Quantitative Aptitude

Quadratic Equations

Level-1

Q1 **Directions : In each of these questions, two equations (I) and (II) are given. You have to solve both the equations and give answer.**

(I) $x^2 - 4x - 5 = 0$

(II) $7y^2 - 25y - 12 = 0$

(A) if x>y

(B) if x≥y

(C) if x<y

(D) if x ≤y

(E) x = y or relationship can't be determined.

Q2 **Directions : In each of these questions, two equations (I) and (II) are given. You have to solve both the equations and give answer.**

(I) $8x^2 - 10x + 3 = 0$

(II) $5y^2 + 14y - 3 = 0$

(A) if x>y

(B) if x≥y

(C) if x<y

(D) if x ≤y

(E) x = y or relationship can't be determined.

Q3 **Directions: In each question two equations numbered *(1)* and *(2)* are given. You should solve both the equations and mark appropriate answer.**

(1) $5x^2 - 16x - 16 = 0$

(2) $y^2 - 5y + 6 = 0$

(A) if x > y

(B) if x ≥ y

(C) if x < y

(D) if x ≤ y

(E) if x = y or the relationship cannot be established

Q4 **Directions: In each question two equations numbered *(1)* and *(2)* are given. You should solve both the equations and mark appropriate answer.**

(1) $2x^2 - 3x - 20 = 0$

(2) $2y^2 - 6y + 4 = 0$

(A) if x > y

(B) if x ≥ y

(C) if x < y

(D) if x ≤ y

(E) if x = y or the relationship cannot be established

Q5 **Directions: In each question two equations numbered *(1)* and *(2)* are given. You should solve both the equations and mark appropriate answer.**

(1) $x^2 - 8x + 12 = 0$

(2) $y^2 - 2y - 3 = 0$

(A) if x > y

(B) if x ≥ y

(C) if x < y

(D) if x ≤ y

(E) if x = y or the relationship cannot be established

Q6 **Directions : Following question contains two equations as I and II. You have to solve both equations and determine the relationship between them and give an answer as,**

I) $2x^2 - 18x + 36 = 0$

II) $y^2 - 12y + 32 = 0$

(A) x > y

(B) x ≥ y

(C) x = y or relationship can't be determined

(D) x < y

(E) x ≤ y

Q7 **Directions : Following question contains two equations as I and II. You have to solve both**

equations and determine the relationship between them and give an answer as,

I) $x^2 + 17x + 52 = 0$

II) $y^2 + 21y + 38 = 0$

(A) x > y

(B) x ≥ y

(C) x = y or relationship can't be determined

(D) x < y

(E) $y \geq x$

Q8 Directions : Following question contains two equations as I and II. You have to solve both equations and determine the relationship between them and give an answer as,

I) $x^2 + 18x + 72 = 0$

II) $y^2 - 21y + 54 = 0$

(A) x > y

(B) x ≥ y

(C) x = y or relationship can't be determined

(D) x < y

(E) y≥x

Q9 Directions : Following question contains two equations as I and II. You have to solve both equations and determine the relationship between them and give an answer as,

I) $5x - 4y = 9$

II) $3x + 5y = 35$

(A) x > y

(B) x ≥ y

(C) x = y or relationship can't be determined

(D) x < y

(E) $y \geq x$

Q10 Directions : Following question contains two equations as I and II. You have to solve both equations and determine the relationship between them and give an answer as,

I) $2x^2 - 6x - 56 = 0$

II) $3y^2 - 12y - 63 = 0$

(A) x > y

(B) x ≥ y

(C) x = y or relationship can't be determined

(D) x < y

(E) y≥x

Q11 Directions : In each of these questions, two equations (I) and (II) are given. You have to solve both the equations and give answer.

(I) $5x^2 + 31x + 48 = 0$

(II) $3y^2 + 27y + 42 = 0$

(A) if x>y

(B) if x≥y

(C) if x<y

(D) if x ≤y

(E) x = y or relationship can't be determined.

Q12 Directions : Following question contains two equations as I and II. You have to solve both equations and determine the relationship between them and give answer as,

I)$x^2 - 27x + 182 = 0$

II)$y^2 - 23y + 132 = 0$

(A) x > y

(B) x ≥ y

(C) x = y or relationship can't be determined.

(D) x < y

(E) x ≤ y

Q13 Directions : Following question contains two equations as I and II. You have to solve both equations and determine the relationship between them and give answer as,

I) $x^2-2x=168$

II) $y^2+28y+195=0$

(A) x < y

(B) x ≥ y

(C) x = y or relationship can't be determined

(D) x > y

(E) x ≤ y

Q14 Directions : Following question contains two equations as I and II. You have to solve both equations and determine the relationship between them and give an answer as,

I)$x^2 + 23x + 120 = 0$

II)$y^2 + 13y + 42 = 0$

(A) x > y

(B) x ≥ y

(C) x = y or relationship can't be determined

(D) x < y

(E) x ≤ y

Q15 **Directions : Following question contains two equations as I and II. You have to solve both equations and determine the relationship between them and give an answer as,**
I) $x^2 - 5x - 104 = 0$
II) $y^2 - 27y + 182 = 0$
(A) x > y
(B) x ≥ y
(C) x = y or relationship can't be determined
(D) x < y
(E) x ≤ y

Q16 **Directions : Following question contains two equations as I and II. You have to solve both equations and determine the relationship between them and give an answer as,**
I) $x^2 - 20x + 99 = 0$
II) $y^2 - 25y + 126 = 0$
(A) x > y
(B) x ≥ y
(C) x = y or relationship can't be determined.
(D) x < y
(E) $y \geq x$

Q17 **Directions : Following question contains two equations as I and II. You have to solve both equations and determine the relationship between them and give an answer as,**
I) 2x + y = 28
II) 3y – x = 14
(A) x > y
(B) x ≥ y
(C) x = y or relationship can't be determined.
(D) x < y
(E) $y \geq x$

Q18 **Directions : In each of these questions, two equations (I) and (II) are given. You have to solve both the equations and give answer.**
(I) $3x^2 + 22x + 24 = 0$
(II) $y^2 + 14y + 40 = 0$
(A) if x>y
(B) if x≥y
(C) if x<y
(D) if x ≤y
(E) x = y or relationship can't be determined.

Q19 **Directions : In each of these questions, two equations (I) and (II) are given. You have to solve both the equations and give answer.**
(I) $x^3 = 512$
(II) $2y^2 - 25y + 78 = 0$
(A) if x>y
(B) if x≥y
(C) if x<y
(D) if x ≤y
(E) x = y or relationship can't be determined.

