



Date : 4th Dec 2023

Special Question – Quantitative Aptitude

English

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

Jerry has a fruit basket containing apples and oranges. The ratio of the number of apples to the number of oranges is 3 : 5. If he adds 12 more apples to the basket, the new ratio becomes 5 : 7.

Equation(i): $2x^2 - 13x + c = 0$

Equation(ii): $y^2 - 10y + d = 0$

The value of c is the initial number of Oranges and the value of d is the final number of apples

Q:1 Find the difference between the sum of the roots of equation(i) and equation(ii).

- 1/2
- 9/2
- 3/2
- 5/2
- 7/2

Q:2 Find twice the sum of all the roots.

- 35
- 33
- 37
- 31
- 36

Directions 3 – 4 : Answer the questions based on the given information below.

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

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

The value of c is 12.5. The value of a is twice the value of p. The value of b is 2.5 more than the value of c and the value of q is 2.5 less than the value of c. The value of p is the only even prime number.

Q:3 Find the ratio of the roots of equation(ii).

- 3 : 2
- 2 : 3
- 2 : 1
- 1 : 1
- 1 : 2

Q:4 Find whose value is greater, the value of x or the value of y.

- $x \geq y$
- $x < y$
- $x = y$
- $x > y$
- $y \geq x$

Q:5 In the question, two columns are given. You are required to solve the equations given in the "equations" column and match them with the correct statement given about the desired equation in the "conditions" column.

Equations	Conditions
(a) $x^2 - 24x + 135 = 0$	(e) Product of both roots and lies between -40 and -50
(b) $y^2 - 4y - 45 = 0$	(f) Differences of both roots will be negative
(c) $5z^2 + 26z - 24 = 0$	(g) One of the roots is negative
(d) $6p^2 + 27p + 12 = 0$	(h) Sum of both roots will be positive

Which of the following option is correct match of "equations" column and "conditions" column?

- (a) - (e), (b) - (g), (c) - (f), (d) - (f)
- (a) - (f), (b) - (g), (c) - (g), (d) - (f)
- (a) - (h), (b) - (f) and (h), (c) - (f), (d) - (h)
- (a) - (h), (b) - (c) and (g), (c) - (e), (d) - (f)
- $y \geq x$



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Answer Key

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

Answers and Solutions

Q:1 The correct answer is **Option 5** i.e. **7/2**.

The ratio of the number of apples to the number of oranges is 3 : 5

If he adds 12 more apples to the basket, the new ratio becomes 5 : 7

$$(3x + 12) / (5x + 12) = 5/7$$

$$7(3x + 12) = 5(5x + 12)$$

$$21x + 72 = 25x + 60$$

$$4x = 12$$

$$x = 3$$

$$\text{Initial number of Oranges} = 5x = 15$$

$$\text{The final number of apples} = 3x + 12 = 9 + 12 = 21$$

$$\text{Equation(i): } 2x^2 - 13x - 15 = 0$$

$$\text{Equation(ii): } y^2 - 10y + 21 = 0$$

On solving the Equation(i)

$$2x^2 - 13x + 15 = 0$$

$$2x^2 - 10x - 3x + 15 = 0$$

$$2x(x - 5) - 3(x - 5)$$

$$(2x - 3)(x - 5)$$

$$x = 3/2, 5$$

On solving the Equation(ii)

$$y^2 - 10y + 21 = 0$$

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

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

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

$$y = 3, 7$$

Now, according to the question

$$\text{Sum of the roots of equation(i)} = 3/2 + 5 = (3 + 10)/2 = 13/2$$

$$\text{Sum of the roots of equation(ii)} = 3 + 7 = 10$$

$$\text{Required difference} = 10 - 13/2 = (20 - 13)/2 = 7/2$$

Q:2 The correct answer is **Option 2** i.e. **33**.

The ratio of the number of apples to the number of oranges is 3 : 5

If he adds 12 more apples to the basket, the new ratio becomes 5 : 7

$$(3x + 12) / (5x + 12) = 5/7$$

$$7(3x + 12) = 5(5x + 12)$$

$$21x + 72 = 25x + 60$$

$$4x = 12$$

$$x = 3$$

$$\text{Initial number of Oranges} = 5x = 15$$

$$\text{The final number of apples} = 3x + 12 = 9 + 12 = 21$$

$$\text{Equation(i): } 2x^2 - 13x - 15 = 0$$

$$\text{Equation(ii): } y^2 - 10y + 21 = 0$$

On solving the Equation(i)

$$2x^2 - 13x + 15 = 0$$

$$2x^2 - 10x - 3x + 15 = 0$$

$$2x(x - 5) - 3(x - 5)$$

$$(2x - 3)(x - 5)$$

$$x = 3/2, 5$$

On solving the Equation(ii)

$$y^2 - 10y + 21 = 0$$

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

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

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

$$y = 3, 7$$

Now, according to the question

$$\text{Sum of all the roots} = 3/2 + 5 + 3 + 7 = 3/2 + 15 = (3 + 30)/2 = 33/2$$

$$\text{Twice of sum of the roots} = 2 \times 33/2 = 33$$

Q:3 The correct answer is **Option 4** i.e. **1 : 1**.

