Linear Equations

Review Exercise Answers
Level-1

Single Choice Correct Only

S1. (C). Thrice the age of Alpha will be equal to $3x$. Twice the age of Beta will be equal to $2y$. Since their sum is equal to 30, we will have

$$3x+2y=30$$

S2. The correct option is (C). Each of the other three equations is satisfied by just one of the two pairs.

S3. The correct option is (D). Each of the other three equations is satisfied by just one of the two pairs.

S4. (B). Consider a simple example:

$$x+y=1$$

Here, $(0,1)$ is a solution of the above equation. If we multiply or divide the above equation by 2, we get:

$$2x+2y=2$$

$$\frac{x}{2}+\frac{y}{2}=\frac{1}{2}$$

We can check that $(0,1)$ is also a solution of these modified equations. Hence, we conclude that on multiplying or dividing both sides of a linear equation with a non-zero number, any solution of the original linear equation will still be a solution of the modified linear equation.

S5. (B). All the given three points satisfy the equation

$$x+y=0$$

S6. (C). We have:

$$\frac{3x+4y}{x+2y}=\frac{9}{4}$$

$$\Rightarrow\ 4(3x+4y)=9(x+2y)$$

$$\Rightarrow\ 12x+16y=9x+18y$$

$$\Rightarrow\ 12x-9x=18y-16y$$

$$\Rightarrow\ 3x=2y$$

Now,

$$\frac{3x+8y}{3x-y}=\frac{2y+5y}{2y-y}$$

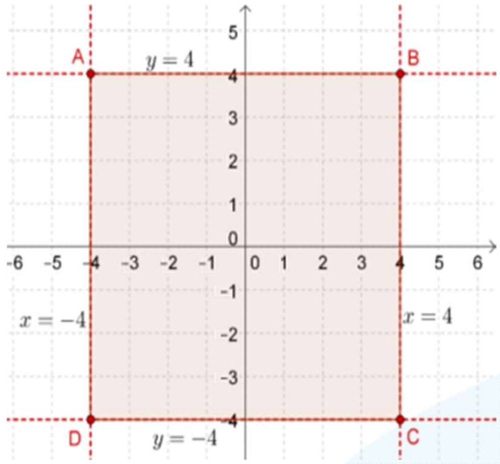
$$=\frac{7y}{y}$$

$$=7:1$$

S7. (B). A linear equation of the form $ax+by+c=0$ has infinitely many solutions. Any point of the form $\left(k,\frac{3}{2}\right)$ is a solution of the given linear equation, where k is a real number.

S8. (A). From the graph, it is clear that the line passes through the point $\left(\frac{3}{2}, \frac{3}{2}\right)$

S9. (D). The graphs of the given lines are shown below:



ABCD is the required square and the length of each side is equal to AB = 8 units. Thus, the area of the square ABCD is

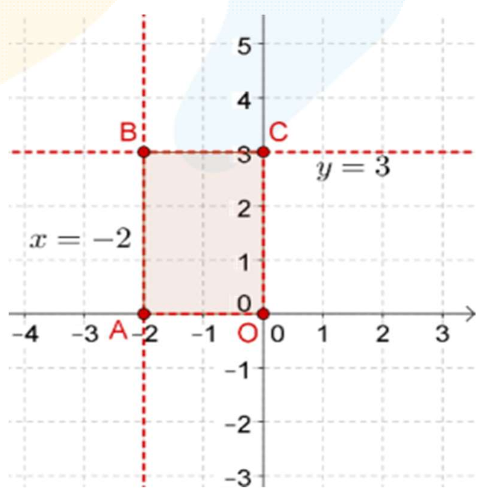
$$(\text{side})^2 = (8)^2$$
$$= 64 \text{ sq. units}$$

S10. (C). The equation of a line parallel to the *x* axis is of the form $y = k$ (where *k* is a real number). In option (C), we have:

$$y + 2 = 3y - 5$$
$$\Rightarrow \quad 3y - y = 2 + 5$$
$$\Rightarrow \quad 2y = 7$$
$$\Rightarrow \quad y = \frac{7}{2}$$

This represents a straight line parallel to the *x* axis.

S11. (E). The lines are plotted on the graph below.



The required region bounded by the given lines is a rectangle OABC whose area is given by

$$OA \times OC$$
$$= 2 \times 3 = 6 \text{ sq. units}$$

S12. (C). Since both the points $(-1,-1)$ and $(1,3)$ satisfy the equation $y=2x+1$, we conclude that (C) is the correct option.

S13. (C). We know that every point on the y axis has an x coordinate of 0. Substituting $x=0$ in the given equation, we get $y=3$. Thus, $(0,3)$ is the required point. We can also check this graphically.