Q20 **Directions: In each question two equations numbered *(1)* and *(2)* are given. You should solve both the equations and mark appropriate answer.**
(1) $x^2 + 19x + 90 = 0$
(2) $y^2 - 23y + 130 = 0$
(A) if x > y
(B) if x ≥ y
(C) if x < y
(D) if x ≤ y
(E) if x = y or the relationship cannot be established

Q21 **Directions: In each question two equations numbered *(1)* and *(2)* are given. You should solve both the equations and mark appropriate answer.**
(1) $x^2 - 29x + 208 = 0$
(2) $y^2 - 20y + 96 = 0$
(A) if x > y
(B) if x ≥ y
(C) if x < y
(D) if x ≤ y
(E) if x = y or the relationship cannot be established

Level-2

Q1 **Directions: In each question two equations numbered *(1)* and *(2)* are given. You should solve both the equations and mark the appropriate answer.**
(1) $x^2 = 256$
(2) $256y^2 = 4$
(A) if x > y
(B) if x ≥ y
(C) if x < y
(D) if x ≤ y
(E) if x = y or the relationship cannot be established

Q2 **Directions: In each question two equations numbered *(1)* and *(2)* are given. You should solve both the equations and mark appropriate answer.**
(1) $x^2 - 24x + 143 = 0$
(2) $y^2 - 28y + 196 = 0$
(A) if x > y
(B) if x ≥ y
(C) if x < y
(D) if x ≤ y
(E) if x = y or the relationship cannot be established

Directions (3-7) Read the following passage and answer the given questions.
Directions: In the following question two equations are given. You have to solve these equations and determine the relation between x and y.

Q3 I. $x^2 + 5x - 204 = 0$
II. $y^2 + 28y + 187 = 0$
(A) x>y
(B) x<y
(C) $x \leq y$
(D) $x \geq y$
(E) x = y or no relation can be established between x and y.

Q4 I. $3x^2 + 8x - 35 = 0$
II. $3y^2 + 16y + 21 = 0$
(A) x>y
(B) x<y
(C) $x \leq y$
(D) $x \geq y$
(E) x = y or no relation can be established between x and y.

Q5 I. $x^2 - 62x + 960 = 0$
II. $y^2 - 45y + 450 = 0$
(A) x>y
(B) x<y
(C) $x \leq y$
(D) $x \geq y$
(E) x = y or no relation can be established between x and y.

Q6 $I.\ x^3 = \sqrt{625} \times 5$
II. $y^2 - 29y + 120 = 0$
(A) x>y
(B) x<y
(C) $x \leq y$
(D) $x \geq y$
(E) x = y or no relation can be established between x and y.

Q7 $I.\ 3x^2 - 4x - 175 = 0$
$II.\ y^2 - 4y - 285 = 0$
(A) x>y
(B) x<y
(C) $x \leq y$
(D) $x \geq y$
(E) x = y or no relation can be established between x and y.

Q8 If $-\frac{8}{3}$ is a root of the equation $ax^2 - x - 24 = 0$, then find the sum of sum of roots and product of roots.
(A) $-\frac{23}{3}$
(B) $-\frac{13}{3}$
(C) $-\frac{46}{3}$

(D) $\frac{23}{3}$
(E) None of these

Q9 **Directions: In each question two equations numbered *(1)* and *(2)* are given. You should solve both the equations and mark appropriate answer.**
(1) $324x^2 - 9 = 0$
(2) $32y - 8 = 0$
(A) if x > y
(B) if x ≥ y
(C) if x < y
(D) if x ≤ y
(E) if x = y or the relationship cannot be established

Q10 **Directions : Read the following information carefully to answer the questions that follow.**
In the following questions an equation followed by some information is given. You have to choose best suitable option.
$x^2 - Kx - 64 = 0$
a and b are roots of the equation. Value of (a – b) = 20
Find the value of K $(K + 4)^2$ K > 0.
(A) 144 (B) 169
(C) 196 (D) 225
(E) 256

Q11 Solve the following equation I and equation II based on the given information and answer the questions based on it.

1. $px^2 - x = 91$
2. $(p + 5)y^2 - 2py = 3$

Some Information:-

1. P is an even number .
2. Roots of equation I is 7 and -6.5.

If the roots of equation II are multiplied by 7 and added together and the sum of the negative roots of both equations are added, then find the difference between the results.
(A) 13.5 (B) 25.5
(C) 18.75 (D) 16.75
(E) None of these

Q12 Solve the following equation I and equation II based on the given information and answer the questions based on it.

1. $x^2 + z\,x\, + 35 = 0$
2. $y^2 = 18y - 77$

Some Information:-

1. Roots of equation I are -7 and -5.
2. The smaller root of equation II be m and larger root of equation II be n.

Find the value of $m^3 - m^2 - n^3 - n^2 + 10 - z$
(A) 384 (B) 394
(C) -396 (D) -394
(E) -1160

Q13 If $x^2 - (p - 1)x + 600 = 0$ has roots as 'a' and 'b', then find the value of (1/a + 1/b) where p is the 6^{th} term of an AP whose first term is 25 and common difference is 5.
(A) 49/600 (B) 29/300
(C) 24/250 (D) 6/49
(E) 5/34

Q14 Directions: In each of these questions, two equations (I) and (II) are given. You have to solve both the equations and give answers.
I. $2u^4 - 36u^2 + 162 = 0$
II. $3v^4 - 75v^2 + 432 = 0$
(A) u > v
(B) u ≤ v
(C) u ≥ v
(D) u < v
(E) u = v or relationship between u and v can't be established

Q15 x = Larger Positive root of $m^2 - 11m + 24$
y = Positive root of $n^2 + 3n - 10$
Find

1. a=HCF of x and y.
2. b=Product of x and y.
3. c= 3a+4b

(A) a<b<c (B) b>c<a
(C) c<a<b (D) c<a>b
(E) None of these

Q16 Three equations I, II, and III are given below you have to solve all three equations and give the answer.
X = √121 - ∛216
$Y^2 - 14y + 48 = 0$
$z^2 - 20z + 99 = 0$
(A) II> I < III
(B) I < II < III
(C) I > II > III
(D) I > II < III
(E) I > III < II

Q17 Solve the following equation I and equation II based on the given information and answer the questions based on it.

1. $px^2 - x = 91$
2. $(p + 5)y^2 - 2py = 3$

Some Information:-

1. P is an even number .
2. Roots of equation I is 7 and -6.5.

Find, The sum of the positive roots of both the equations are multiplied by the cube root of 8.
(A) 40 (B) 30
(C) 28 (D) 35
(E) None of these

Q18 A quadratic equation in X, has two roots $\frac{P}{2}$ and $(\mathrm{R} - 8)$,
$X^2 - R + P = 0$
Find the value of $(3P + 4R)$.
(A) 88 (B) 68
(C) 94 (D) 84
(E) None of these

Level-3

Directions (1-2) Read the following passage and answer the given questions.

