# **ANSWER KEYS**

- **1.** (1) mathons **2.** (2)
- 3. (4) 4. (3) mathonic ///. r
- **5.** (2)
- **6.** (3) mathongo
- 7. (1) 8. (3) matho

- **9.** (4) **10.** (4)
- ///. mathongo ///.
  - $\alpha^{2015} \stackrel{h}{=} = \omega^2$ ,  $\beta^{2015} \stackrel{h}{=} = \omega^2$  /// mathongo /// mathongo /// mathongo /// mathongo ///

- 2. (2)
  - As we know if  $lx^2 + mx + n = 0$  is identity, then l = 0, m = 0, n = 0 mathongo mathons and mathons are suppressed in the superscript of the s

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

- (a-2)(a-1)=0
- mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo a=2 , a=1

- mathongo ///. mathongo

- (a-3)(a-2)=0 mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo ///

- a=3, 2ngo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///.

- $a^2 = 0$  /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo ///
- (a-2)(a+2)=0 mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo ///

- ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo

- $\therefore a=2$
- 3. (4) Let  $\alpha$ ,  $\beta$  and  $\gamma$ ,  $\delta$  are the roots of the equations with mathons with mathon with mathon with mathons with mathon with matho

 $x^2 + ax + b = 0$  and  $x^2 + bx + a = 0$  respectively.

 $\therefore \alpha + \beta = -a, \alpha\beta = b$  and  $\gamma + \delta = -b, \gamma\delta = a$ .

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

 $a^2 - 4b = b^2 - 4a \Rightarrow (a^2 - b^2) + 4(a - b) = 0$ 

- $\Rightarrow a+b+4=0. \ (\because a\neq b)$  mathongo /// mathongo // mathongo /

# **Basic Question Practice Set 1**

#### **Answer Kevs and Solutions**

## **Quadratic Equation** JEE Main Crash Course

4.' (3) athongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///.

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

- $\Rightarrow x^2 + (4-\lambda)x + 3 \lambda \equiv 0$  /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo ///  $\Rightarrow \alpha + \beta = -(4 - \lambda) = \lambda - 4$  and  $\alpha\beta = 3 - \lambda$
- $\alpha^2 + \beta^2 = (\alpha + \beta)^2 2\alpha\beta$  mathongo /// mathongo /// mathongo /// mathongo /// mathongo ///
- $=\left(\lambda-4
  ight)^2-2(3-\lambda)$  $=\lambda^2-6\lambda+10$ 
  - $= (\lambda 3)^2 + 1$
  - For least value  $\lambda = 3$
- 5. (2) Since, 4 is a root of  $x^2 + ax + 12 = 0$  mathongo /// mathong
- $\therefore$  16+4a+12=0  $\Rightarrow$  a=7 /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo ///
  - Let the roots of the equation  $x^2 + ax + b = 0$  be  $\alpha$  and  $\alpha$  mothons we mathons with mothons with mothons and mothons are mothons as  $\alpha$  mothons.
- $-\frac{2\alpha}{m}$  and  $-\frac{a}{m}$  and  $-\frac{a}{m}$  mathong  $-\frac{a}{m}$  mathon  $-\frac{a}{m}$  mathon
- $\Rightarrow \alpha = \frac{7}{2}$  mathongo /// mathongo ///
- And  $\alpha$ .  $\alpha = b$ mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo
- $\Rightarrow \left(\frac{7}{2}\right)^2 = b$ mathongo /// mathongo // mathongo /// mathongo /// mathongo /// mathongo /// mathongo //  $\Rightarrow b = \frac{49}{4}$
- 6. (3) Since the given equation has no real solution. "mathongo "m
- $\Rightarrow 4(1+3m)^2-4 \times (1+m^2)(1+8m) < 0$  thongo /// mathongo /// mathongo /// mathongo /// mathongo ///
- $\Rightarrow$   $(1+9m^2+6m)-(1+8m+m^2+8m^3)<0$
- $\Rightarrow$   $-2m(2m-1)^2 < 0$  athongo /// mathongo /// mathongo /// mathongo /// mathongo /// Clearly, for infinite values of m given condition is true.

