MATHS

BOOKS - MTG IIT JEE FOUNDATION

ALGEBRA

Illustrations

1. Complete the table.

Algebraic form	Constants	Variables
$x + 3$		
$x + y + 2$		
$x - y$		
$2m + 3n + 5$		
$l - k - 2p$		

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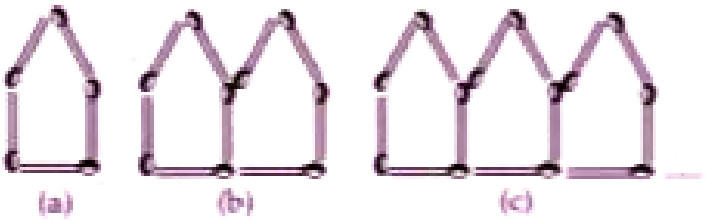
2. Find the pattern followed in given figure and the number of matchsticks used in 86^{th}

figure.



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3. Study the pattern and identify the rule of n^{th} pattern.

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4. Convert the following statements into algebraic expressions.

15 less than t.

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5. Convert the following statements into algebraic expressions.

8 more than 12 times of x.

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6. Convert the following statements into algebraic expressions.

12 taken away from z.

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7. Convert the following expressions into statements. Also , find variables and constants in each of the following.

$15x + 4$.

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8. Convert the following expressions into statements. Also , find variables and constants in each of the following.

$3 - 2y$

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9. Convert the following expressions into statements. Also , find variables and constants in each of the following.

$\frac{3}{5}p - 8$

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10. Find the value of the expression $\frac{15x+9}{3}$

when

$x = 5$

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11. Find the value of the expression $\frac{15x+9}{3}$

when

$x = 2$

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12. Find the value of the expression $\frac{15x + 9}{3}$

when

$x = 1$

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13. If the perimeter of a square is $(8a + 16)$ units. Find the length of the side of the square (in terms of a).

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14. Find the perimeter of the rectangle, if its length is 5 times of a and breadth is 3 units.

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15. Classify the following as numerical equations or algebraic equations.

$19 \times 4 = 38 \times 2$

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16. Classify the following as numerical equations or algebraic equations.

$9x + 5 = 10$

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17. Classify the following as numerical equations or algebraic equations.

$15 \times 0 + 25 = 25$

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18. Find the solution of the equation $5m + 2 = 32$ using trial and error method.

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19. Find the solution of the equation unsing trial and error method.

$2x - 5 = (x + 4) + (3x - 9)$

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20. Solve the following equations.

$x + 3 = 10$

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21. Solve the following equations.

$x - 5 = 12$

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22. Solve the following equations.

$$\frac{x}{3} = 6$$

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23. Solve the following equations.

$$12x = 24$$

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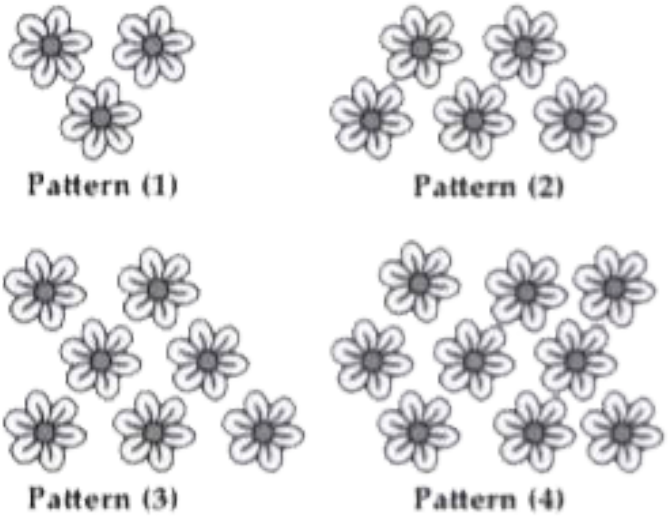
Solved Examples

1. Study the patterns and identify the rule of n^{th} pattern.



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2. The length of a rectangular hall is 5 m less than 4 times the breadth of the hall. What is

the length, if breadth is x metres?

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3. An apple costs Rs. R. A mango costs Rs. 1 more than an apple. Find the total cost of 8 mangoes in terms of R.