Read the data carefully and answer the following questions.

Below given are two equations I and II.

I: $ax^2 + 15x - a = 0$

II: $y^2 + 9y + k = 0$

- One root of equation I is $\frac{1}{a}(a > 0)$.

- One root is common in both the equations and value of ' k ' is an integer.

Q1 Find the sum of difference between roots of equation I and difference between roots of equation II.

(A) $\frac{11}{2}$ (B) $\frac{23}{4}$

(C) $\frac{19}{4}$ (D) $\frac{21}{4}$

(E) $\frac{13}{2}$

Q2 Find the value of $k^2 + k + 1$.

(A) 421 (B) 419

(C) 441 (D) 484

(E) 396

Q3 Solve the following equation I and equation II based on the given information and answer the questions based on it.

1. $x^2 + z\,x\, + 35 = 0$
2. $y^2 = 18\,y - 77$

Some Information:-

1. Roots of equation I are -7 and -5.

Find the value of (25% of smaller root of equation II + 60% of z).

(A) 8.95 (B) 8.15

(C) 8.36 (D) 8.16

(E) None of these

Q4 **Q1. P = Positive root of x^2-x-30.**

Q = Negative root of P y^2-y-2P.

If,

L = Product of P and Q.

M = Sum of P and Q

Find M-L

(A) 12.33 (B) 12.66

(C) 14.33 (D) 14.66

(E) none of these

Q5 Solve the following equation I and equation II based on the given information and answer the questions based on it.

1. x^2+z x +35=0
2. y^2 – 15y – 700 = 0

Some Information:-

1. Roots of equation I are -7 and -5.
2. The smaller root of equation II be m and larger root of equation II be n

Find the value of 2n-7m+10-z?

(A) 345 (B) 208

(C) 265 (D) 280

(E) 312

Directions (6-7) Read the following passage and answer the given questions.

Equation 1: rx^2 + sx + c = 0

Equation 2: my^2+ ny + c = 0

· c is a single digit prime number greater than 2.

· m and s are 2-digit prime number less than 20.

· m is greater than 11.

· s is greater than m.

· Smallest roots of both the equations are same.

· No root is irrational.

· 3c is greater than s.

· n = s + 1

Q6 Find the value of r.

(A) 10 (B) 11

(C) 12 (D) 13

(E) 14

Q7 Find the value of m × n.

(A) 240 (B) 130
(C) 260 (D) 340
(E) 100

Directions (8-9) Read the following passage and answer the given questions.
Study the following information carefully and answer the questions given beside.
Equation 1: $ax^2 - 41x + c = 0$

Equation 2: $21x^2 + qx - r = 0$

The roots of Equation 1 are reciprocal of the roots of Equation 2.

Q8 If the roots of equation 2 are real and unequal, what is the sum of all the possible integer values of a? (a > 0)

(A) 210 (B) 132
(C) 120 (D) 136
(E) None of these

Q9

If the roots of equation 1 are 3.5 and z, what is the sum of the first 7 terms of an A.P with first term equal to 5 and common difference equal to $\frac{1}{z}$?

(A) 90 (B) 65
(C) 50 (D) 84
(E) 70

Q10 Find which of the following statement/s is/are definitely false related to given equations.
$x^2 + 13x - 198 = 0$
$y^2 - 11y - 102 = 0$
I. Maximum value of x, is $33\frac{1}{3}\%$ of y.
II. Value of x is more than that of y.
III. The difference between both roots of equation II and the sum of both roots in equation I are co-prime numbers.

(A) Only II (B) Only III
(C) I and III (D) I, II and III
(E) None of these.

Q11 Solve the given equations based on the given information below and answer the questions based on them.

1. Equation 1: $px^2 - 31x + 40 = 0$
2. Equation 2 : $qy^2 - 22y - 21 = 0$

Some information:

1. One of the root of equation 1 is k= $\frac{8}{3}$
2. One of the roots of equation 2 is 14/5 times the value of z and $z = \frac{5}{4}$.

Find the value of $(25\%\ of\ p + 33.33\%\ of\ q)$.

(A) $\frac{25}{8}$ (B) $\frac{28}{6}$
(C) $\frac{25}{6}$ (D) $\frac{27}{6}$
(E) None of these

Q12 Study the following information carefully and answer the related questions.
$x^2 - ax + 114 = 0$
$y^2 - by + c = 0$
I. The difference between roots of equation I is 13 and a > 0
II. LCM and HCF of roots of equation II are 84 and 7.
III. Find the value of (ab – c)

(A) 654 (B) 345
(C) 637 (D) 456
(E) 656

Answer Key

Level-1

Q1 (E)
Q2 (A)
Q3 (E)
Q4 (E)
Q5 (E)
Q6 (C)
Q7 (C)
Q8 (D)
Q9 (A)
Q10 (C)
Q11 (E)
Q12 (A)
Q13 (D)
Q14 (D)
Q15 (E)
Q16 (C)
Q17 (A)
Q18 (E)
Q19 (A)
Q20 (C)
Q21 (A)

Level-2

Q1	(E)	Q10	(E)
Q2	(C)	Q11	(A)
Q3	(E)	Q12	(E)
Q4	(E)	Q13	(A)
Q5	(D)	Q14	(E)
Q6	(C)	Q15	(A)
Q7	(E)	Q16	(B)
Q8	(C)	Q17	(E)
Q9	(C)	Q18	(A)

Level-3

Q1	(D)	Q7	(C)
Q2	(A)	Q8	(A)
Q3	(A)	Q9	(E)
Q4	(B)	Q10	(B)
Q5	(B)	Q11	(C)
Q6	(C)	Q12	(C)

Hints & Solutions

Level-1

Q1 Text Solution:

(I) $x^2 - 4x - 5 = 0$

x^2 – 5x + x – 5 = 0

x(x–5) + 1(x–5) = 0

x = 5, –1

(II) $7y^2 - 25y - 12 = 0$

$7y^2$ –28y+3y–12 = 0

7y(y–4) + 3 (y–4) = 0

(y–4) (7y + 3) = 0

y = 4, $\frac{-3}{7}$

relationship can't be determined.