S14. (D). We have:

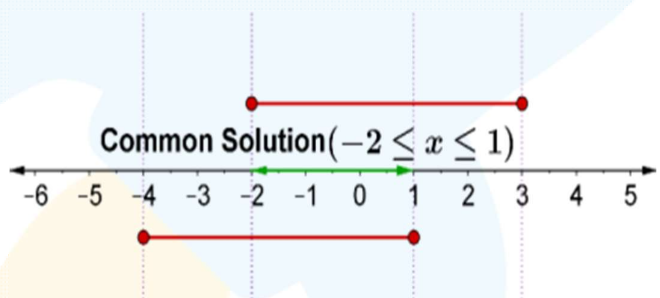
$$2x-8<4$$
$$\Rightarrow\ 2x<12$$
$$\Rightarrow\ x<6$$
$$\Rightarrow\ x=\{1,2,3,4,5\}$$

S15. (E). We have:

$$3(x-2)<1$$
$$\Rightarrow\ 3x-6<1$$
$$\Rightarrow\ 3x<7$$
$$\Rightarrow\ x<2\cdot 3$$
$$\Rightarrow\ x=\{1,2\}$$

S16. (E).

S17. (C). The number line representations of both the inequalities are shown below:



From the above number line we can observe that the integers common to both the solution set are

$$\{-2,\ -1,0,1\}$$

S18. (B). We have:

$$4(x-6)<2x+12$$
$$\Rightarrow\ 4x-24<2x+12$$
$$\Rightarrow\ 2x<36$$
$$\Rightarrow\ x<18$$

Therefore, x can be equal to 17.

S19. (C). It is given that

$$86^o < F < 95^o$$

$$\Rightarrow \quad 86^o < \frac{9}{5}C + 32^o < 95^o$$

$$\Rightarrow \quad 86^o - 32^o < \frac{9}{5}C < 95^o - 32^o$$

$$\Rightarrow \quad 54^o < \frac{9}{5}C < 63^o$$

$$\Rightarrow \quad \frac{5}{9}(54^o) < C < \frac{5}{9}(63^o)$$

$$\Rightarrow \quad 30^o < C < 35^o$$

S20. (B). It is given that CA = 12 years. Thus, we have:

$$IQ = \frac{MA}{CA} \times 100$$

$$\Rightarrow \quad IQ = \frac{MA}{12} \times 100$$

$$\Rightarrow \quad IQ = \frac{25}{3} MA$$

Now,

$$80 \le IQ \le 140$$

$$\Rightarrow \quad 80 \le \frac{25}{3} MA \le 140$$

$$\Rightarrow \quad 240 \le 25MA \le 420$$

$$\Rightarrow \quad \frac{240}{25} \le MA \le \frac{420}{25}$$

$$\Rightarrow \quad 9 \cdot 6 \le MA \le 16 \cdot 8$$

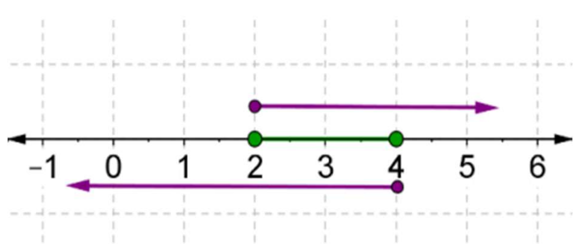
S21. (D). We have:

$$3x - 6 \ge 0 \Rightarrow 3x \ge 6 \Rightarrow x \ge 2$$

Therefore, the solution set of the first inequation is $[2, \infty)$. And,

$$4x - 10 \le 6 \Rightarrow 4x \le 16 \Rightarrow x \le 4$$

Therefore, the solution set of the second inequation is $(-\infty, 4]$. The solution sets of inequations (i) and (ii) are represented on the real line below.



Clearly, the common part of these solution sets is the set $[2, 4]$. Hence, the solution set of the given system of linear inequations is the interval $[2, 4]$.

One or more options may be correct

S22. (A), (B) and (E). In both (C) and (D), the power of the variable x is 2. Note that the powers of any constants are irrelevant to the degree of the equation.

S23. The correct options are (B), (C) and (D). In these equations, the power of every variable is unity, whereas in (A) and (E), we have non-unity powers for the variables.

S24. (A), (D) and (E). Let us consider each option one-by-one:

Option (A)

$$\left(1+x^2+2x\right)-x^2=1$$

$$\Rightarrow \quad 1+2x=1$$

This is obviously a linear equation.

Option (B)

$$\left(x^2+y^2+2xy\right)-x^2-y^2=3$$

$$\Rightarrow \quad 2xy=3$$

This is a non-linear equation as we have a term containing the product of x and y (even though the power of each is unity).