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4. Use the algebraic expressions to complete the solu table.

S.No.	Series	Algebraic expression	Terms to be found	Term
(i)	5, 8, 11, ...	$3y + 2$	75^{th}	
(ii)	4, 6, 8, 10, ...	$2x + 2$	250^{th}	
(iii)	4, 5, 6, ...	$n + 3$	195^{th}	
(iv)	13, 21, 29, ...	$8p + 5$	68^{th}	
(v)	2, 7, 12, ...	$5z - 3$	46^{th}	

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5. Write the following statement using arithmetical numbers, literal numbers and arithmetic operations. The father's present

age is 4 years more than twice the age of his son.

6. When 6 is subtracted from four times a number, the result is 10. Form the equation and find the solution using trial and error method.

7. Classify the following into algebraic expression and arithmetic expression. Give reasons also.

$9 \times 27 - 2$

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8. Classify the following into algebraic expression and arithmetic expression. Give reasons also.

$11p - 5$

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9. Classify the following into algebraic expression and arithmetic expression. Give reasons also.

$3s - 7$

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10. Classify the following into algebraic expression and arithmetic expression. Give

reasons also.

$35 - 8 \times 12$

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11. Verify the given equation for $y = \frac{29}{19}\frac{17 - 9y}{19 - 3y} = \frac{31}{137}$

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12. Express the following as algebraic expressions:

Sum of two consecutive numbers is 15.

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13. Express the following as algebraic expressions:

5 is added to the product of two consecutive numbers.

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14. Evaluate the expression $2ab + 7bc$ when $a = 2, b = 3$ and $c = 4$.

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15. Give expressions for the following cases.

4b added to 3a

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16. Give expressions for the following cases.

20a subtracted from 40

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17. Give expressions for the following cases.

$-a$ divided by 7

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18. Give expressions for the following cases.

x multiplied by8

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19. Solve the equation $5x = 30$ by the trial and

d by error method.

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20. 7 increased by one-fifth of a number is 8.

Write the expression and find the number.

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21. Simplify each of the following if $x = 5$ and $y = 2$.

$13x + 17y - 18$

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22. Simplify each of the following if $x = 5$ and $y = 2$.

$-12 + 8x - 9y$

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23. Three friends Riya, Mini and Trisha are going up a flight of stairs. Riya is at step x, Mini is four steps ahead of Riya and Trisha is three steps behind Riya.

How many steps each Mini and Trisha have climbed?

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24. Three friends Riya, Mini and Trisha are going up a flight of stairs. Riya is at step x, Mini is four steps ahead of Riya and Trisha is three steps behind Riya.

If the total number of steps is 5 less than three times the number of steps climbed by

Riya, find to the total number of steps in terms of x.

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Ncert Section Exercise 11 1

1. Find the rule which gives the number of matchsticks required to make the following matchstick patterns. Use a variable to write the rule.

A pattern of letter T as T

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2. Find the rule which gives the number of matchsticks required to make the following matchstick patterns. Use a variable to write the rule.

A pattern of letter Z as Z

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3. Find the rule which gives the number of matchsticks required to make the following

matchstick patterns. Use a variable to write the rule.

A pattern of letter U as U

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4. Find the rule which gives the number of matchsticks required to make the following matchstick patterns. Use a variable to write the rule.

A pattern of letter V as V

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5. Find the rule which gives the number of matchsticks required to make the following matchstick patterns. Use a variable to write the rule.

A pattern of letter E as E

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6. Find the rule which gives the number of matchsticks required to make the following matchstick patterns. Use a variable to write

the rule.

A pattern of letter S as S

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7. Find the rule which gives the number of matchsticks required to make the following matchstick patterns. Use a variable to write the rule.

A pattern of letter A as A

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8. We already know the rule for the pattern of letters L, C and F. Some of the letters from Q.1 (given above) give us the same rule as that given by L. Which are these? Why does this happen?

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9. Cadets are marching in a parade. There are 5 cadets in a row. What is the rule which gives the number of cadets, given the number of rows? (Use n for the number of rows.)

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10. If there are 50 mangoes in a box, how will you write the total number of mangoes in terms of the number of boxes? (Use b for the number of boxes.)

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11. The teacher distributes 5 pencils per student. Can you tell how many pencils are

needed, given the number of students? (Use s for the number of students.