Q2 Text Solution:

(I) $8x^2 - 10x + 3 = 0$

$8x^2 - 6x - 4x + 3 = 0$

2x(4x–3) – 1(4x–3) = 0

(2x–1) (4x–3) = 0

x = $\frac{1}{2}$ or $\frac{3}{4}$

(II) $5y^2 + 14y - 3 = 0$

$5y^2$+15y–y–3 = 0

5y(y+3) – 1(y+3) = 0

(5y–1)(y+3) = 0

y = $\frac{1}{5}$ or –3

Q3 Text Solution:

$5x^2$–16x –16=0 ;

$5x^2$+4x–4(5x)–16=0;

(x–4)(5x + 4)= 0

x = 4 or –0.8

y^2–5y+6=0

y^2–3y–2y+6=0

(y–2)(y–3) = 0

y = 2 or 3

Hence, no relation

Q4 Text Solution:

(1) $2x^2 - 3x - 20 = 0$

x(2x)+5x–4(2x)–20=0

(x–4)(2x + 5)=0

x = 4,– 2.5

(2) $2y^2 - 6y + 4 = 0$

y^2 – 2y – y + 2=0

(y–1)(y–2) = 0

y = 1, 2

the relationship cannot be established.

Q5 Text Solution:

(1) $x^2 - 8x + 12 = 0$

x^2 –6x –2x + 12 =0

(x–2)(x–6) = 0

x = 2,6

(2) $y^2 - 2y - 3 = 0$

y^2–3y+1y–3=0

(y+1)(y–3)

y = –1, 3

the relationship cannot be established

Q6 Text Solution:

$2x^2 - 18x + 36 = 0$

$2x^2 - 12x - 6x + 36 = 0$

2x(x – 6) – 6(x – 6) = 0

(2x – 6)(x – 6) = 0

x = 3, 6

$y^2 - 12y + 32 = 0$

$y^2 - 8y - 4y + 32 = 0$

y(y – 8) – 4(y – 8) = 0

(y – 4)(y – 8) = 0

y = 4, 8

Hence Relationship between x and y cannot be established.

Q7 Text Solution:

$x^2 + 17x + 52 = 0$

$x^2 + 13x + 4x + 52 = 0$

x(x + 13) + 4(x + 13) = 0

(x + 4)(x + 13) = 0

x = –4, –13

$y^2 + 21y + 38 = 0$

$y^2 + 19y + 2y + 38 = 0$

y(y + 19) + 2(y + 19) = 0

(y + 2)(y + 19) = 0

y = –2, –19

Relationship between x and y cannot be established.

Q8 Text Solution:

$x^2 + 18x + 72 = 0$

$x^2 + 12x + 6x + 72 = 0$

$x(x + 12) + 6(x + 12) = 0$

$(x + 6)(x + 12) = 0$

$x = -6, -12$

$y^2 - 21y + 54 = 0$

$y^2 - 18y - 3y + 54 = 0$

$y(y - 18) - 3(y - 18) = 0$

$(y - 3)(y - 18) = 0$

$y = 3, 18$

Hence, x < y

Q9 Text Solution:

$5x - 4y = 9$ –> (1)

$3x + 5y = 35$ –> (2)

By solving the equation (1) $\times 3$ and (2)$\times 5$, we get,

$15x-12y=27$ .....)(3)

$15x+25y=175$.....(4)

equation (3)-(4)

$x = 5, y = 4$

x > y

Q10 Text Solution:

I) $2x^2 - 6x - 56 = 0$

$2x^2 - 14x + 8x - 56 = 0$

$2x(x - 7) + 8(x - 7) = 0$

$(2x + 8)(x - 7) = 0$

$x = -4, 7$

II) $3y^2 - 12y - 63 = 0$

$3y^2 - 21y + 9y - 63 = 0$

$3y(y - 7) + 9(y - 7) = 0$

$(3y + 9)(y - 7) = 0$

$y = -3, 7$

Can't be determined

Q11 Text Solution:

(i) $5x^2 + 31x + 48 = 0$

$5x^2 + 15x + 16x + 48 = 0$

$5x(x+3) + 16(x+3) = 0$

$x = -3, -\frac{16}{5}$

(ii) $3y^2 + 27y + 42 = 0$

$3y^2 + 21y + 6y + 42 = 0$

$3y(y+7) + 6(y+7) = 0$

$(3y + 6)(y+7) = 0$

$Y = \frac{-6}{3}, -7$

So, relationship can't be established

Q12 Text Solution:

$x^2 - 27x + 182 = 0$

$x^2 - 13x - 14x + 182 = 0$

$x(x - 13) - 14(x - 13) = 0$

$(x - 14)(x - 13) = 0$

$x = 14, 13$

$y^2 - 23y + 132 = 0$

$y^2 - 12y - 11y + 132 = 0$

$y(y - 12) - 11(y - 12) = 0$

$(y - 11)(y - 12) = 0$

$y = 11, 12$

Hence x > y

Q13 Text Solution:

I) $x^2-2x-168 = 0$

$x^2-14x+12x-168 = 0$

$(x-14)(x+12) = 0$

$x = 14, -12$

II) $y^2+28y+195=0$

$y^2+13y+15y+195=0$

$(y+13)(y+15) =0$

$y = -13, -15$

$x > y$

Q14 Text Solution:

$x^2 + 23x + 120 = 0$

$x^2 + 8x + 15x + 120 = 0$

$x(x + 8) + 15(x + 8) = 0$

$(x + 15)(x + 8) = 0$

$x = -15, -8$

$y^2 + 13y + 42 = 0$

$y^2 + 7y + 6y + 42 = 0$

$y(y + 7) + 6(y + 7) = 0$

$(y + 6)(y + 7) = 0$

$y = -6, -7$

Hence x < y

Q15 Text Solution:

I) $x^2 - 5x - 104 = 0$

$(x - 13)(x + 8) = 0$

$x = 13, -8$

II) $y^2 - 27y + 182 = 0$

$(y - 14)(y - 13) = 0$

$y = 14, 13$

x ≤ y

Q16 Text Solution:

I) $x^2 - 20x + 99 = 0$

$(x - 11)(x - 9) = 0$

$x = 11, 9$

II) $y^2 - 25y + 126 = 0$

$(y - 18)(y - 7) = 0$

$y = 18, 7$

Can't be determined

Q17 Text Solution:

$2x + y = 28 \quad (1)$

$3y - x = 14 \quad (2)$

$(1) + (2) \times 2$

$7y = 56$

$y = 8$

$2x + 8 = 28$

$2x = 20$

$x = 10$

Hence, x > y

Q18 Text Solution:

(I) $3x^2 + 22x + 24 = 0$

$3x^2 + 18x + 4x + 24 = 0$

$3x(x+6) + 4(x+6) = 0$

$x = -6, \frac{-4}{3}$

(II) $y^2 + 14y + 40 = 0$

$y^2 + 10y + 4y + 40 = 0$

$y(y+10) + 4(y+10) = 0$

$y = -10, -4$

relationship can't be determined.

