

# SPECIAL EQUATION

(Ref: FM-QAH2022018)

## TYPE I

1. If  $3x + 7y = 42$ , the number of non-negative integer solutions for  $(x, y)$  is
2. If  $5x + 4y = 300$ , where  $x$  and  $y$  are positive integers, all the possible values of  $y$  are
  - a) multiples of 10                      b) multiples of 4
  - c) multiples of 20                     d) multiples of 5
3. The number of solutions of the equation  $7x + 4y = 92$  in which both  $x$  and  $y$  are positive integers is
4. If  $p$  and  $q$  are positive integers such that  $5x - 7y = 147$  which of the following is a possible value of  $p$ ?
  - a) 9                      b) 12                      c) 22                      d) 21
5. The number of solutions of the equation  $5x + 3y = 47$ , where  $x$  and  $y$  are positive integers is
  - a) 4                      b) 3                      c) 2                      d) 1
6. The equation  $3x + 11y = k$ , where  $k$  is a 2-digit number, has exactly three solutions in which both  $x$  and  $y$  are positive integers. Which of the following is not a possible value of  $x$ ?
  - a) 5                      b) 17                      c) 25                      d) 19
7. Akash bought 'e' erasers and 's' sharpeners spending Rs. 48 on the whole. Each eraser cost Rs. 2 and each sharpener cost Rs. 3. Find the number of possible values of  $e$ .
8. Virat bought two varieties of books – P and Q. Each book of variety P cost Rs. 30 and each book of variety Q cost Rs. 40. He spent a total of Rs. 360 for purchasing these books. How many different combinations are possible for his purchase?
9. Mayank bought bars of two varieties of rice. The first variety cost Rs. 9 per kg. The second variety cost Rs. 11 per kg. He paid a total of Rs. 227 for his purchase. How many different combinations are possible for his purchase?
10.  $5x + 7y = k$  has exactly 4 whole number solution find minimum value of  $k$ ?
11.  $13a - 11b = 43$  where  $a$  is a positive integer. Find the number of possible values of  $(a, b)$ . If  $16 < a < 45$ .
12. Ram bought three varieties of rice A, B and C. The cost per kg was Rs. 11, Rs. 10 and Rs. 5 respectively. He spent an amount of Rs. 74 on the rice. The maximum kg of rice of variety A that he could have bought is.
13. In a triangle in which the measure of each angle is an integral number of degrees, 17 times one angle is equal to 19 times one of the other at angles. How many such triangles are possible?
  - a) 4                      b) 5                      c) 3                      d) 2

14. If  $x, y, z$  are non -ve integers. How many different solutions are possible for  $x + y + 3z = 24$ ?
15. Find the integer solution of equation  $3x + 4y = 57$ . Where  $-50 < x < 50$ .
16. How many natural number solution exist for equation  $4x - 5y = 17$ , where  $x < 200$ .
17. How many integral solution exist for equation  $7x - 5y = 197$ , such that  $x \times y < 0$ .
18. How many positive integer solutions exist for equation  $3x + y = 80$  such that  $x \leq y$ .

## TYPE II

19. Find the number of solutions for  $\frac{1}{p} + \frac{1}{q} = \frac{1}{12}$ , where  $p$  &  $q$  are positive integers.
20. How many ordered pairs of positive integers  $(p, q)$  satisfy the equation  $\frac{1}{p} + \frac{1}{q} = \frac{1}{8}$ ?
  - a) 14                      b) 7\*                      c) 16                      d) 8
21. How many ordered pairs of integers  $(p, q)$  where  $p > 0$ , satisfy the equation  $\frac{1}{p} + \frac{3}{q} = \frac{1}{29}$ ?
  - a) 12                      b) 2                      c) 8\*                      d) 6
22. How many ordered pairs of integers  $(p, q)$  satisfy the equation  $\frac{7}{p} - \frac{3}{q} = \frac{1}{4}$ ?
  - a) 40                      b) 19                      c) 39\*                      d) 38
23. How many ordered pairs of integers  $(a, b)$  where  $b > 0$ , satisfy the equation  $\frac{2}{a} + \frac{3}{b} = \frac{1}{4}$ ?
  - a) 24                      b) 18\*                      c) 21                      d) 9
24. How many ordered pairs of integers  $(a, b)$  satisfy the equation  $\frac{5}{p} - \frac{7}{q} = \frac{1}{11}$ ?
  - a) 16                      b) 12                      c) 24                      d) 23\*

## TYPE III

25. Find positive integer whole number & integral solution for equations:
  - (i)  $a^2 - b^2 = 138$
  - (ii)  $a^2 - b^2 = 120$
  - (iii)  $a^2 - b^2 = 144$
  - (iv)  $a^2 - b^2 = 273$
  - (v)  $a^2 - b^2 = 987$
  - (vi)  $a^2 - b^2 = 225$

**MIXED**

26. Find integer solution of equation:

i)  $x + y + xy = 13$

ii)  $x + y + 3xy = 30$

27. How many integral values of  $(x, y)$  satisfy the equation  $x^2 - 4y^2 = 980$ ?

28. A test has 60 questions. A student scores 1 mark for a correct answer,  $-\frac{1}{2}$  for a wrong answer and  $-\frac{1}{4}$ th for not attempting a question. If the net score of a student who attempted 48 questions is 33 marks, then how many questions did he get wrong?

- a) 8                      b) 12                      c) 10                      d) 14

29. Kunal sells apples in boxes of different sizes. Apples are priced at Rs. 6 per apple up to 100 apples. For every additional 10 apples over the first '100 apples, the price for all the apples goes down by 50 paise per apple. What should be the size of the box, such that the fully-packed box would fetch the greatest?

- a) 140                      b) 110                      c) 120                      d) 100

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