Pair of Linear Equations in Two Variables

Assertion & Reason Type Questions

In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option:

a. Both Assertion (A) and Reason (R) are true and
Reason (R) is the correct explanation of Assertion (A)
b. Both Assertion (A) and Reason (R) are true but
Reason (R) is not the correct explanation of
Assertion (A)
c. Assertion (A) is true but Reason (R) is false
d. Assertion (A) is false but Reason (R) is true

Q 1. Assertion (A): x = 2, y = 1 is a solution of pair of equations 3x - 2y = 4 and 2x + y = 5.
Reason (R): A pair of values (x, y) satisfying each one of the equations in a given system of two simultaneous linear equations in x and y is called a solution of the system of equations.

Answer : (a) **Assertion (A):** The given system of equations is
3x-2y=4 ...(1)
and 2x+y=5 ...(2)
Putting x = 2 and y = 1 in eq. (1), we get
LHS=3x2-2x1=4=RHS
Putting x = 2 and y = 1 in eq. (2), we get
LHS = 2x2+11=5= RHS
Thus, x=2 and y = 1 satisfy both the equations of the given system.
Hence, x = 2, y = 1 is a solution of the given pair of equations.
So, Assertion (A) is true.
Reason (R): It is also true.
Hence, both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Q 2. Assertion (A): The system of equations x+2y-5=0 and 2x-6y+9=0 has infinitely many solutions.
Reason (R): The system of equations $a_1x+b_1y+c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ has infinitely

many solutions

when $\frac{a_1}{a_2}=\frac{b_1}{b_2}=\frac{c_1}{c_2}$.

Answer : (d) **Assertion (A):** The given system of equations is x+2y-5-0 and 2x-6y+9=0

Here, $\frac{a_1}{a_2}=\frac{1}{2}, \frac{b_1}{b_2}=\frac{2}{-6}=\frac{-1}{3}, \frac{c_1}{c_2}=\frac{-5}{9}$

Since, $\frac{a_1}{a_2}\neq\frac{b_1}{b_2}$

:- The given system of equations has a unique solution.

So, Assertion (A) is false.

Reason (R): It is true to say that the system of equations $a_1x + b_1y + G_1 = 0$ and $a_2x + b_2y + C_2 = 0$ has

infinitely many solutions, when $\frac{a_1}{a_2}=\frac{b_1}{b_2}=\frac{c_1}{c_2}$.

Hence, Assertion (A) is false but Reason (R) is true.

Q 3. Assertion (A): Graphically, the pair of linear equations 2x-y-5-0 and x-y-3 = 0 represent intersecting lines.

Reason (R): The linear equations 2x-y-5=0 and x-y-3=0 meet the Y-axis at (0, 3) and (0,-5).

Answer : (c) **Assertion (A):** The given system of linear equations are

2x-y-5=0 ...(1)

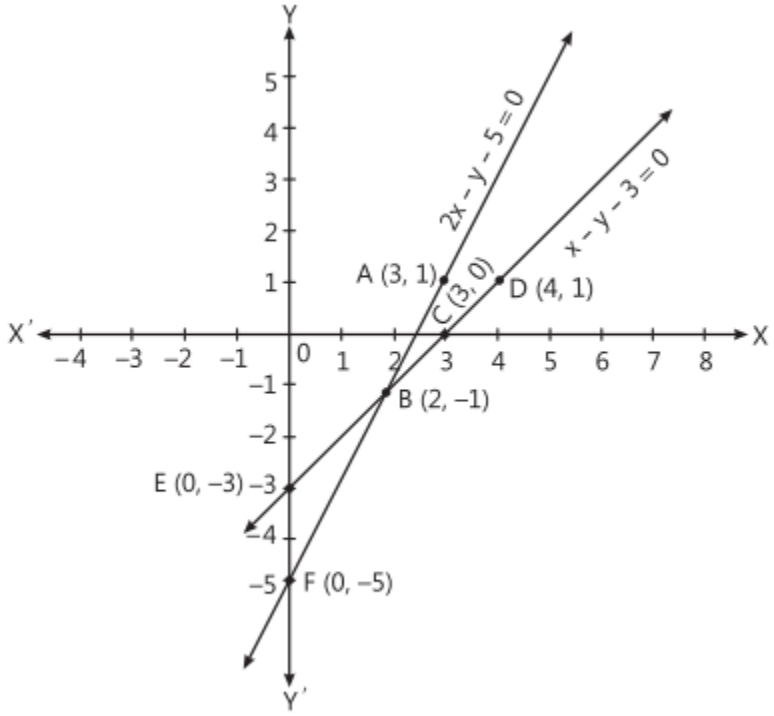
and x-y-3=0 ...(2)