Q19 Text Solution:

(I) $x^3 = 512$

$x = (512)^{1/3}$

$x = 8$

(II) $2y^2 - 25y + 78 = 0$

$2y^2 - 12y - 13y + 78 = 0$

$2y(y-6) - 13(y-6) = 0$

$y = \frac{13}{2}, 6$

Q20 Text Solution:

$x^2 + 19x + 90 = 0$; $y^2 - 23y + 130 = 0$

$x^2 + 10x + 9x + 90 = 0$; $y^2 - 10y - 13y + 130 = 0$

$(x+9)(x+10) = 0$; $(y-10)(y-13) = 0$

$x = -9, -10$; $y = 10, 13$

Hence y>x

Q21 Text Solution:

(1) $x^2 - 29x + 208 = 0$

(2) $y^2 - 20y + 96 = 0$

$\Rightarrow x^2 - 16x - 13x + 208 = 0$; $y^2 - 12y - 8y + 96 = 0$

$\Rightarrow (x-13)(x-16) = 0$: $(y-8)(y-12) = 0$

$\Rightarrow x = 13, 16$; $y = 8, 12$

$\Rightarrow x > y$

Level-2

Q1 Text Solution:

$x^2 = 256$; $256y^2 - 4 = 0$

x = +16 or -16 ; $y^2 = \frac{4}{256}$

x = +16 or -16 ; $y = +\frac{2}{16}\ or\ -\frac{2}{16}$

Hence, relationship cannot be established

Q2 Text Solution:

(1) $x^2 - 24x + 143 = 0$

(2) $y^2 - 28y + 196 = 0$

=> $x^2-13x-11x+143=0$: $y^2-14y-14y+196=0$

=> (x-11)(x-13) = 0 : (y-14)(y-14) =0

=> x = 11, 13 ; y = 14

=> y > x

Q3. Text Solution:

I.

$x^2 + 5x - 204 = 0$

$x^2 + 17x-12x - 204 = 0$

x (x+17)-12(x+17)=0

(x+17) (x-12)=0

x =-17, x =12

II.

$y^2 + 28y + 187 = 0$

$y^2 +17y+11y + 187 = 0$

y (y+17)+11(y+17)=0

(y+17)(y+11)=0

Y= -17, -11

x = y or no relation can be established between x and y.

Q4. Text Solution:

I.

$3x^2 + 8x - 35 = 0$

$3x^2 + 15x-7x - 35 = 0$

3x(x + 5) - 7(x + 5) = 0

(x + 5) (3x - 7) = 0

x = -5, 7/3

II.

$3y^2 + 16y + 21 = 0$

$3y^2 + 9y +7y + 21 = 0$

3y(y + 3) + 7(y + 3) = 0

(3y + 7) (y + 3) = 0

y =-7/3, -3

No relation can be established between x and y.

Q5. Text Solution:

I.

$x^2 - 62x + 960 = 0$

$x^2 - 32x - 30x + 960 = 0$

x(x-32)-30(x -32)=0

(x-30)(x-32)=0

x=30, 32

II.

$y^2 - 45y + 450 = 0$

$y^2 - 30y-15y + 450 = 0$

y(y-30)-15(y-30)=0

(y-30)(y-15)=0

Y=30, 15

so $x \geq y$

Q6. Text Solution:

$I.\ x^3 = \sqrt{625} \times 5$

$x^3 = 25 \times 5$

$x = 5$

II.

$y^2 - 29y + 120 = 0$

$y^2 - 24y - 5y + 120 = 0$

$y(y - 24) - 5(y - 24) = 0$

$(y - 24)(y - 5) = 0$

$y = 24\ or\ y = 5$

So, $x \leq y$

Q7. Text Solution:

$I.$

$3x^2 - 4x - 175 = 0$

$3x^2 - 25x + 21x - 175 = 0$

$x(3x - 25) + 7(3x - 25) = 0$

$(x + 7)(3x - 25) = 0$

$(x + 7) = 0,\ (3x - 25) = 0$

$x = -7\ or\ x = \frac{25}{3}$

$II.$

$y^2 - 4y - 285 = 0$

$y^2 + 15y - 19y - 285 = 0$

$y(y + 15) - 19(y + 15) = 0$

$(y + 15) = 0\ or\ (y - 19) = 0$

$y = -15\ or\ y = 19$

x = y or no relation can be established between x and y.

Q8 Text Solution:

$-\frac{23}{3}$

$ax^2 - x - 24 = 0$ has one root (x = $\frac{8}{3}$)

$\therefore x = -8/3$ will satisfy the equation.

$\Rightarrow a\left(-\frac{8}{3}\right)^2 - \left(-\frac{8}{3}\right) - 24 = 0$

$\Rightarrow a\left(-\frac{8}{3}\right)^2 + \frac{8}{3} - 24 = 0$

$\Rightarrow \frac{64a}{9} + \frac{8}{3} - 24 = 0$

$\Rightarrow 64a + 24 - 216 = 0$

$\Rightarrow 64a = 192$

$\Rightarrow a = 3$

$\therefore$ ~Sum of roots~ $= \frac{-(-1)}{3} = \frac{1}{3}$

Product of roots~ $= -\frac{24}{3} = -8$

$\Rightarrow$ ~required answer $= \frac{1}{3} - 8$

$= -\frac{23}{3}$

Q9 Text Solution:

$324x^2 - 9 = 0$; $32y - 8 = 0$

$x^2 = \frac{9}{324}$; $y = \frac{8}{32}$

$x = \frac{3}{18} = \frac{1}{6}$; $y = \frac{8}{32} = \frac{1}{4}$

Hence, y > x

Q10 Text Solution:

$ab = -64$

K = sum of roots, so

$a - b = 20$

$(a - b)^2 = 400$

$a^2 + b^2 - 2ab = 400$

$(a + b)^2 - 4ab = 400$

$(a + b)^2 = 400 + 4(-64)$

$(a + b)^2 = 144$

a+b = +12 or -12

Here, k > o

So,

$K = 12$

$(k + 4)^2 = (12 + 4)^2 = 256$

Q11 Text Solution:

As the roots of the equation are 7 and -6.5, putting any of these values in equation 1, we will get the desired value of P.