### **Basic Question Practice Set 1**

#### **Answer Kevs and Solutions**

## **Quadratic Equation** JEE Main Crash Course

- 7. (1) athongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo
- Given,  $6x^2 11x + \alpha = 0$ Roots of the quadratic equation  $\frac{-(-11)\pm\sqrt{11^2-4(6)(\alpha)}}{2\times6} = \frac{11\pm\sqrt{121-24\alpha}}{12}$
- For the roots to be rational, discriminant must be non-negative and a perfect square.
  - Let  $121 24\alpha = k^2$
  - mat  $121-24lpha \geq 0 \Rightarrow lpha \leq rac{121}{24}$  /// mathongo /// mathongo /// mathongo /// mathongo ///
    - Since, we have to find positive integral values for  $\alpha$ , range of  $\alpha$  is  $0 < \alpha < \frac{121}{24}$
- mot The positive integral values in the above range are 1, 2, 3, 4, 5, ngo /// mothongo /// mothongo /// mothongo ///  $\alpha=1\Rightarrow 121-24\alpha=121-24$  (1)= 97, not a perfect square.
- $lpha=2\Rightarrow 121-24lpha=121-24(2)=73,$  not a perfect square.  $\alpha = 3 \Rightarrow 121 - 24\alpha = 121 - 24(3) = 49$ , is a perfect square.
- $\alpha=4\Rightarrow 121-24\alpha=121-24(4)=25$ , is a perfect square.  $\alpha = 5 \Rightarrow 121 - 24\alpha = 121 - 24(5) = 1$ , 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. Once we mathonical math
- **8.** (3) Given Equation:  $x^2 + |2x 3| 4 = 0$  mathongo mathon
- $x < \frac{3}{2} \Rightarrow x^2 (2x 3) 4 = 0$  mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo ///
  - $\Rightarrow x^2 2x 1 = 0$  mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///.
  - Roots  $\alpha,\beta=\frac{2\pm\sqrt{4+4}}{2}=1\pm\sqrt{2}$  mathongo /// mathongo // mathongo /// mathongo /// mathongo /// mathongo /// mathongo // mathongo /// mathongo // mathon
  - root  $1+\sqrt{2}>\frac{3}{2}$ , hence rejected
- mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo  $\Rightarrow$  root accepted  $1 - \sqrt{2}$
- mathongo /// math
- mathenae ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo ///. mathongo
- Roots  $\gamma,\delta=rac{-2\pm\sqrt{4+4 imes7}}{2}+1\pm2\sqrt{2}$  mathongo /// mathongo /// mathongo /// mathongo /// mathongo ///
- root  $-1-2\sqrt{2}<rac{3}{2}$ , hence rejected  $^{\prime\prime\prime}$  mathongo  $^{\prime\prime\prime}$  mathongo  $^{\prime\prime\prime}$  mathongo  $^{\prime\prime\prime}$  mathongo  $^{\prime\prime\prime}$  mathongo  $^{\prime\prime\prime}$
- $\Rightarrow$  root accepted  $-1+2\sqrt{2}$  ango /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo ///
- Sum of roots =  $\left(1-\sqrt{2}\right)+\left(-1+2\sqrt{2}\right)=\sqrt{2}$  mathong mathong mathong mathong

#### **Basic Question Practice Set 1**

## **Answer Keys and Solutions**

# Quadratic Equation JEE Main Crash Course

9. (4) Let 
$$\alpha$$
,  $\beta$  be roots  $x^2-5x+3=0$ . mathongo /// mathongo /// mathongo /// mathongo /// mathongo ///

Now 
$$\frac{\alpha}{\beta} + \frac{\beta}{\alpha} = \frac{\alpha^2 + \beta^2}{\alpha \beta} = \frac{(\alpha + \beta)^2 - 2\alpha\beta}{\alpha \beta} = \frac{25 - 6}{3} = \frac{19}{3}$$
 mathongo /// mathongo ///

So equation whose roots are 
$$\frac{\alpha}{\beta}$$
 and  $\frac{\beta}{\alpha}$  is othoroo /// mathongo /// mathongo /// mathongo /// mathongo ///

$$x^2-rac{19}{3}x+1=0\Rightarrow 3x^2-19x+3=0.$$
10. (4)  $rac{a_{10}-2a_8}{2a_9}=rac{(lpha^{10}-eta^{10})-2\,(lpha^8-eta^8)}{2\,(lpha^9-eta^9)}$  /// mathongo /// mat

$$= \frac{\alpha^8 (\alpha^2 - 2) - \beta^8 (\beta^2 - 2)}{2 (\alpha^9 - \beta^9)}$$
 mathongo /// ma

(:Also, 
$$\beta$$
 is root of  $x^2-6x-2=0 \Rightarrow \beta^2-2=6\beta$ )

$$=\frac{\alpha^8(6\alpha)-\beta^8(6\beta)}{2\left(\alpha^9-\beta^9\right)}=\frac{6\left(\alpha^9-\beta^9\right)}{2\left(\alpha^9-\beta^9\right)}=3$$
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