Option (C)

$$\left(1+x^3+3x+3x^2\right)-x^3=7$$

$$\Rightarrow \quad 1+3x+3x^2=7$$

This is a quadratic equation.

Option (D)

$$\frac{\left(1+\pi^2-\sqrt{2}\right)x^2}{x}=\frac{1}{\sqrt{2}}$$

$$\Rightarrow \quad \left(1+\pi^2-\sqrt{2}\right)x=\frac{1}{\sqrt{2}}$$

This is a linear equation.

Option (E)

If you expand the first term, you can tell by observation that the quadratic terms will cancel out, leaving you with a linear equation.

S25. (A), (B), (C) and (D). The first three equations are obviously linear (the powers of the constants are irrelevant). For option (D), we have

$$\frac{(x+y)(x-y)}{x-y}=3$$

$$\Rightarrow \quad x+y=3$$

Therefore, this is linear as well. For option (E),

$$\frac{(x-z)\left(x^2-xz+z^2\right)}{x-z}=3$$

$$\Rightarrow \quad x^2-xz+z^2=3$$

This is therefore non-linear.

S26. (A), (D) and (E). In each of these equations, the power of every variable is unity (the powers of the constants are irrelevant to the degree of the equation). The equation in option (B) is non-linear since we have a term containing the product of the variables x and y. The equation in option (C) is quadratic.

S27. (B) and (C). Clearly, in options (B) and (C), the powers of the variable are not unity, and therefore, the equations in options (B) and (C) are not linear.

S28. (B) and (D). Substitute and check:

Option (B)

$$(-1)+2(1)=1$$

Option (D)

$$(-3)+2(2)=1$$

S29. (A), (C) and (D). Substitute and check:

Option (A)

$$x=4 \Rightarrow y=\frac{4(4)-2}{7}=2$$

Option (C)

$$x=\pi \Rightarrow y=\frac{4(\pi)-2}{7}$$

Option (D)

$$x=0 \Rightarrow y=-\frac{2}{7}$$

S30. (C), (D) and (E). Once again, we substitute and check:

Option (A)

$$(0)+2(1)-3\left(\frac{2}{3}\right)=2-2=0\neq 4$$

This is not a valid solution.

Option (B)

$$(1)+2(-1)-3(1)=1-2-3=-4\neq 4$$

This is not a valid solution.

Option (C)

$$\left(-\frac{1}{3}\right)+2\left(-\frac{1}{3}\right)-3\left(-\frac{5}{3}\right)$$

$$=-\frac{1}{3}-\frac{2}{3}+5=-1+5=4$$

We see that this is a valid solution.

Option (D)

$$(4)+2(-2)-3\left(-\frac{4}{3}\right)$$

$$=4-4+4=4$$

This is again a valid solution.

Option (E)

$$\left(2\sqrt{2}\right)+2\left(-\sqrt{2}\right)-\left(-\frac{4}{3}\right)$$

$$=2\sqrt{2}-2\sqrt{2}+4=4$$

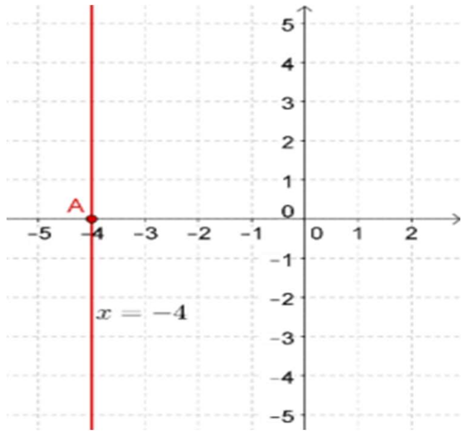
We see that this is also a valid solution.

S31. (A), (B), (C) and (D). We have:

$$2x+1=x-3$$

$$\Rightarrow \quad x=-4$$

The graph of the equation $x = -4$ is shown below:



The graph is on the left side of the y axis. Also, if we consider the original equation as an equation in one variable only, then $x = -4$ will be a solution to this equation.

S32. (A) and (B). Clearly the points

$$\left(\frac{9}{2}, 0\right) \text{and} \left(\frac{9}{2}, n\right)$$

satisfies the given linear equation and thus the required solutions.