So,

$p(7)^2 - 7 = 91$

$=> 49p = 98$

$=> p = 2$

Equation I :-

$2x^2 - x - 91 = 0$

$=> x = 7, -6.5$

Equation II :-

$7y^2 - 4y - 3 = 0$

$=> 7y^2 - 7y + 3y - 3 = 0$

$=> 7y(y - 1) + 3(y - 1) = 0$

$=> y = 1, -\frac{3}{7}$

When roots of y are multiplied by 7;

value of $y = 7, -3$

Required difference

$= [7 + (-3)] - [-3 + (-6.5)] = 4 - (-9.5) = 13.5$

Q12 Text Solution:

$x^2 + z\,x + 35 = 0$

As roots of the equation are given, hence to find the value of z we can put any value of root, to get the desired output of z.

$=> (-7)^2 + z(-7) + 35 = 0$

$=> 49 - 7z + 35 = 0$

$=> 84 = 7z$

$=> z = 12$

Therefore; equation 1 is $x^2 + 12x + 35 = 0$

Given

$y^2 = 18\,y - 77$

$=> y^2 - 18y + 77 = 0$

$=> y^2 - 11y - 7y + 77 = 0$

$=> y(y - 11) - 7(y - 11)$

$\Rightarrow y = 7, 11$

Roots of equation (II) are; m= 7 and n =11

Therefore; required answer= $7^3 - 7^2 - 11^3 - 11^2 + 10 - 12$ = -1160

Q13 Text Solution:

Ans. $\frac{49}{600}$

$p = 6^{\text{th}}$- term of an AP whore first term is 25 and common difference is 5.

$\therefore p = 25 + (6 - 1) \times 5$

$= 25 + 25 = 50$

$x^2 - 49x + 600 = 0$

$\therefore \frac{1}{a} + \frac{1}{b} = \frac{a+b}{ab}$

$\Rightarrow a + b = 49$

$ab = 600$

$\therefore \frac{1}{a} + \frac{1}{b} = \frac{49}{600}$

Q14 Text Solution:

According to the given equations :

I. $2u^4 - 36u^2 + 162 = 0$

$u^4 - 18u^2 + 81 = 0$

$u^4 - 9u^2 - 9u^2 + 81 = 0$

$u^2 (u^2 - 9) - 9(u^2 - 9) = 0$

$(u^2 - 9)(u^2 - 9) = 0$

$u^2 = 9$; $u = \pm 3$

II. $3v^4 - 75v^2 + 432 = 0$

$v^4 - 25v^2 + 144 = 0$

$v^4 - 16v^2 - 9v^2 + 144 = 0$

$v^2 (v^2 - 16) - 9 (v^2 - 16) = 0$

$(v^2 - 9)(v^2 - 16) = 0$

$v^2 = 9$; $v^2 = 16$

$v = \pm 3$, $v = \pm 4$

After comparison of both equations, the conclusion is, u = v or no relation is obtained

Q15 Text Solution:

For x;

$m^2 - 11m + 24 = 0$

$m^2 - 8m - 3m + 24 = 0$

$(m - 8)(m - 3) = 0$

$m = 3, 8$

Therefore, m = 8

So, x =8

For y;

$n^2 + 2n - (x + 2)$

$n^2 + 5n - 2n - 10 = 0$

$(n + 5)(n - 2)$

$n = -5, 2$

So, y = 2

1. a=HCF of 8 and 2 = 2.
2. b=Product $= 8 \times 2 = 16$
3. c= $3(2) + 4(16) = 70$

Therefore, a<b<c

Q16 Text Solution:

Given that,

x = √121 – $\sqrt[3]{216}$

⇒ √121 = +11

⇒ $\sqrt[3]{216}$ = 6

x = 11 – 6 = 5

II.

Y^2 – 14y + 48 = 0

⇒ Y = 8 and y = 6

III.

Z^2 – 20z + 99 = 0

⇒ Z = 11 and Z = 9

Required answer is

I < II < III

Q17 Text Solution:

As the roots of the equation are 7 and -6.5, putting any of these values in equation 1, we will get the desired value of P.

So,

$p(7)^2 - 7 = 91$

$49p = 98$

$p = 2$

Equation I :-

$2x^2 - x - 91 = 0$

$x = 7, -6.5$

Equation II :-

$7y^2 - 4y - 3 = 0$

$\Rightarrow 7y^2 - 7y + 3y - 3 = 0$

$\Rightarrow 7y(y - 1) + 3(y - 1) = 0$

$\Rightarrow y = 1, -\frac{3}{7}$

Required answer $= (7 + 1) \times \sqrt[3]{8} = 8 \times 2 = 16$

Q18 Text Solution:

Sum of roots $= \frac{P}{2} + R - 8 = R$
Value of $P = 16$
Product of roots $= P = 16$
so, $\frac{16}{2} \times (R - 8) = 16$
Value of $R = 10$
Required value $= (3 \times 16 + 4 \times 10) = 88$
Hence answer is option A

Level-3

Q1. Text Solution:

Since one root of equation I is $\frac{1}{a}$.

$a \times \left(\frac{1}{a}\right)^2 + 15 \times \left(\frac{1}{a}\right) - a = 0$

$\left(\frac{1}{a}\right) + \left(\frac{15}{a}\right) - a = 0$

$16 - a^2 = 0$

$a = 4, \ -4$

Equation I: $4x^2 + 15x - 4 = 0$

$4x^2 + 16x - x - 4 = 0$

$4x(x + 4) - 1(x + 4) = 0$

$(x + 4)(4x - 1) = 0$

$x = -4 \text{ and } \frac{1}{4}$

Case 1: When ' -4 ' is the common root in both the equations.

$(-4)^2 + 9 \times (-4) + k = 0$

$16 - 36 + k = 0$

$k = 20$

Case 2: When '$\frac{1}{4}$' is the common root in both the equations.

$\left(\frac{1}{4}\right)^2 + 9 \times \left(\frac{1}{4}\right) + k = 0$

$\left(\frac{1}{16}\right) + \left(\frac{36}{16}\right) + \left(\frac{16k}{16}\right) = 0$

$1 + 36 + 16k = 0$

$k = -\frac{37}{16}$

Invalid case.

Equation II: $y^2 + 9y + k = 0$

$y^2 + 9y + 20 = 0$

$y^2 + 5y + 4y + 20 = 0$

$y(y + 5) + 4(y + 5) = 0$

$(y + 5)(y + 4) = 0$

$y = -4$ and -5

Difference between roots of equation I $= \left(\frac{1}{4}\right) - (-4) = \frac{17}{4}$

Difference between roots of equation II =(-4) - (-5)=1

Required sum = $\left(\frac{17}{4}\right) + 1 = \frac{21}{4}$

Q2. Text Solution:

Since one root of equation I is $\frac{1}{a}$.