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12. A bird flies 1 kilometer in one minute. Can you express the distance covered by the bird in terms of its flying time in minutes? (Use t for flying time in minutes.

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13. Radha is drawing a dot Rangoli (a beautiful pattern of lines joining dots) with chalk powder. She has 9 dots in a row. How many dots will her Rangoli have for r rows? How many dots are there if there are 8 rows? If there are 10 rows?

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14. Leela is Radha's younger sister. Leela is 4 years younger than Radha. Can you write

Leela's age in terms of Radha's age? Take Radha's age to be x years.

15. Mother has made laddus. She gives some laddus to guests and family members; still 5 laddus remain. If the number of laddus mother gave away is l, how many laddus did she make?

16. Oranges are to be transferred from larger boxes into smaller boxes. When a large box is emptied, the oranges from it fill two smaller boxes and still 10 oranges remain outside. If the number of oranges in a small box are taken to be x, what is th

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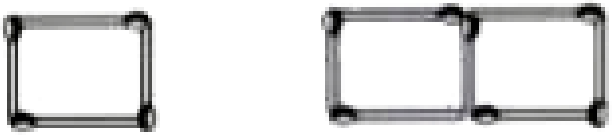
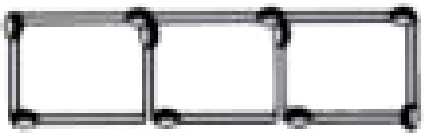
17. Look at the following matchstick pattern of squares (see fig.). The squares are not

separate. Two neighbouring squares have a common matchstick. Observe the patterns and find the rule that gives the number of matchsticks in terms of the number of squares. (Hint: If you remove the vertical stick at the end, you will get a pattern of Cs.)

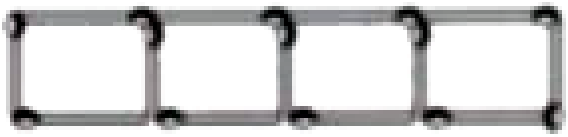


(a)

(b)



(c)



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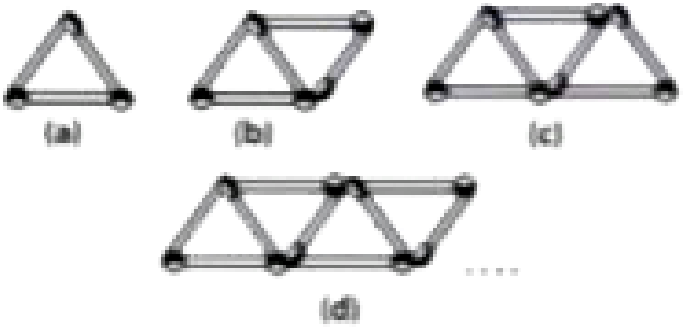
18. The given figure gives a matchstick pattern of triangles. As in above, find the general rule that gives the number of matchsticks in terms of the number of triangles.



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Ncert Section Exercise 11 2

1. The side of an equilateral triangle is shown by l. Express the perimeter of the equilateral triangle using l.

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2. The side of a regular hexagon (Fig 11.10) is denoted by l. Express the perimeter of the hexagon using l. A regular hexagon has all its six sides equal in length.)

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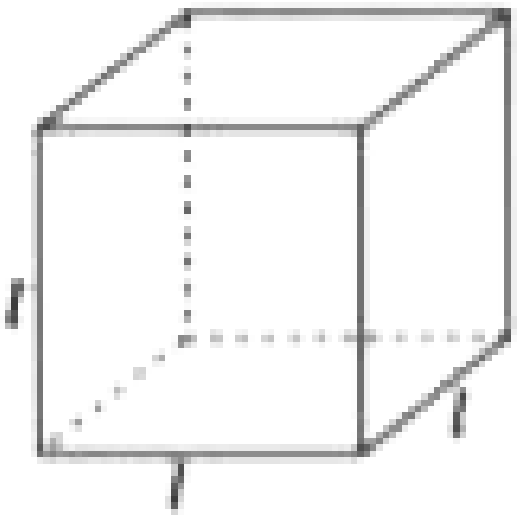
3. A cube is a three-dimensional figure as shown in the given figure. It has six faces and all of them are identical squares. The length of an edge of the cube is given by 1. Find the formula for the total length of the edges of a

cube.