Integer Answers

S33. The linear equation corresponding to this situation will be

$$3x - 2y = 7$$

Note that x and y can take only integer values from 1 to 6. Let us try different values for y, and see which values give rise to valid integer values for x:

$$y = 1 \quad \Rightarrow \quad x = 3$$

$$y = 2 \quad \Rightarrow \quad x = \frac{11}{3}$$

$$y = 3 \quad \Rightarrow \quad x = \frac{13}{3}$$

$$y = 4 \quad \Rightarrow \quad x = 5$$

$$y = 5 \quad \Rightarrow \quad x = \frac{17}{13}$$

$$y = 6 \quad \Rightarrow \quad x = \frac{19}{3}$$

Thus, we see that there can be two integer values for y, namely: 1 and 4. The required sum is

$$1 + 4 = 5$$

S34. The answer is 2. We start by substituting x equal to 0. Then, we give increasing integer values to x, considering only those values for which y comes out to be a non-negative integer:

$$x = 0 \Rightarrow y = 3$$
$$x = 2 \Rightarrow y = 0$$

If we increase x any further, y will become negative. Thus, only 2 solutions exist for which both x and y are non-negative integers.

S35. The answer is 4. We start with x equal to 0, and give increasing integer values to x, considering only those values for which y comes out to a non-positive integer:

$$x = 0 \Rightarrow y = -3 \quad ✓$$
$$x = 1 \Rightarrow y = -\frac{8}{3} \quad ✗$$
$$x = 2 \Rightarrow y = -\frac{7}{3} \quad ✗$$
$$x = 3 \Rightarrow y = -2 \quad ✓$$
$$\vdots$$
$$x = 6 \Rightarrow y = -1 \quad ✓$$
$$x = 9 \Rightarrow y = 0 \quad ✓$$

Above, we have shown some sample calculations. If we increase x any further, y will start taking on positive values. Thus, we see that there are 4 acceptable solutions:

$$x = 0,\ y = -3, \qquad x = 3, y = -2$$
$$x = 6,\ y = -1, \qquad x = 9,\ y = 0$$

S36. The answer is 4. We start by substituting x equal to 0. Then, we give increasing integer values to x, considering only those values for which y comes out to be a non-negative integer:

$$x = 0 \Rightarrow y = \frac{7}{2} \quad ✗$$
$$x = 1 \Rightarrow y = 3 \quad ✓$$
$$x = 3 \Rightarrow y = 2 \quad ✓$$
$$x = 5 \Rightarrow y = 1 \quad ✓$$
$$x = 7 \Rightarrow y = 0 \quad ✓$$

If we increase x any further, y will become negative. Thus, 4 solutions exist for which both x and y are non-negative integers.

S37. The answer is 3. The possible non-negative integer solutions are listed out below:

$$(1, 0, 0), \quad (0, 1, 0), \quad (0, 0, 1)$$

Convince yourself that no other non-negative integer solutions to this linear equation are possible. Thus, there are 3 acceptable solutions.

S38. The correct answer is 0. It is given that $(1, 0)$ and $(2, 1)$ lie on the given line. Thus, we have:

$$\left\{\frac{1}{a}+0=1,\ \frac{2}{a}+\frac{1}{b}=1\right.$$

$$\Rightarrow \left\{a=1,\ 2+\frac{1}{b}=1\right.$$

$$\Rightarrow \left\{a=1,\ b=-1\right.$$

$$\Rightarrow \quad a+b=1+(-1)=0$$

S39. The answer **S39.** is m1. Since both pairs satisfy the linear equation in the problem, we must have:

$$\begin{cases} -1=m(1)+b \\ 3=m(2)+b \end{cases}$$

$$\Rightarrow \begin{cases} m+b=-1 \\ 2m+b=3 \end{cases}$$

$$\Rightarrow \quad m=4, b=-5$$

$$\Rightarrow \quad m+b=-1$$

S40. The answer is m1. Since both pairs satisfy the linear equation in the problem, we must have:

$$\begin{cases} 3=m(2)+b \\ -1=m(5)+b \end{cases}$$

$$\Rightarrow \begin{cases} 2m+b=3 \\ 5m+b=-1 \end{cases}$$

$$\Rightarrow \quad m=-\frac{4}{3}, b=\frac{17}{3}$$

$$\Rightarrow \quad 5m+b=-1$$

S41. The answer is 1. Since both pairs satisfy the linear equation in the problem, we must have:

$$\begin{cases} 4=m(3)+b \\ 7=m(1)+b \end{cases}$$

$$\Rightarrow \begin{cases} 3m+b=4 \\ m+b=7 \end{cases}$$

$$\Rightarrow \quad m=-\frac{3}{2}, b=\frac{17}{2}$$

$$\Rightarrow \quad 5m+b=1$$

S42. The answer is 11. Since both pairs satisfy the linear equation in the problem, we must have:

$$\begin{cases} 1 = m(8) + b \\ 6 = m(2) + b \end{cases}$$

$$\Rightarrow \begin{cases} 8m + b = 1 \\ 2m + b = 6 \end{cases}$$

$$\Rightarrow m = -\frac{5}{6}, b = \frac{46}{6}$$

$$\Rightarrow -4m + b = \frac{20}{6} + \frac{46}{6}$$

$$= 11$$

S43. The answer is 5. Since both pairs satisfy the linear equation in the problem, we must have:

$$\begin{cases} 1 = m(6) + b \\ 6 = m(1) + b \end{cases}$$

$$\Rightarrow \begin{cases} 6m + b = 1 \\ m + b = 6 \end{cases}$$

$$\Rightarrow m = -1, b = 7$$

$$\Rightarrow 2m + b = 5$$

S44. The correct answer is 61. We have:

$$\frac{2x}{3} + \frac{y}{6} - 5 = 0$$

$$\Rightarrow \frac{4x + y - 30}{6} = 0$$

$$\Rightarrow 4x + y - 30 = 0$$

$$\therefore b = 1, c = -30$$

$$\Rightarrow b - 2c = 1 - 2(-30)$$

$$= 1 + 60$$

$$= 61$$

S46. The correct answer is 9. From the graph, we observe that $P\left(\frac{k}{3}, \frac{k}{3}\right)$ is the point of intersection of the two lines, which implies that the coordinates of P must satisfy both the linear equations. So, we have:

$$-4\left(\frac{k}{3}\right) + 7\left(\frac{k}{3}\right) = 9$$

$$\Rightarrow -\frac{4k}{3} + \frac{7k}{3} = 9$$

$$\Rightarrow \frac{-4k + 7k}{3} = 9$$

$$\Rightarrow \frac{3k}{3} = 9$$

$$\Rightarrow k = 9$$

Note that we didn't need to use the second equation.

S47. The correct answer is 21. From the graph, we observe that $P(-2, 3)$ is the point of intersection of the two lines, which implies that the coordinates of P must satisfy both the linear equations. So, we have:

$$\left.\begin{aligned} a(-2)-3&=-11 \\ -2+3b&=1 \end{aligned}\right\}$$

$$\Rightarrow \left.\begin{aligned} -2a&=-8 \\ 3b&=-3 \end{aligned}\right\}$$

$$\Rightarrow \left.\begin{aligned} a&=4 \\ b&=1 \end{aligned}\right\}$$

$$\therefore \quad 4a+b=4(4)+1=17$$

S48. The correct answer is 19. From the graph, we observe that $P\left(0, \dfrac{k}{3}\right)$ is the point of intersection of the two lines, which implies that the coordinates of P must satisfy both the linear equations. So, we have:

$$\left.\begin{aligned} -4(0)+\frac{k}{3}&=1 \\ -3(0)+2\left(\frac{k}{3}\right)&=\ell \end{aligned}\right\}$$

$$\Rightarrow \left.\begin{aligned} 0+\frac{k}{3}&=1 \\ 0+\frac{2k}{3}&=\ell \end{aligned}\right\}$$

$$\Rightarrow \left.\begin{aligned} k&=3 \\ \ell&=2 \end{aligned}\right\}$$

$$\Rightarrow \quad 3k+5\ell=3(3)+5(2)=9+10=19$$

S49. The correct answer is 32. P lies on the line, so its coordinates will satisfy the given linear equation. We have:

$$3\sqrt{k}+4(0)=12$$

$$\Rightarrow \quad 3\sqrt{k}=12$$

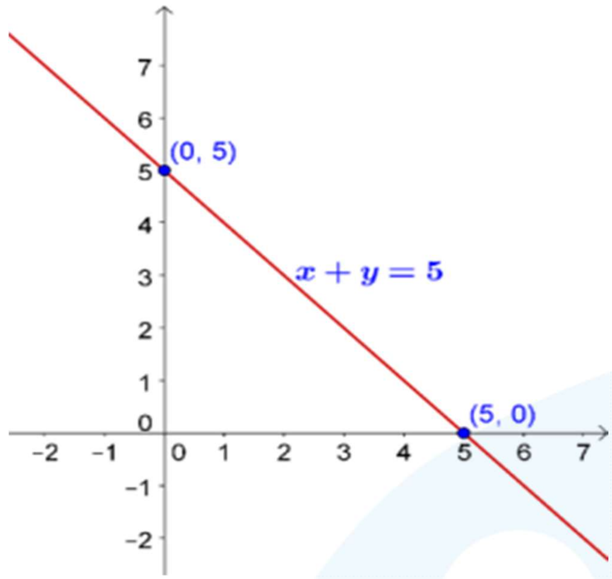
$$\Rightarrow \quad \sqrt{k}=4$$

On squaring both sides, we get

$$k=16$$

$$\Rightarrow \quad 2k=32$$

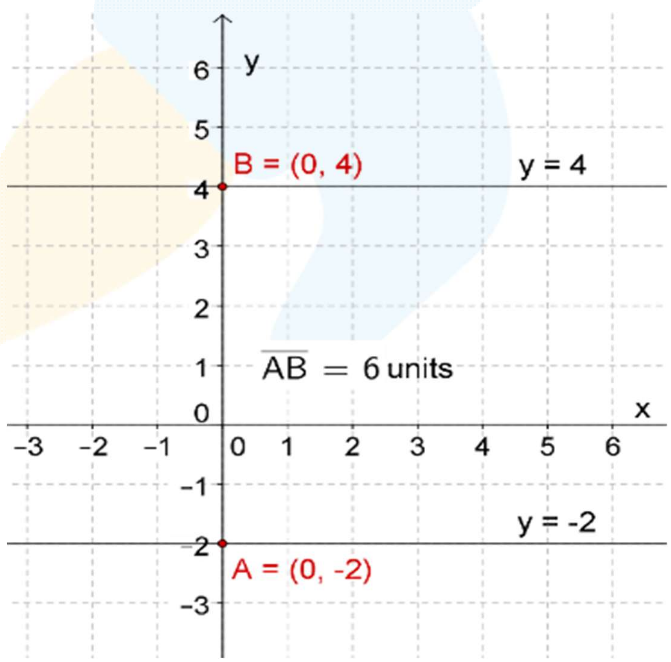
S50. The given statement is false. The coordinates of the origin, which is the point $(0, 0)$, do not satisfy the given equation. We can also verify it graphically:



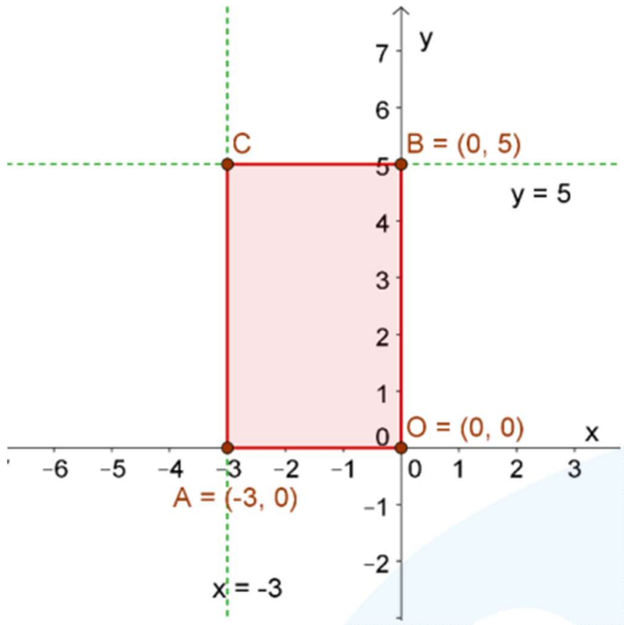
S51. The given statement is true, because $(0,0)$ always satisfies the given equation, regardless of the value of *m*.

S52. The correct answer is 90. $x = -2$ is a straight line parallel to the *y* axis, and $y = 3$ is a straight line parallel to the *x* axis. Thus, the two lines intersect each other at right angles.

S53. The correct answer is 6. From the graph shown below, we observe that the distance between the two lines is 6 units:



S54. The correct answer is 15. The area of rectangle OACB in the figure below is the required area:



We have:

Length of the rectangle = 5 units
Breadth of the rectangle = 3 units

Area of the rectangle = 5 × 3 = 15 sq. units

S55. The correct answer is 2. A line is uniquely determined by two points lying on it.

S56. The correct answer is 3. We have:

$$5x-3\le 3x+1$$
$$\Rightarrow\quad 2x\le 4$$
$$\Rightarrow\quad x\le 2$$
$$\Rightarrow\quad x\in(-\infty,2]$$

Therefore, the non-negative integers in the solution set are 0, 1 and 2.

S57. The correct answer is 26. we have:

$$\frac{4+2x}{3}\ge\frac{x}{2}-3$$
$$\Rightarrow\quad \frac{4+2x}{3}-\frac{x}{2}\ge -3$$
$$\Rightarrow\quad \frac{2(4+2x)-3x}{6}\ge -3$$
$$\Rightarrow\quad 8+4x-3x\ge -18$$
$$\Rightarrow\quad x\ge -18-8$$
$$\Rightarrow\quad x\ge -26$$
$$\Rightarrow\quad x\in[-26,\infty)$$

Therefore, there are 26 negative integers in the solution set of the given linear inequation.