Table for eqs. (1) and (2) are given below:

x	3	2
y	1	–1

x	3	4
y	0	1

The graphical representation of the given pair of linear equations is as follows:



In the graph, we observe that the two lines intersect at the point B(2, -1).
So, x=2, y = -1 is the required solution of the given pair of linear equations.
So, Assertion (A) is true.
Reason (R): We observe from the graph that the lines (1) and (2) meet the Y-axis at the points E(0,-3) and F(0,-5) respectively.
So, Reason (R) is false.
Hence, Assertion (A) is true but Reason (R) is false.

Q 4. Assertion (A): The system of linear equations 3x+5y-4=0 and 15x+25y-25=0 is inconsistent.
Reason (R): The pair of linear equations $a_1x+b_1y+c_1=0$ and $a_2x+b_2y+c_2=0$ is inconsistent if

$$\frac{a_1}{a_2}=\frac{b_1}{b_2}\neq\frac{c_1}{c_2}$$

Answer : (a) **Assertion (A):** Given system of linear equations
are
3x+5y-4=0 .....(1)
and 15x+25y-25=0 .....(2)
On comparing with $a_1x+b_1y+c_1=0$ and $a_2x+b_2y+c_2=0$ respectively, we get
$a_1=3$, $b_1=5$, $c_1=-4$

$a_2=15$, $b_2=25$, $c_2 = -25$

Now, $\frac{a_1}{a_2}=\frac{3}{15}=\frac{1}{5}, \frac{b_1}{b_2}=\frac{5}{25}=\frac{1}{5}$ and $\frac{c_1}{c_2}=\frac{-4}{-25}=\frac{4}{25}$

Here, $\frac{a_1}{a_2}=\frac{b_1}{b_2}\neq\frac{c_1}{c_2}$

We know that, the pair of linear equations

$a_1x+b_1y+c_1=0$ and $a_2x + b_2y + c_2 = 0$ is

inconsistent, if $\frac{a_1}{a_2}=\frac{b_1}{b_2}\neq\frac{c_1}{c_2}$

So, the given system of linear equations are inconsistent.

Thus, Assertion (A) is true.

Reason (R): It is also true statement.

Hence both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Q 5. Assertion (A): If the system of equations $2x + 3y = 7$ and $2ax + (a + b)y = 28$ has infinitely many solutions, then $2a - b = 0$.

Reason (R): The system of equations $3x - 5y = 9$ and $6x-10y= 8$ has a unique solution.

Answer : (c) **Assertion (A):** Given system of equations has infinitely many solutions. If

$$\frac{2}{2a}=\frac{3}{a+b}=\frac{-7}{-28}$$

i.e., $$\frac{1}{a}=\frac{3}{a+b}=\frac{1}{4}$$

$\therefore$ $$3a=a+b \Rightarrow 2a-b=0$$

So, Assertion (A) is true.

Reason (R): For unique solution, condition is

$$\frac{a_1}{a_2}\neq\frac{b_1}{b_2}$$

But here $$\frac{3}{6}=\frac{-5}{-10} \Rightarrow \frac{1}{2}=\frac{1}{2}$$

So, Reason (R) is false.

Hence, Assertion (A) is true but Reason (R) is false.

Q 6. Assertion (A): If the system of equations
$2x + 3y = 7$ and $2ax + (a + b)y = 28$ has infinitely
many solutions, then $2a - b = 0$.

