



## MATHS

### BOOKS - S CHAND IIT JEE FOUNDATION

### LINEAR EQUATIONS IN ONE VARIABLE

#### Solved Examples

1. Solve :  $\frac{3}{5}(4x - 9) - \frac{5}{4}(3x - 8) = 5 - \frac{7}{10}(2x - 1)$ .

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2. Solve :  $(x + 6)(x - 6) - (x - 5)^2 = 40 - 17(x - 2)$

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3. The sum of three numbers is 264. If the first number be twice the second and third number be one third of the first, then the second number is a. 48 b. 72 c. 54 d. 84



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4. If 0 is subtracted from two third of a number the result is equal to sum of 40 and one-fourth of that number. What is the number? a. 174 b. 216 c. 246 d. 336



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5. The difference between two numbers is 16. If one-third of the smaller number is greater than one-seventh of the larger number

by 4, then the two numbers are a. 9 and 25 b. 12 and 28 c. 33 and 49 d. 6 and 72

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6. The sides of a triangle are in the ratio of  $\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$ . If the perimeter is 52 cm, then the length of the smallest side is (a) 9cm (b) 10cm (c) 11cm (d) 12cm

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7. A labourer was engaged for 20 days on the condition that he will receive Rs 60 for each day he works and he will be fined Rs 5 for each day he is absent. If he received Rs 745 in all, then the number of days on which he remained absent is (a) 3 (b) 5 (c) 7 (d) 9



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8. The numerator and denominator of a fraction are in the ratio of 2:3. If 6 is subtracted from the numerator, the result is a fraction that has a value  $\frac{2}{3}$  of the original fraction. The numerator of the original fraction is a. 6 b. 18 c. 27 d. 36

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9. A number consists of two digits such that the digit in the tens place is less by 2 than the digit in the units place. Three times the number added to  $\frac{6}{7}$  times the number obtained by reversing the digits equal 108. The sum of the digits in the number is a. 6 b. 7 c. 8 d. 9

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10. The present ages of three persons are in the ratio 4:7:9. Eight years ago, the sum of their ages was 56. Find their present ages (in years).



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11. The ratio of present ages of two brothers is 1 : 2 and 5 years back the ratio was 1: 3. What will be the ratio of their ages after 5 years ?



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12. The total value of a collection of coins of denominations Re 1, 50-paise, 25-paise, 10-paise and 5-paise is Rs 380. If the number of coins of each denomination is the same, then the number of one-rupee coins is (a) 160 (b) 180 (c) 200 (d) 220



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13. A person travelled  $\frac{5}{8}$ th of the distance by train  $\frac{1}{4}$  th by bus and the remaining 15 km by boat. What was the total distance travelled by him ?



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## Question Bank 9

1. The value of m that satisfies the equation  $\frac{7}{4m - 2} = \frac{5}{3m - 4}$  is :

A. 9

B.  $3\frac{1}{2}$

C. 18

D. 38

**Answer: C**



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2. Given,  $5(x+4) - 8(4-x) = 25 - 3(7-x) + 144$ , then the value of  $x$  is

A. 8

B. 16

C. 4

D. 11

**Answer: B**



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3. If  $(x - 2)(x + 3) = x^2 - 4$ , the value of  $x$  is

A. 3

B. 2

C.  $\frac{1}{2}$

D.  $-2$

**Answer: B**



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4. The solution of  $0.2(2x - 1) - 0.5(3x - 1) = 0.4$  is

A.  $\frac{1}{11}$

B.  $-\frac{1}{11}$



C.  $\frac{3}{11}$

D.  $-\frac{3}{11}$

**Answer: B**

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5. Match the equations with their solutions.

