}=rac{19}{3}$		
and $\frac{\alpha}{\beta} \times \frac{\beta}{\alpha} = 1$. So equation whose roots are $\frac{\alpha}{\beta}$ and $\frac{\beta}{\alpha}$ is		
$x^2 - rac{19}{3}x + 1 = 0 \Rightarrow 3x^2 - 19x + 3 = 0.$		
$10. (4) \frac{a_{10} - 2a_8}{2a_9} = \frac{(\alpha^{10} - \beta^{10}) - 2(\alpha^8 - \beta^8)}{2(\alpha^9 - \beta^9)}$		
$=\frac{\alpha^8 \left(\alpha^2-2\right)-\beta^8 \left(\beta^2-2\right)}{2 \left(\alpha^9-\beta^9\right)}$ mathongo		
mathongo mathongo mathongo (: ais root of $x^2-6x-2=0 \Rightarrow \alpha^2-2=6\alpha$)		
(::Also, β is root of $x^2-6x-2=0 \Rightarrow \beta^2-2=0$	$=6\beta$) mathongo ///. mathongo	
$=rac{lpha^8(6lpha)-eta^8(6eta)}{2\left(lpha^9-eta^9 ight)}=rac{6\left(lpha^9-eta^9 ight)}{2\left(lpha^9-eta^9 ight)}=\;3$		