



Date : 26th Nov 2023

Special Question – Quantitative Aptitude

English

Directions 1 – 2 : Answer the questions based on the given information below.

Equation(i): $ax^2 - bx - d/3 = 0$

Equation(ii): $py^2 - qy + c = 0$

The value of a is $(p + 1)$, and the value of p is that number which has only two factors i.e. 2 and 3. The value of q is the third most prime number between 30 and 40 while the value of b is two times eleven. The value of d is 195 and the value of c is 45.

Q:1 The sum of the roots of equation 2 is how much greater than the sum of the roots of equation 1.

1. 3.00
2. 3.03
3. 2.01
4. 3.02
5. 4.03

Q:2 Find the sum of all roots of both the equations.

1. $337/42$
2. $391/42$
3. $319/17$
4. $193/24$
5. $489/47$

Q:3 Answer the questions based on the information given below.

Sarah deposited a certain amount of money in a bank account that offers a simple interest rate of 6% per annum. After 2 years, she withdrew half of the amount and reinvested it in another account with a simple interest rate of 8% per annum. After 3 years from the initial deposit, the total interest earned from both accounts was Rs.480. Find the amount Sarah initially deposited.

Equation (i): $P \times a \times x + (P/2) \times b \times y = 480$

Here, a and b are the rates of interest for x and y years respectively

Find the initial amount deposited by Sarah in the bank.

1. Rs.2000
2. Rs.2500
3. Rs.3000
4. Rs.1000
5. Rs.5000

Directions 4 – 5 : Answer the questions based on the given information below.

Equation(i): $ax^2 - bx - c = 0$

Equation(ii): $py^2 - qy + d = 0$

The value of c is the square of the smallest two-digit number while the value of d is the square of the largest one-digit number. The value of a = p i.e. the third most single-digit prime number. The value of b = $(a + 2)$ and, the value of q = $(b + 1)^2$

Q:4 Find the ratio between the positive roots of the equation.

1. 27 : 9 : 25
2. 10 : 9 : 7
3. 20 : 7 : 25
4. 22 : 7 : 27
5. 20 : 9 : 27

Q:5 Find the number by which the sum of natural roots is divisible.

1. 11
2. 9
3. 6
4. 5
5. 7



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Answer Key

1. (4) 2. (2) 3. (1) 4. (5) 5. (3)

Answers and Solutions

Q:1 The correct answer is **Option 4** i.e. **3.02**.

Let us try to find out the values of the variables in the equations using the given information

The value of p is that number which has only two factors i.e. 2 and 3 = 6

The value of a is $(p - 1) = 6 - 1 = 5$

$a = 5$

The value of q is the third most prime number between 30 and 40

Prime numbers between 30 and 40 = 31, 33, 37, 39

So, $q = 37$

The value of b is two times eleven = $2 \times 11 = 22$

The value of d is 195

the value of c is twenty less than the value of the coefficient of Equation 1

So, the equations are

Equation(i): $576y^2 - 37y + c = 0$

Now,

Equation(i): $7x^2 - 22x - 65 = 0$

Equation(ii): $6y^2 - 37y + 45 = 0$

Let's solve the equation one by one

Equation(i): $7x^2 - 22x - 65 = 0$

$7x^2 - 35x + 13x - 65 = 0$

$7x(x - 5) + 13(x - 5) = 0$

$(7x + 13)(x - 5) = 0$

$x = -13/7, 5$

Equation(ii): $6y^2 - 37y + 45 = 0$

$6y^2 - 27y - 10y + 45 = 0$

$3y(2y - 9) - 5(2y - 9) = 0$

$(3y - 5)(2y - 9) = 0$

$y = 5/3, 9/2$

Now according to the question

The sum of the roots of equation 1 = $-13/7 + 5 = (-13 + 35)/7 = 22/7 = 3.14$

The sum of the roots of equation 2 = $5/3 + 9/2 = (10 + 27)/6 = 37/6 = 6.16$

Required difference = $6.16 - 3.14 = 3.02$

Q:2 The correct answer is **Option 2** i.e. **391/42**.