(1)  $14 - \frac{x-1}{10} = \frac{x+5}{6} - 3$

(a) 4

(2)  $(x-5)^2 - (x+3)^2 = 48$

(b)  $-11\frac{1}{2}$

(3)  $6(x-4) = 4(x-3) - (3x-8)$

(c) 61

(4)  $(2x-1)(2x+3) = (2x-7)(2x+7)$

(d) -2

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6. The sum of three consecutive multiples of 3 is 72. What is the largest number? a. 21 b. 24 c. 27 d. 36

A. 21

B. 24

C. 27

D. 36

**Answer: C**



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7. A number is doubled and 9 is added. If the resultant is trebled, it becomes 7. What is that number? a. 3.5 b. 6 c. 8 d. none of these

A. 3.5

B. 6

C. 8

D. 7

**Answer: C**



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8. If the sum of one-half and one-fifth of a number exceeds one-third of that number by  $7\frac{1}{3}$ , the number is a. 15 b. 18 c. 20 d. 30

A. 15

B. 18

C. 20

D. 30

**Answer: C**



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9.  $\frac{1}{2}$  is subtracted from a number and the difference is multiplied by 4. If 25 is added to the product and the sum is divided by 3, the result is equal to 10. Find the number

A.  $\frac{3}{5}$

B.  $\frac{7}{4}$

C.  $\frac{6}{7}$

D.  $\frac{2}{3}$

**Answer: B**



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10. The denominator of a fraction is 1 more than its numerator. If 1 is deducted from both the numerator and the denominator, the fraction becomes equivalent to 0.5. The fraction is

A.  $\frac{3}{4}$

B.  $\frac{4}{5}$

C.  $\frac{2}{3}$

D.  $\frac{7}{8}$

**Answer: C**



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**11.** Divide 224 into three parts so that the second will be twice the first and third will be twice the second

A. 26,52, 104

B. 24, 48, 96

C. 18, 36, 72

D. 32, 64,128

**Answer: D**



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12. A rectangle is 8 cm long and 5 cm wide. Its perimeter is doubled when each of its sides is increased by  $x$  cm.

A. 15 cm

B. 14.5 cm

C. 0.5 cm

D. 9 cm

**Answer: B**



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13. In an isosceles triangle, each of the two equal sides is 3 cm more than twice the base. If the perimeter of the triangle is 31 cm, find the sides of the triangle

- A. 7 cm, 12 cm, 12 cm
- B. 5 cm, 13 cm, 13 cm
- C. 10 cm, 10.5 cm, 10.5 cm
- D. 9 cm, 11 cm, 11 cm

**Answer: B**



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14. In a two digit number the digit in the units place is four times the digit in tens place and sum of the digits is equal to 10. What

is the number? a. 14 b. 41 c. 82 d. Data inadequate e. none of these

A. 14

B. 44

C. 82

D. 28

**Answer: D**



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**15.** In a two digit number, unit's digit is 3 more than ten's digit.

The number formed by interchanging the digits and the original number are in the ratio 7:4. Find the number.

A. 63



B. 36

C. 57

D. 75

**Answer: B**



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**16.** One third of a pole is painted yellow, one-fifth is painted white and the remaining 7 metres is painted black. The length of the pole is :

A. 15m

B. 30 m

C.  $10\frac{7}{15}m$

D.  $7\frac{1}{15}m$

**Answer: A**



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17. The number that should be added to both the so that the numerator and denominator of  $\frac{4^2}{9^2}$ , so that the fraction becomes  $\frac{4}{9}$  is

A. 0

B. 16

C. 36

D. 81

**Answer: C**



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18. The sum of two numbers is 18 and the difference of their squares is 108. The difference between the numbers is

A. 2

B. 12

C. 6

D. 8

**Answer: C**



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19. X is 36 years old and Y is 16 years old. In how many years will X be twice as old as Y?

A. 1 year

B. 2 years

C. 3 years

D. 4 years

**Answer: D**



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**20.** A is 2 years older than B who is twice as old as C. If the total of the ages of A, B and C be 27 years, then how old is B?

A. 7 years

B. 8 years

C. 9 years

D. 10 years

**Answer: D**



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21. The present ages of Amit and his father are in the ratio 2:5 respectively. Four years hence, the ratio of their age becomes 5:11 respectively. What was the fathers age five years ago? a. 30 years b. 35years c. 40 years d. 45 years e. none of these

A. 40 years

B. 45 years

C. 30 years

D. 35 years

**Answer: D**



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22. The sum of the ages of 5 children born at intervals of 3 years each is 50 years. What is the age of the youngest child?