$a \times \left(\frac{1}{a}\right)^2 + 15 \times \frac{1}{a} - a = 0$

$\left(\frac{1}{a}\right) + \left(\frac{15}{a}\right) - a = 0$

$16 - a^2 = 0$

$a = 4, \ -4$

Equation I: $4x^2 + 15x - 4 = 0$

$4x^2 + 16x - x - 4 = 0$

$4x(x + 4) - 1(x + 4) = 0$

$(x + 4)(4x - 1) = 0$

$x = -4 \text{ and } \frac{1}{4}$

Case 1: When ' -4 ' is the common root in both the equations.

$(-4)^2 + 9 \times (-4) + k = 0$

$16 - 36 + k = 0$

$k = 20$

Case 2: When ' $\frac{1}{4}$ ' is the common root in both the equations.

$\left(\frac{1}{4}\right)^2 + 9 \times \left(\frac{1}{4}\right) + k = 0$

$\left(\frac{1}{16}\right) + \left(\frac{36}{16}\right) + \left(\frac{16k}{16}\right) = 0$

$1 + 36 + 16k = 0$

$k = -\frac{37}{16}$

Invalid case.

Equation II: $y^2 + 9y + k = 0$

$y^2 + 9y + 20 = 0$

$y^2 + 5y + 4y + 20 = 0$

$y(y + 5) + 4(y + 5) = 0$

$(y + 5)(y + 4) = 0$

$y = -4 \text{ and } -5$

$\text{Value of } k = 20$

$\text{Now, } k^2 + k + 1$

$= 20^2 + 20 + 1$

$= 400 + 20 + 1$

$= 421$

Q3 Text Solution:

$x^2 + z\,x\, + 35 = 0$

As roots of the equation are given, hence to find the value of z we can put any value of root, to get the desired output of Z.

$=> (-7)^2 + z(-7) + 35 = 0$

$=> 49 - 7z + 35 = 0$
$=> 84 = 7z$
$=> z = 12$
Therefore; equation 1 is $x^2 + 12x + 35 = 0$
Given
$y^2 = 18\ y - 77$
$=> y^2 - 18y + 77 = 0$
$=> y^2 - 11y - 7y + 77 = 0$
$=> y(y - 11) - 7(y - 11)$
$=> y = 7, 11$
Therefore;
25% of smaller root of equation II + 60% of z
$= 25\%(7) + 60\%(12) = 8.95$

Q4 Text Solution:
x^2-x-30
=>x^2-6x+5x-30=0
=>(x-6)(x+5)=0
=>x=6,-5
Hence, P= 6
So;
6y^2-y-12=0
=6y^2-9y+8y-12=0
=3y(2y-3)+4(2y-3)=0
=(2y-3)(3y+4)=0
=y=3/2,-4/3
Q=-4/3
Therefore,
L =6(-4/3)=-8
M=(6)+(-4/3)=14/3
Hence required difference,M-L =(14/3)+8
=(38/3)
=12.66

Q5 Text Solution:
x^2+z x +35=0
As roots of the equation are given, hence to find the value of z we can put any value of root, to get the desired output of Z.
=>-7^2+z(-7)+35=0
=>49-7z+35=0
=>84=7z
=>z=12
Therefore; equation 1 is x^2+12x+35=0
Given
y^2 – 15y – 700 = 0
y^2 – 35y + 20y – 700 = 0

y = 35 and – 20
Roots of equation (II) are; n= 35 and m =-20

Therefore; required answer=2n-7m+10-12=70+140+10-12
=208

Q6. Text Solution:
Equation 1: rx^2 + sx + c = 0
Equation 2: my^2 + ny + c = 0
c is a single digit prime number greater than 2.
So, possible value of c = {3, 5, and 7}
m and s are 2-digit prime number less than 20.
m is greater than 11.
So, possible value of m = {13, 17, and 19}
And s is greater than m.
So, possible value of s = {17 and 19}
3c > s and m = s + 1
So, value of c = 7
Now tabulating the possible values of c, m, s, and n

c	m	s (s > r & 3c > s)	m (q = s + 1)
7	13	17	18
7	13	19	20
7	17	19	20

No root is irrational.
That means D > 0 and a perfect square, then the roots of the quadratic equation are real, unequal, and rational.
Equation 2: my^2 + ny + c = 0
Putting values of c = 7, m = 13, and n = 18
So, n^2q^2- 4mc
$=> 18^2 - 4 \times 13 \times 7$
= 324 - 364
= -40 (which is not a perfect square and less than zero)
Putting values of c = 7, p = 13, and q = 20
So, n^2 - 4pc
$=20^2 - 4 \times 13 \times 7$

= 36 (which is perfect square and greater than zero)

Putting values of c = 7, m = 17, and n = 20

So, n^2 - 4mc

= $20^2 - 4 \times 17 \times 7$

= -76 (which is not a perfect square and less than zero)

Hence, possible values of c = 7, m = 13, and n = 20 and s = 19

Therefore, equation 2: my^2 + ny + c = 0

=> 13y^2 + 20y + 7 = 0

=> (13y + 7)(y + 1) = 0

=> y = $-\frac{7}{13}$ and -1

Smallest roots of both the equations are same.

So, putting value of x = -1 in equation 1.

Equation 1: rx^2 + sx + c = 0

=> r - 19 + 7 = 0

=> r = 12

Hence, 12x^2 + 19x + 7 = 0

=> (12x + 7)(x + 1) = 0

=> x = $-\frac{7}{12}$ and -1

Hence, value of r = 12

Q7. Text Solution:

Equation 1: rx^2 + sx + c = 0

Equation 2: my^2 + ny + c = 0

c is a single digit prime number greater than 2.

So, possible value of c = {3, 5, and 7}

m and s are 2-digit prime number less than 20.

m is greater than 11.

So, possible value of m = {13, 17, and 19}

And b is greater than m.

So, possible value of s = {17 and 19}

3c > s and n = s + 1

So, value of c = 7

Now tabulating the possible values of c, m, s, and n

c	m	s (s > m & 3c > s)	n (n = s + 1)
7	13	17	18
7	13	19	20
7	17	19	20

No root is irrational.

That means D > 0 and a perfect square, then the roots of the quadratic equation are real, unequal, and rational.