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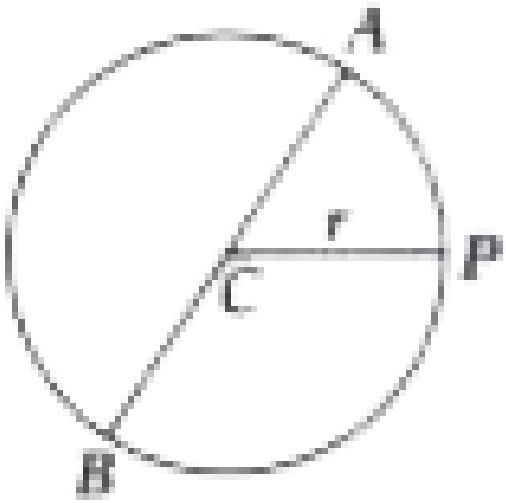
4. The diameter of a circle is a line which joins two points on the circle and also passes through the centre of the circle. (In the

adjoining figure, AB is a diameter of the circle, C is its centre.) Express the diameter of the circle (d) in terms of its radius (r).



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5. To find sum of three numbers 14,27 and 13, we can have two ways: (a) We may first add 14 and 27 to get 41 and then add 13 to it to get the total sum 54 or (b) We may add 27 and 13 to get 40 and then add 14 to get the sum 54. Thus, (14+27)+13=14+(27+13) This can be done for any three numbers. This property is known as the associativity of addition of numbers. Express this property which we have already studied in the chapter on whole numbers, in a general way, by using variables a,b and c.

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Ncert Section Exercise 11 3

1. Make up as many expressions with numbers (no variables) as you can from three numbers 5, 7 and 8. Every number should be used not more than once. Use only addition, subtraction and in multiplication.

(Hint: Three possible expressions are 5 + (8 - 7), 5 - (8 - 7), (5 x 8) + 7, make the other expressions.)

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2. Which out of the following are expressions with numbers only?

(a) $y + 3$ (b) $(7 \times 20) - 82$

(c) $5(21 - 7) + 7 \times 2$ (d) 5

(e) $3x$ (f) $5 - 5n$

(g) $(7 \times 20) - (5 \times 10) - 45 + p$

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3. Identify the operations (addition, subtraction, division, multiplication) in forming the following expressions and tell how the expressions have been formed.

$z + 1, z - 1, y + 17, y - 17$

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4. Identify the operations (addition, subtraction, division, multiplication) in forming the following expressions and tell

how the expressions have been formed.

$17y, \frac{y}{17}, 5z$

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5. Identify the operations (addition, subtraction, division, multiplication) in forming the following expressions and tell how the expressions have been formed.

$2y + 17, 2y - 17$

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6. Identify the operations (addition, subtraction, division, multiplication) in forming the following expressions and tell how the expressions have been formed.

$7m,\ -7m+3,\ -7m-3$

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7. Give expressions for the following cases.

7 added to p

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8. Give expressions for the following cases. (a) 7 added to p (b) 7 subtracted from p (c) p multiplied by 7 (d) p divided by 7 (e) 7 subtracted from  - m

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9. Give expressions for the following cases. (a) 7 added to p (b) 7 subtracted from p (c) p multiplied by 7 (d) p divided by 7 (e) 7 subtracted from  - m

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10. Give expressions for the following cases.

p divided by 7

11. Give expressions for the following cases.

7 subtracted from - m

12. Give expressions for the following cases.

– p multiplied by 5

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13. Give expressions for the following cases.

– p divided by 5

Watch Video Solution

14. Give expressions for the following cases.

p multiplied by -5

Watch Video Solution

15. Give expressions in the following cases.

11 added to 2m

Watch Video Solution

16. Give expressions in the following cases.

11 subtracted from 2m

Watch Video Solution

17. Give expressions in the following cases.

5 times y to which 3 is added

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18. Give expressions in the following cases.

5 times y from which 3 is subtracted

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19. Give expressions in the following cases.

y is multiplied by - 8

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20. Give expressions in the following cases.

y is multiplied by - 8 and then 5 is added to the result

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21. Give expressions in the following cases.

y is multiplied by 5 and the result is subtracted from 16

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22. Give expressions in the following cases.

y is multiplied by - 5 and the result is added to 16.