A. 4 years

B. 8 years

C. 10 years

D. 6 years

**Answer: A**



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23. A train starts with full number of passengers. At the first station, the train drops one-third of the passengers and takes in 96 more. At the next station, one half of the passengers on board

get down while 12 new passengers get on board. If the passengers on board now are 240, the number of passengers in the beginning was:

A. 540

B. 600

C. 444

D. 430

**Answer: A**



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**24.** Shuba got three fourth of what Alka had. Alka gave half of what remained with her to Mohini. If Mohini got Rs. 625, how much did Alka have in the beginning?

A. Rs. 3750

B. Rs. 7000

C. Rs. 5000

D. Rs. 5625

**Answer: C**



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**25.** A man was asked to state his age in years. his reply was Take my age 3 years hence, multiply it by 3 and then subtract 3 times my age 3 years age and you will know how old I am. What is the age of the man? a. 18 years b. 20 years c. 24 years d. 32 years

A. 24 years

B. 20 years



C. 32 years

D. 18 years

**Answer: D**



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**26.** In an examination, a student attempted 15 questions correctly and secured 40 marks. If there were two types of questions (2 marks and 4 marks questions), how many questions of 2 marks did he attempt correctly? (a) 5 (b) 10 (c) 20 (d) 40

A. 5

B. 10

C. 20

D. 40

**Answer: B**



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27. A sum of Rs. 36.90 is made up of 180 coins which are either 10 paise coins or 25 paise coins. Determine the number of each type of coins.

- A. 126 of 10 p coins and 54 of 25 p coins
- B. 54 of 10 p coins and 126 of 25 p coins
- C. 90 of 10 p coins and 90 of 25 p coins
- D. 54 of 10 p coins and 90 of 25 p coins

**Answer: B**



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28. A sum of Rs. 770 has been divided among A, B and C in such a way that A receives  $\frac{2}{9}$ th of what B and C together receive. Then A's share is

A. Rs. 140

B. Rs. 154

C. Rs. 165

D. Rs. 170

**Answer: A**



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29. In a zoo, there are rabbits and pigeons. If their heads are counted these are 90 while their legs are 224. The number of pigeons in the zoo are

A. 70

B. 68

C. 72

D. 22

**Answer: B**



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**30.** The ratio of three numbers is 3:4:5 and the sum of their squares is 1250. The sum of the three numbers is:

A. 60

B. 90

C. 30

D. 50

**Answer: A**



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**31.** Find a number such that if 6,12 and 20 are added to it, the product of the first and third sums may be equal to the square of the second.

A. 10

B. 8

C. 12

D. 9

**Answer: C**



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**32.** The sum of the digits of a three digit number is 16. If the ten's digit of the number is 3 times the unit's digit and the unit's digit is one-fourth of the hundredth digit, then what is the number?

A. 446

B. 561

C. 682

D. 862

**Answer: D**



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**33.** The ratio between the present ages of A and B is 5:3 respectively the ratio between As age 4 years ago and Bs age 4

years hence is 1:1. What is the ratio between As age 4 hence and

Bs age 4 years ago? a. 1:3 b. 3:1 c. 2:1 d. 4:1 e. none of these

A. 2:1

B. 1:3

C. 4:1

D. 3:1

**Answer: D**



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**34.** A man engaged a servant on the condition that he would pay him Rs. 90 and a turban after a service of one year. He served only for nine months and received the turban and Rs. 65. The price of the turban is :

A. Rs. 25

B. Rs. 18975

C. Rs. 10

D. Rs. 2.50

**Answer: C**



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**35.** Aman gave 40% of the amount he had to Rohan. Rohan in turn gave one-fourth of what he received from Aman to Sahil. After paying Rs. 200 to the taxi driver out of the amount he got from Rohan, Sahil now has Rs. 600 left with him. How much amount did Aman have? a. Rs. 4000 b. Rs. 8000 c. Rs. 12,000 d. Data inadequate



A. Rs. 1200

B. Rs. 4000

C. Rs. 8000

D. Rs. 6000

**Answer: C**



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## Self Assessment Sheet 9

1. For which equation(s) is  $x = 3$  a solution?

(I)  $2x - 5 + 3x = 10$  (II)  $\frac{-x + 7}{2} = 2$

(III)  $4x - 11 = 17$  (IV)  $9 = -(x - 1) + 11$

A. I only

B. I and II

C. I, II and III

D. I, II and IV

**Answer: D**



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2. Solve :  $\frac{n + 3}{\frac{1}{3}} - \frac{n + 2}{\frac{1}{2}} = \frac{n - 4}{\frac{1}{10}}$ . The value of n is obtained

as

A.  $-5$

B. 5

C. 6

D. 4

**Answer: B**

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3. Solve :  $(x - 7)^2 - (x + 8)^2 = 75$ . The value of x is:

A. 3

B. 1

C. -3

D. -1

**Answer: C**

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4. Solve :  $(t-4)(t+4)=54+(t-5)(t-10)$ . The value of t is:

A. 4

B. 8

C.  $-8$

D. 2

**Answer: B**



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5. An old rhyme, and problem:

"If to my age, there added be,

One half of it, and three times three,

Four score and seven my age will be.

How old am I, pray tell me ?"

A. 52 years

B. 50 years

C. 48 years

D. 54 years

**Answer: A**



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6. Solve :  $\frac{x + 5}{4} - \frac{3x - 1}{8} + \frac{4 - x}{6} = 2\frac{1}{24}$ . The value of x is

A. 1

B. -1

C. 0

D. 2

**Answer: C**



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7. Mr. Joshi has 430 cabbage - plants which he wants to plant out, some 25 to a row, the rest 20 to a row. If there are to be 18 rows in all, how many rows of 25 will there be ?

A. 10

B. 14

C. 8

D. 12

**Answer: B**



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8. A choir is singing at a festival. On the first night, 12 choir members were absent, so the choir stood in 5 equal rows. On the second night, only 1 member was absent, so the choir stood in 6 equal rows. The same number of people stood in each row each night. How many members are in the choir ?

A. 65

B. 67

C. 70

D. 64

**Answer: B**



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9. Solve :  $\frac{2}{3}(n + 6) - \frac{1}{5}(n - 4) = \frac{3}{7}(n + 12)$

A.  $-9$

B.  $8$

C.  $3\frac{1}{9}$

D.  $9$

**Answer: D**



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**10.** There are 90 multiple choice questions in a test. Suppose you get two marks for every correct answer and for every question you leave unattempted or answer wrongly, one mark is deducted from your total score of correct answers. If you get 60 marks in the test, then how many questions did you answer correctly?

A.  $40$



B. 60

C. 50

D. 48

**Answer: C**



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## Unit Test 2

1. If  $\frac{b}{a} = 0.25$ , then what is the value of  $\frac{2a - b}{2a + b} + \frac{2}{9}$ ?

A.  $\frac{4}{9}$

B.  $\frac{5}{9}$

C. 1

D. 2

**Answer: C**



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**2. Find the value of :**

$$(0.98)^3 + (0.02)^3 + 3 \times 0.98 \times 0.02 - 1$$

A. 0

B. 1

C. 1.09

D. 1.98

**Answer: A**



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3.

Simplify:

$$a^2b(a^3 - a + 1) - ab(a^4 - 2a^2 + 2a) - b(a^3 - a^2 - 1)$$

A.  $ab$

B.  $ab^2$

C.  $a$

D.  $b$

**Answer: D**



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4. Match the problem with their answers :

**Column I**

**Problem**

1.  $(3x - 2)(2x - 3) + (5x - 3)(x + 1)$
2.  $3x^3 + 4x^2 + 5x + 18$  divided by  $x + 2$
3. Sum of  $2x - x^2 + 5$  and  $-4x - 3 + 7x^2$  subtracted from 5
4.  $(3x - 2)^3 - (3x^2 + 2)(9x - 7)$

**Column II**

**Answer**

- (a)  $3 + 2x - 6x^2$
- (b)  $-33x^2 + 18x + 6$
- (c)  $11x^2 - 11x + 3$
- (d)  $3x^2 - 2x + 9$

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5. Simplify:  $\frac{(0.35)^2 - (0.03)^2}{0.19}$ .

A. 0.32

B. 0.48

C. 0.76

D. 0.64

**Answer: D**



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6. The value of  $\frac{(2.3)^3 - 0.027}{(2.3)^2 + 0.69 + 0.09}$  is 2 (b) 3 (c) 2.327 (d)

2.273

A. 2.6

B. 2

C. 2.33

D. 2.8

**Answer: B**



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7.  $2n$  is an even number. What are the odd numbers on each side of it ? The sum of two consecutive odd numbers is 96. What are they ?