Reason (R): The system of equations $3x - 5y = 9$ and $6x-10y=8$ has a unique solution.

Answer : (c) **Assertion (A):** Given system of equations has infinitely many solutions. If

$$\frac{2}{2a} = \frac{3}{a+b} = \frac{-7}{-28}$$

i.e., $$\frac{1}{a} = \frac{3}{a+b} = \frac{1}{4}$$

$$\therefore \quad 3a = a + b \Rightarrow 2a - b = 0$$

So, Assertion (A) is true.

Reason (R): For unique solution, condition is

$$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$$

But here $$\frac{3}{6} = \frac{-5}{-10} \Rightarrow \frac{1}{2} = \frac{1}{2}$$

So, Reason (R) is false.

Hence, Assertion (A) is true but Reason (R) is false.

Q.7. Assertion (A) : The graph of the linear equations $3x+2y=12$ and $5x-2y=4$ gives a pair of intersecting lines.

Reason (R) : The graph of linear equations $a_1x+b_1y+c_1=0$ and $a_2x+b_2y+c_2=0$ gives a pair of intersecting lines if $a_1/a_2 \neq b_1/b_2$

Answer : (a)

Q.8. Assertion (A) : If the pair of lines are coincident, then we say that pair of lines is consistent and it has a unique solution.

Reason (R) : If the pair of lines are parallel, then the pairs has no solution and is called inconsistent pair of equations.

Answer : (d)

Q.9. Assertion (A) : The linear equations x-2y-3=0 and 3x+4y-20=0 have exactly one solution

Reason (R) : The linear equation 2x+3y-9=0 and 4x+6y-18=0 have a unique solution.

Answer : (c)

Q.10. Assertion (A) : The graphical representation of the equations x+2y=3 and 2x+4y+7=0 gives a pair of coincident lines.

Reason (R) : The graph of linear equations a1x+b1y+c1=0 and a2x+b2y+c2=0 gives a pair of intersecting lines if a1/a2 ≠ b1/b2

Answer : (d)

Q.11. Assertion (A) : The value of k for which the system of equations 3x+ky=0 and 2x-y=0 has a unique solution is k ≠ -3/2

Reason (R) : The graph of linear equations $a_1x+b_1y+c_1=0$ and $a_2x+b_2y+c_2=0$ gives a pair of intersecting lines if $a_1/a_2 \neq b_1/b_2$

Answer : (a)

Q.12. Assertion (A) : The number of common solutions for the system of linear equations 5x+4y+6=0 and 10x+8y=12 is zero.

Reason (R) : The graph of linear equations $a_1x+b_1y+c_1=0$ and $a_2x+b_2y+c_2=0$ gives a pair of intersecting lines if $a_1/a_2 \neq b_1/b_2$

Answer : (b)

Q.13. Assertion (A) : The value of k for which the system of linear equations 3x-4y=7 and 6x-8y=k have infinite number of solution is 14.

Reason (R) : The graph of linear equations $a_1x+b_1y+c_1=0$ and $a_2x+b_2y+c_2=0$ gives a pair of intersecting lines if $a_1/a_2 \neq b_1/b_2$

Answer : (c)

Q.14. Assertion (A) : A pair of linear equations has no solution (s) if it is represented by intersecting lines graphically.

Reason (R) : If the pair of lines are intersecting, then the pair has unique solution and is called consistent pair of equations.

Answer : (d)

Q.15. Assertion (A) : The value of $q=\pm 2$, if $x=3$, $y=1$ is the solution of the line $2x+y-q^2-3=0$.

Reason (R) : The solution of the line will satisfy the equation of the line.

Answer : (a)

Q.16. Assertion (A) : The value of k for which the system of linear equations $kx-y=2$ and $6x-2y=3$ has a unique solution is 3.

Reason (R) : The graph of linear equations $a_1x+b_1y+c_1=0$ and $a_2x+b_2y+c_2=0$ gives a pair of intersecting lines if $a_1/a_2 \neq b_1/b_2$

Answer : (d)