S58. We have:

$$6 \le -3(2x-4) < 12$$
$$\Rightarrow \quad -4 < 2x-4 \le -2$$
$$\Rightarrow \quad 0 < 2x \le 2$$
$$\Rightarrow \quad 0 < x \le 1$$
$$\Rightarrow \quad 0+19 < x+19 \le 1+19$$
$$\Rightarrow \quad \frac{19}{5} < \frac{x+19}{5} \le \frac{20}{5}$$
$$\Rightarrow \quad \frac{19}{5} < \frac{x+19}{5} \le 4$$

Therefore, the maximum value of $\frac{x+19}{5}$ is 4.

S59. The correct answer is 58. We have:

$$-5 \le \frac{2-3x}{4} \le 9$$
$$\Rightarrow \quad -20 \le 2-3x \le 36$$
$$\Rightarrow \quad -22 \le -3x \le 34$$
$$\Rightarrow \quad -34 \le 3x \le 22$$
$$\Rightarrow \quad -34+35 \le 35+3x \le 22+35$$
$$\Rightarrow \quad 1 \le 35+3x \le 57$$

Thus, the required sum is equal to 58.

S60. The correct answer is 30. We have:

$$-5 \le \frac{5-3x}{2} \le 8$$
$$\Rightarrow \quad -10 \le 5-3x \le 16$$
$$\Rightarrow \quad -15 \le -3x \le 11$$
$$\Rightarrow \quad -11 \le 3x \le 15$$
$$\Rightarrow \quad -11+13 \le 13+3x \le 15+13$$
$$\Rightarrow \quad 2 \le 13+3x \le 28$$

Thus, the required sum is equal to 30.

S61. The correct answer is 8. We have:

$$\frac{5-2x}{3} \le \frac{x}{6} - 5$$
$$\Rightarrow \quad \frac{5-2x}{3} \le \frac{x-30}{6}$$
$$\Rightarrow \quad 6(5-2x) \le 3(x-30)$$
$$\Rightarrow \quad 30-12x \le 3x-90$$
$$\Rightarrow \quad -12x-3x \le -90-30$$
$$\Rightarrow \quad x \ge \frac{120}{15}$$
$$\Rightarrow \quad x \ge 8$$
$$\Rightarrow \quad x \in [8, \infty)$$

Therefore, the smallest integer in the solution set is 8.

S62. The correct answer is –21. We have:

$$-15 \le \frac{3(x-2)}{5} \le 0$$

$$\Rightarrow \quad -75 \le 3(x-2) \le 0$$

$$\Rightarrow \quad -75 \le 3x-6 \le 0$$

$$\Rightarrow \quad -75+6 \le 3x \le 6$$

$$\Rightarrow \quad -69 \le 3x \le 6$$

$$\Rightarrow \quad -\frac{69}{3} \le x \le \frac{6}{3}$$

$$\Rightarrow \quad -23 \le x \le 2$$

Therefore, the required sum is –21.

S63. The correct answer is 9. We have:

$$|x-2| \ge 5 \quad \Leftrightarrow \quad x-2 \ge 5 \text{ or } x-2 \le -5$$

$$\Leftrightarrow \quad x \ge 5+2 \text{ or } x \le -5+2$$

$$\Leftrightarrow \quad x \ge 7 \text{ or } x \le -3$$

$$\Leftrightarrow \quad x \in (-\infty, -3] \cup [7, \infty)$$

We can observe that there are a total of 9 integers which are not in the solution set.

S64. The correct answer is 11. We have:

$$|x-1| \ge 5 \quad \Leftrightarrow \quad -5 \le x-1 \le 5$$

$$\Leftrightarrow \quad -5+1 \le x \le 5+1$$

$$\Leftrightarrow \quad -4 \le x \le 6$$

We can observe that there are a total of 11 integers in the solution set.

S65. The correct answer is 70. Let x be the marks obtained by the student in the annual examination. Then

$$\frac{62+48+x}{3} \ge 60$$

$$\Rightarrow \quad 110+x \ge 180$$

$$\Rightarrow \quad x \ge 70$$

Thus, the student must obtain a minimum of 70 marks to get an average of at least 60 marks.

S66. The correct answer is 2. We have:

$$\frac{1}{x-2} < 0$$

$$\Rightarrow \quad x-2 < 0 \quad \left[\because \frac{a}{b} < 0,\, a > 0 \;\Rightarrow\; b < 0\right]$$

$$\Rightarrow \quad x < 2$$

$$\Rightarrow \quad x \in (-\infty, 2)$$

S67. The correct answer is 7. We have:

$$\frac{5x}{2}+\frac{3x}{4}\geq\frac{39}{4}$$

$$\Rightarrow \quad \frac{10x+3x}{4}\geq\frac{39}{4}$$

$$\Rightarrow \quad \frac{13x}{4}\geq\frac{39}{4}$$

$$\Rightarrow \quad x\geq 3$$

$$\Rightarrow \quad x\in[3,\infty)$$

Thus, the number of integer less than 10 which are in the solution set is 10.