Equation 2: my^2 + ny + c = 0

Putting values of c = 7, m = 13, and n = 18

So, n^2 - 4mc

=> $18^2 - 4 \times 13 \times 7$

= 324 - 364

= -40 (which is not a perfect square and less than zero)

Putting values of c = 7, m = 13, and n = 20

So, n^2 - 4mc

= $20^2 - 4 \times 13 \times 7$

= 36 (which is perfect square and greater than zero)

Putting values of c = 7, m = 17, and n = 20

So, n^2 - 4mc

= $20^2 - 4 \times 17 \times 7$

= -76 (which is not a perfect square and less than zero)

Hence, possible values of c = 7, m = 13, and n= 20 and s= 19

Therefore, equation 2: my^2 + ny + c = 0

=> 13y^2 + 20y + 7 = 0

=> (13y + 7)(y + 1) = 0

=> y = $-\frac{7}{13}$ and -1

Smallest roots of both the equations are same.

So, putting value of x = -1 in equation 1.

Equation 1: rx^2 + sx + c = 0

=> r - 19 + 7 = 0

=> r = 12

Hence, 12x^2 + 19x + 7 = 0

=> (12x + 7)(x + 1) = 0

=> x = $\frac{-7}{12}$ and -1

So, value of $m \times n$ = 13 ×20 = 260

Q8. Text Solution:

From the common explanation, we have

For roots to be real and unequal

D = $b^2 - 4ac > 0$

$(-41)^2 - 4(21)(a) > 0$

$a < \frac{41 \times 41}{84}$

$a < 20.01$

$0 < a \leq 20$

Possible integer values of a = 1, 2, 3 ....., 20

Sum of all the possible integer values of a

$= \frac{20(20+1)}{2} = 210$

Hence, Option A is correct.

Common explanation :

$ax^2 - 41x + c = 0$

The equation with roots as reciprocal of this equation

$= a\left(\frac{1}{x}\right)^2 - \frac{41}{x} + c = 0$

$= cx^2 - 41x + a = 0$

Now, $cx^2 - 41x + a = 21x^2 + qx - r$

So, c = 21, q = – 41 and r = – a

So,

Equation 1: $ax^2 - 41x + 21 = 0$

Equation 2: $21x^2 - 41x + a = 0$

Let the roots of Equation 1 be m and n and that of Equation 2 be $\frac{1}{m}$ and $\frac{1}{n}$

$m+n = \frac{41}{a}$ and $m \times n = \frac{21}{a}$

Q9. Text Solution:

From the common explanation, we have

For equation 1: roots = m and n

$m+n = \frac{41}{a}$ and $m \times n = \frac{21}{a}$

$\frac{m+n}{m \times n} = \frac{41}{21}$

$\frac{1}{m} + \frac{1}{n} = \frac{41}{21}$

$\frac{1}{3.5} + \frac{1}{z} = \frac{41}{21}$

$\frac{1}{z} = \frac{5}{3}$

Sum of first n terms of an A.P.

$= \frac{n}{2}\left(2a + (n-1)d\right)$

Sum of first 7 terms

$= \frac{7}{2}\left(2 \times 5 + (7-1) \times \frac{5}{3}\right) = 70$

Hence, Option D is correct.

Common explanation :

$= a\left(\frac{1}{x}\right)^2 - \frac{41}{x} + c = 0$

$= cx^2 - 41x + a = 0$

Now, $cx^2 - 41x + a = 21x^2 + qx - r$

So, c = 21, q = – 41 and r = – a

So,

Equation 1: $ax^2 - 41x + 21 = 0$

Equation 2: $21x^2 - 41x + a = 0$

Let the roots of Equation 1 be m and n and that of Equation 2 be $\frac{1}{m}$ and $\frac{1}{n}$

$m+n = \frac{41}{a}$ and $m \times n = \frac{21}{a}$

Q10 Text Solution:

$x^2 + 13x - 198 = 0$

$x^2 + 22x - 9x - 198 = 0$

x = – 22 and x = 9

$y^2 - 11y - 102 = 0$

$y^2 - 17y + 6y - 102 = 0$

y = 17 and y = – 6

I. Maximum value of x, is $33\frac{1}{3}\%$ of y.

9 is not $\frac{1}{3}$rd of 17.

This statement is false.

II. Value of x is more than that of y.

x = – 22 and x = 9

y = 17 and y = – 6

This statement is false.

III. The difference between both roots of equation II and the sum of both roots in equation I are co-prime numbers.

Two numbers are co-prime numbers when the factors are 1 and the number itself.

The difference between both roots of equation II = 17 – (– 6) = 23

The sum of both roots in equation I = – 22 + 9 = – 13

Factors of – 13 = 1 × -13

Factors of 23 = 1 × 23

∴ - 13 and 23 are co-prime numbers.

Statement III is true.

Q11 Text Solution:

$px^2 - 31x + 40 = 0$

Since, one of the roots is $(\frac{8}{3})$.

So; $p(\frac{8}{3})^2 - 31(\frac{8}{3}) + 40 = 0$

$\frac{64}{9}p - \frac{248}{3} + 40 = 0$

$\frac{64}{9}p = \frac{128}{3}$

$p = 6$

For equation 2;

One of the roots is $\frac{14}{5}$ times the value of z.

Let the root be a.

Thus, $a = \frac{14}{5}(\frac{5}{4}) = \frac{7}{2}$

Therefore;

$qy^2 - 22y - 21 = 0$

$q(\frac{7}{2})^2 - 22(\frac{7}{2}) - 21 = 0$

$\frac{49}{4}q - 77 - 21 = 0$

$\frac{49}{4}q - 77 - 21 = 0$

$q = 8$

Therefore;

$25\%\ of\ p + 33.33\%\ of\ q = 25\%\ of\ 6 + \frac{1}{3}(8)$

$= \frac{3}{2} + \frac{8}{3} = \frac{25}{6}$

Q12 Text Solution:

Solution

Given that, the difference between the roots of equation I is 14 and a > 0

Factors 114 = 2 × 3 × 19

Roots can be 19 and 6

Value of a is = 19 + 6 = 25

LCM and HCF of roots of equation II are 84 and 7.

Now,

7α × 7β = 84 × 7

⇒ α β = 12

⇒ 12 = 4 × 3 or 12 × 1 or 6 × 2

Case 1: 12 = 4 × 3 = 7α × 7β = 28 × 21

Case 2: 12 = 12 × 1 = 7α × 7β = 84 × 7

Case 3: 12 = 6 × 2 = 7α × 7β = 42 × 14

Given that, No roots of equation II is 7 therefore case 3 is not possible.

Only case I is possible. Case 2 is not possible because roots are not co-prime.

According to case 1,

Value of c is the product of roots 28 and 21 = 588

Value of b is the sum of roots = 49

a = 25

Now,

Value of (ab – c) = (25 × 49) – 588 = 637