Let's find out the value of the coefficients

The value of c = 12.5

$$\text{The value of b is 2.5 more than the value of c} = 12.5 + 2.5 = 15$$

$$\text{The value of q is 2.5 less than the value of c} = 12.5 - 2.5 = 10$$

$$\text{The value of p is the only even prime number} = p = 2$$

The value of a is twice the value of p

$$a = 2p = 4$$

So, the new equation formed are

$$\text{Equation(i): } 4x^2 - 15x - 12.5 = 0$$

$$\text{Equation(ii): } 2y^2 - 10y - 12.5 = 0$$

Solving equation(i)

$$4x^2 - 15x - 12.5 = 0$$

$$4x^2 - 5x - 10x + 12.5 = 0$$

$$2x(x - 2.5) - 5(x - 2.5) = 0$$

$$(2x - 5)(x - 2.5) = 0$$

$$x = 5/2, 2.5$$

Solving equation(ii)

$$2y^2 - 10y - 12.5 = 0$$

$$2y^2 - 5y - 5y - 12.5 = 0$$

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$$2y(y - 2.5) - 5(y - 2.5) = 0$$

$$(2y - 5)(y - 2.5) = 0$$

$$y = 5/2, 2.5$$

Now, according to the question

$$\text{Ratio} = 5/2 : 2.5 = 5 : 5 = 1 : 1$$

Q:4 The correct answer is **Option 3** i.e. **x = y**.

Let's find out the value of the coefficients

The value of c = 12.5

The value of b is 2.5 more than the value of c =

$$12.5 + 2.5 = 15$$

The value of q is 2.5 less than the value of c = 12.5

$$- 2.5 = 10$$

The value of p is the only even prime number = p = 2

The value of a is twice the value of p

$$a = 2p = 4$$

So, the new equation formed are

$$\text{Equation (i): } 4x^2 - 15x - 12.5 = 0$$

$$\text{Equation (ii): } 2y^2 - 10y - 12.5 = 0$$

Solving equation (i)

$$4x^2 - 15x - 12.5 = 0$$

$$4x^2 - 5x - 10x + 12.5 = 0$$

$$2x(x - 2.5) - 5(x - 2.5) = 0$$

$$(2x - 5)(x - 2.5) = 0$$

$$x = 5/2, 2.5$$

Solving equation (ii)

$$2y^2 - 10y - 12.5 = 0$$

$$2y^2 - 5y - 5y - 12.5 = 0$$

$$2y(y - 2.5) - 5(y - 2.5) = 0$$

$$(2y - 5)(y - 2.5) = 0$$

$$y = 5/2, 2.5$$

Now, according to the question

$$x = 5/2, 2.5 \text{ and } y = 5/2, 2.5$$

The value of x = The value of y

Q:5 The correct answer is **option 5**. i.e: **(a) - (h), (b) - (e) and (g), (c) - (g) and (f), (d) - (f)**

From a,

$$x^2 - 24x + 135 = 0$$

$$x^2 - 9x - 15x + 135 = 0$$

$$x \times (x - 9) - 15 \times (x - 9) = 0$$

$$(x - 9) \times (x - 15) = 0$$

$$x = 9, 15$$

the sum of both the roots will be positive (a)

satisfies (h)

From b,

$$y^2 - 4y - 45 = 0$$

$$y^2 - 9y + 5y - 45 = 0$$

$$y \times (y - 9) + 5 \times (y - 9) = 0$$

$$(y - 9) \times (y + 5) = 0$$

$$y = 9, -5$$

b satisfies both conditions (e) and (g)

From III:

$$5z^2 + 26z - 24 = 0$$

$$5z^2 + 30z - 4z - 24 = 0$$

$$5z \times (z + 6) - 4 \times (z + 6) = 0$$

$$(z + 6) \times (5z - 4) = 0$$

$$z = -6, 4/5$$

c satisfies conditions (g) and (f)

From IV:

$$6p^2 + 24p + 3p + 12 = 0$$

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

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

$$p = -4, -1/2$$

Differences of both roots will be negative (d)

satisfies (f)