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23. Form expressions using t and 4. Use not more than one number operation. Every expression must have t in it.

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24. Form expressions using y, 2 and 7. Every expression must have y in it. Use only two number operations. These should be different.

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Ncert Section Exercise 11 4

1. Answer the following:

Take Sarita's present age to be y years

What will be her age 5 years from now?

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2. Answer the following:

Take Sarita's present age to be y years

What was her age 3 years back?

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3. Answer the following:

Take Sarita's present age to be y years

Sarita's grandfather is 6 times her age. What is the age of her grandfather?

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4. Answer the following:

Take Sarita's present age to be y years

Sarita's grandfather is 6 times her age. Grandmother is 2 years younger than grandfather. What is grandmother's age?

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5. Answer the following:

Take Sarita's present age to be y years

Sarita's father's age is 5 years more than 3 times Sarita's age. What is her father's age?

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6. The length of a rectangular hall is 4 metres less than 3 times the breadth of the hall. What is the length, if the breadth is b metres?

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7. A rectangular box has height h cm. Its length is 5 times the height and breadth is 10 cm less than the length. Express the length and the breadth of the box in terms of the height.

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8. Meena, Beena and Leena are climbing the steps to the hill top. Meena is at step s, Beena is 8 steps ahead and Leena 7 steps behind. Where are Beena and Meena? The total number of steps

to the hill top is 10 less than 4 times what Meena has reached. Express the total number of steps using s.

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9. A bus travels at v km per hour. It is going from Daspur to Beespur. After the bus has travelled 5 hours, Beespur is still 20 km away. What is the distance from Daspur to Beespur? Express it using v.

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10. Change the following statements using expressions into statements in ordinary language. (For example, Given Salim scores r runs in a cricket match, Nalin scores (r + 15) runs. In ordinary language - Nalin scores 15 runs more than Salim.)

A notebook costs Rs. p. A book costs Rs. 3p.

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11. Change the following statements using expressions into statements in ordinary language. (For example, Given Salim scores r runs in a cricket match, Nalin scores (r + 15) runs. In ordinary language - Nalin scores 15 runs more than Salim.)

Tony puts q marbles on the table. He has 8q marbles in his box.

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12. Change the following statements using expressions into statements in ordinary language. (For example, Given Salim scores r runs in a cricket match, Nalin scores (r + 15) runs. In ordinary language - Nalin scores 15 runs more than Salim.)

Our class has n students. The school has 20n students.

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13. Change the following statements using expressions into statements in ordinary language. (For example, Given Salim scores r runs in a cricket match, Nalin scores (r + 15) runs. In ordinary language - Nalin scores 15 runs more than Salim.)

Jaggu is z years old. His uncle is 4z years old and his aunt is $(4z - 3)$ years old.

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14. Change the following statements using expressions into statements in ordinary language. (For example, Given Salim scores r runs in a cricket match, Nalin scores (r + 15) runs. In ordinary language - Nalin scores 15 runs more than Salim.)

In an arrangement of dots there are r rows. Each row contains 5 dots.

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15. Given Munnu's age to be x years, can you guess what (x - 2) may show?

(Hint : Think of Munnu's younger brother.)

Can you guess what $(x + 4)$ may show? What $(3x + 7)$ may show?

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16. Given Sara's age today to be y years. Think of her age in the future or in the past.

What will the following expression indicate?

$y + 7, y - 3, y + 4\frac{1}{2}, y - 2\frac{1}{2}$

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17. Given n students in the class like football, what may 2n show? What may $\frac{n}{2}$ show? (Hint : Think of games other than football).

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Ncert Section Exercise 11 5

1. State which of the following are equations (with a variable). Give reason for your answer. Identify the variable from the equations with a variable.

$17 = x + 7$

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2. State which of the following are equations (with a variable). Give reason for your answer. Identify the variable from the equations with a

variable.

$(t - 7) > 5$

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3. State which of the following are equations (with a variable). Give reason for your answer. Identify the variable from the equations with a variable.

$\frac{4}{2} = 2$

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4. State which of the following are equations (with a variable). Give reason for your answer. Identify the variable from the equations with a variable.