A. 41, 43

B. 57, 59

C. 47, 49

D. 31, 33

**Answer: C**



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8. The factors of  $a^4 - 4a^2$  are

A.  $a^2(a - 2)(a + 2)$

B.  $a(a - 2)(a + 2)$

C.  $a(a + 2)(a + 2)$

D.  $a^2(a - 2)^2$

**Answer: A**



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9. If  $a + \frac{1}{a} = 4$ , then the value of  $a^2 + \frac{1}{a^2}$  is



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10. The value of

$$\frac{(1.5)^3 + (4.7)^3 + (3.8)^3 - 3 \times 1.5 \times 4.7 \times 3.8}{(1.5)^2 + (4.7)^2 + (3.8)^2 - (1.5 \times 4.7) - (4.7 \times 3.8) - (1.5 \times 3.8)}$$

is :

A. 0

B. 1

C. 10

D. 30

**Answer: C**



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11. Solve :  $(x - 4)^2 - (x + 4)^2 = 48$ . The value of x is

A. 3

B. -3

C. 4



D. 2

**Answer: B**



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12. Divide  $3x^4 - 5x^3y + 6x^2y^2 - 3xy^3 + y^4$  by  $x^2 - xy + y^2$ .



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13. Simplify, giving your answer in factors :

$3(x - 1)^2 + 5(x - 1)(x + 4) - 2(x + 4)^2$ . The answer is

A.  $(2x + 7)(3x - 7)$

B.  $(x - 7)(2x + 7)$

C.  $(2x - 3)(x + 7)$

D.  $(2x - 7)(3x + 7)$

**Answer: D**



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14. factorize  $2x^2 - 5xy + 3y^2$ , and use your result to factorize  $2(3a - b)^2 - 5(3a - b)(2a - b) + 3(2a - b)^2$ . The factors are

A.  $a^2b$

B.  $(a + b)(a - b)$

C.  $ab$

D.  $(2a + b)(a - b)$

**Answer: C**



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15.  $\frac{a^2 - b^2 - 2bc - c^2}{a^2 + b^2 + 2ab - c^2}$  is equivalent to  $\frac{a - b + c}{a + b + c}$  (b)

$\frac{a - b - c}{a - b + c}$  (c)  $\frac{a - b - c}{a + b - c}$  (d)  $\frac{a + b + c}{a - b + c}$

A.  $\frac{a + b + c}{a - b + c}$

B.  $\frac{a - b - c}{a + b - c}$

C.  $\frac{a - b - c}{a - b + c}$

D.  $\frac{a - b + c}{a + b + c}$

**Answer: B**



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16. One of the factors of  $a^3 - b^3 - a^2b + ab^2 + a^2 - b^2$  is

A.  $a + b$

B.  $b - a$

C.  $a - b$

D.  $a^2 + b^2$

**Answer: C**



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17. If  $x + y - 1 = 0$ , then  $x^3 + y^3 - 1$  is equal to

A.  $x^2 + y^2 - 1$

B.  $x^2 - xy + y^2$

C.  $x^2 + xy + y^2$

D.  $-3xy$

**Answer: D**



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18.  $x + y = a$  and  $xy = b$ , then the value of  $\frac{1}{x^3} + \frac{1}{y^3}$

A.  $a^3 - 3ab$

B.  $\frac{a^3 + 3ab}{b^3}$

C.  $\frac{a^3 - 3ab}{b^3}$

D.  $a^3 + 3ab$

**Answer: C**



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19. If  $2x + ky + z$  is a factor of  $9y^2 - z^2 - 2xz + 6xy$ , then the value of  $k$  is equal to

A.  $-3$

B.  $-1$

C. 1

D. 3

**Answer: D**



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**20.** In a lottery, a total of 200 prizes are to be given. A prize is either Rs. 500 or Rs. 100. If the total prize money is Rs. 50,000, then the number of rs. 500 and rs. 100 prizes are

A. 70, 130

B. 75, 125

C. 60, 140

D. 80, 120

**Answer: B**



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