S68. We have:

$$|x-1|\leq 3$$

$$\Rightarrow \quad -3\leq x-1\leq 3$$

$$\Rightarrow \quad -3+1\leq x\leq 3+1$$

$$\Rightarrow \quad -2\leq x\leq 4$$

$$\Rightarrow \quad -2+7\leq x+7\leq 4+7$$

$$\Rightarrow \quad 5\leq x+7\leq 11$$

Thus, the required sum is 16.

S69. We have:

$$|4-x|+1\leq 3$$

$$\Rightarrow \quad |4-x|\leq 2$$

$$\Rightarrow \quad -2\leq 4-x\leq 2$$

$$\Rightarrow \quad -2-4\leq -x\leq 2-4$$

$$\Rightarrow \quad -6\leq -x\leq -2$$

$$\Rightarrow \quad 2\leq x\leq 6$$

$$\Rightarrow \quad 4\leq 2x\leq 12$$

$$\Rightarrow \quad 4+1\leq 2x+1\leq 12+1$$

$$\Rightarrow \quad 5\leq 2x+1\leq 13$$

Thus, the required sum is 18.

S70. The correct answer is 6. We have:

$$\left|x+\frac{1}{3}\right|>\frac{8}{3}$$

$$\Leftrightarrow \quad x+\frac{1}{3}<-\frac{8}{3} \text{ or } x+\frac{1}{3}>\frac{8}{3}$$

$$\Leftrightarrow \quad x<-\frac{1}{3}-\frac{8}{3} \text{ or } x>\frac{8}{3}-\frac{1}{3}$$

$$\Leftrightarrow \quad x<-3 \text{ or } x>\frac{7}{3}$$

$$\Leftrightarrow \quad x\in(-\infty,-3)\cup\left(\frac{7}{3},\infty\right)$$

Thus, there are a total of 6 integers which are not in the solution set.

S71. We have:

$$\left|\frac{3x-4}{2}\right| \le \frac{5}{12}$$

$$\Rightarrow \quad \frac{|3x-4|}{2} \le \frac{5}{12}$$

$$\Rightarrow \quad |3x-4| \le \frac{5}{6}$$

$$\Rightarrow \quad -\frac{5}{6} \le 3x-4 \le \frac{5}{6}$$

$$\Rightarrow \quad -\frac{5}{6}+4 \le 3x \le \frac{5}{6}+4$$

$$\Rightarrow \quad \frac{19}{6} \le 3x \le \frac{29}{6}$$

$$\Rightarrow \quad 19 \le 18x \le 29$$

Thus, the required sum is 48.

Matching

S72. (A) to (Q), (B) to (R), (C) to (P) and (D) to (S)

S73. (A) to (R), (B) to (P), (C) to (S) and (D) to (Q)

S74. (A) to (Q), (B) to (S), (C) to (P) and (D) to (R)

S75. (A) to (P), (B) to (R), (C) to (Q) and (D) to (S)

S76. (A) to (S), (B) to (R), (C) to (Q) and (D) to (P)

S77. (A) to (P), (B) to (Q), (C) to (S) and (D) to (R)

S78. (A) to (S), (B) to (Q), (C) to (P) and (D) to (R)

S79. (A) to (R), (B) to (P), (C) to (Q) and (D) to (S)

S80. (A) to (Q), (B) to (S), (C) to (P) and (D) to (R)

S81. (A) to (P), (B) to (S), (C) to (R) and (D) to (Q)

S82. (A) to (P), (B) to (R), (C) to (Q) and (D) to (S)

S83. (A) to (R), (B) to (P), (C) to (Q) and (D) to (S)

S83. (A) to (R), (B) to (S), (C) to (P) and (D) to (Q)

S84. (A) to (R), (B) to (S), (C) to (P) and (D) to (Q)

S85. (A) to (P), (B) to (R), (C) to (Q) and (D) to (S)

S86. (A) to (P), (B) to (S), (C) to (Q) and (D) to (R)

S87. (A) to (S), (B) to (Q), (C) to (R) and (D) to (P)

S88. (A) to (R), (B) to (S), (C) to (P) and (D) to (Q)

S89. (A) to (S), (B) to (P), (C) to (R) and (D) to (Q)

S90. (A) to (Q), (B) to (P), (C) to (S) and (D) to (R)

Miscellaneous

S91. The given statement is false. The given equation is a linear equation in two variables only: x and y.

S92. The given statement is false. We have:

$$z = 9 - 2x - 3y$$

There is only one value of z possible for fixed x and y.

S93. The given statement is true. The three given points all satisfy the given equation, and hence, lie on the corresponding line.