Let us try to find out the values of the variables in

the equations using the given information

The value of p is that number which has only two factors i.e. 2 and 3 = 6

The value of a is $(p - 1) = 6 - 1 = 5$

$a = 5$

The value of q is the third most prime number between 30 and 40

Prime numbers between 30 and 40 = 31, 33, 37, 39

So, $q = 37$

The value of b is two times eleven = $2 \times 11 = 22$

The value of d is 195

the value of c is twenty less than the value of the coefficient of Equation 1

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Equation(i): $7x^2 - 22x - 65 = 0$

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$7x(x - 5) + 13(x - 5) = 0$

$(7x + 13)(x - 5) = 0$

$x = -13/7, 5$

Equation(ii): $6y^2 - 37y + 45 = 0$

$6y^2 - 27y - 10y + 45 = 0$

$3y(2y - 9) - 5(2y - 9) = 0$

$(3y - 5)(2y - 9) = 0$

$y = 5/3, 9/2$

Now according to the question

The sum of roots = $5/3 + 9/2 + 5 + (-13/7)$

$(70 + 189 + 210 - 78)/42 = 391/42$

Q:3 The correct answer is **Option 1** i.e. **Rs.2000**.

Given:

Simple interest rate for the first account: 6% per annum

Simple interest rate for the second account: 8% per annum

Time for the first account: 2 years

Time for the second account: 3 years

Total interest earned: Rs.480

The formula for simple interest is $S.I. = P \times R \times T$

where P = principle, R = rate and T = time

The total interest earned is the sum of the interest from the first and second accounts:

Solving the equation

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$P \times a \times x + (P/2) \times b \times y = 480$
 $P \times 0.06 \times 2 + (P/2) \times 0.08 \times 3 = 480$
 $0.12P + 0.12P = 480$
 $0.24P = 480$
 $P = \text{Rs.}2000$
 Hence, Sarah deposits Rs.2000

Q:4 The correct answer is **Option 5** i.e. **20 : 9 : 27**.

Let us try to find out the values of the variables in the equations using the given information

The value of $c = (10)^2 = 100$ and the value of $d = (9)^2 = 81$

The value of $a = p = 3$

The value of $b = (a + 2) = (3 + 2) = 5$

$b = 5$

The value of $q = (b + 1)^2 = (5 + 1)^2$

$q = 36$

So, the equations are

Equation(i): $3x^2 - 5x - 100 = 0$

Equation(ii): $3y^2 - 36y + 81 = 0$

Let's solve the equation one by one

Equation(i): $3x^2 - 5x - 100 = 0$

$3x^2 + 15x - 20x - 100 = 0$

$3x(x + 5) - 20(x + 5) = 0$

$(3x - 20)(x + 5) = 0$

$x = 20/3, -5$

Equation(ii): $3y^2 - 36y + 81 = 0$

$3y^2 - 27y - 9y + 81 = 0$

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

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

$y = 3, 9$

Now according to the question

Ratio between the positive roots = $20/3 : 3 : 9 = 20$

: 9 : 27

Q:5 The correct answer is **Option 3** i.e. **6**.

Let us try to find out the values of the variables in the equations using the given information

The value of $c = (10)^2 = 100$ and the value of $d = (9)^2 = 81$

The value of $a = p = 3$

The value of $b = (a + 2) = (3 + 2) = 5$

$b = 5$

The value of $q = (b + 1)^2 = (5 + 1)^2$

$q = 36$

So, the equations are

Equation(i): $3x^2 - 5x - 100 = 0$

Equation(ii): $3y^2 - 36y + 81 = 0$

Let's solve the equation one by one

Equation(i): $3x^2 - 5x - 100 = 0$

$3x^2 + 15x - 20x - 100 = 0$

$3x(x + 5) - 20(x + 5) = 0$

$(3x - 20)(x + 5) = 0$

$x = 20/3, -5$

Equation(ii): $3y^2 - 36y + 81 = 0$

$3y^2 - 27y - 9y + 81 = 0$

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

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

$y = 3, 9$

Now according to the question

The sum of natural roots = $3 + 9 = 12$

Hence, it is divisible by 3, 4, 2 and 6