$(7 \times 3) - 19 = 8$

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5. State which of the following are equations (with a variable). Give reason for your answer. Identify the variable from the equations with a

variable.

$5 \times 4 - 8 = 2x$

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6. State which of the following are equations (with a variable). Give reason for your answer. Identify the variable from the equations with a variable.

$x - 2 = 0$

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7. State which of the following are equations (with a variable). Give reason for your answer. Identify the variable from the equations with a variable.

$2m < 30$

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8. State which of the following are equations (with a variable). Give reason for your answer. Identify the variable from the equations with a

variable.

$2n + 1 = 11$

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9. State which of the following are equations (with a variable). Give reason for your answer. Identify the variable from the equations with a variable.

$7 = (11 \times 5) - (12 \times 4)$

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10. State which of the following are equations (with a variable). Give reason for your answer. Identify the variable from the equations with a variable.

$7 = (11 \times 2) + p$

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11. State which of the following are equations (with a variable). Give reason for your answer. Identify the variable from the equations with a

variable.

$20 = 5y$

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12. State which of the following are equations (with a variable). Give reason for your answer. Identify the variable from the equations with a variable.

$\frac{3q}{2} < 5$

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13. State which of the following are equations (with a variable). Give reason for your answer. Identify the variable from the equations with a variable.

$z + 12 > 24$

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14. State which of the following are equations (with a variable). Give reason for your answer. Identify the variable from the equations with a

variable.

$20 - (10 - 5) = 3 \times 5$

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15. State which of the following are equations (with a variable). Give reason for your answer. Identify the variable from the equations with a variable.

$7 - x = 5$

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16. Complete the entries in the third column of the table.

S.No.	Equation	Value of variable	Equation satisfied Yes/No
(a)	$10y = 80$	$y = 10$	
(b)	$10y = 80$	$y = 8$	
(c)	$10y = 80$	$y = 5$	
(d)	$4l = 20$	$l = 20$	
(e)	$4l = 20$	$l = 80$	
(f)	$4l = 20$	$l = 5$	
(g)	$b + 5 = 9$	$b = 5$	
(h)	$b + 5 = 9$	$b = 9$	
(i)	$b + 5 = 9$	$b = 4$	
(j)	$h - 8 = 5$	$h = 13$	
(k)	$h - 8 = 5$	$h = 8$	
(l)	$h - 8 = 5$	$h = 0$	
(m)	$p + 3 = 1$	$p = 3$	
(n)	$p + 3 = 1$	$p = 1$	
(o)	$p + 3 = 1$	$p = 0$	
(p)	$p + 3 = 1$	$p = -1$	
(q)	$p + 3 = 1$	$p = -2$	

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17. Pick out the solution from the values given in the bracket next to each equation. Show that the other values do not satisfy the equation.

$5m = 60 (10, 5, 12, 15)$

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18. Pick out the solution from the values given in the bracket next to each equation. Show that the other values do not satisfy the equation.

$n + 12 = 20 \qquad (12, 8, 20, 0)$

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19. Pick out the solution from the values given in the bracket next to each equation. Show that the other values do not satisfy the equation.

$p - 5 = 5 \qquad (0, 10, 5, -5)$

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20. Pick out the solution from the values given in the bracket next to each equation. Show that the

other values do not satisfy the equation.

$\frac{q}{2} = 7 \qquad (7, 2, 10, 14)$

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21. Pick out the solution from the values given in the bracket next to each equation. Show that the other values do not satisfy the equation.

$r - 4 = 0 \qquad (4, \ -4, 8, 0)$

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22. Pick out the solution from the values given in the bracket next to each equation. Show that the other values do not satisfy the equation.

$x + 4 = 2 \qquad (-2, 0, 2, 4)$

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23. Complete the table and by inspection of the table, find the solution to the equation $m + 10 = 16$.

m	1	2	3	4	5	6	7	8	9	10	—	—	—
$m + 10$	—	—	—	—	—	—	—	—	—	—	—	—	—

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24. Complete the table and by inspection of the table, find the solution to the equation $5t = 35$.

t	3	4	5	6	7	8	9	10	11	—	—	—	—	—
$5t$	—	—	—	—	—	—	—	—	—	—	—	—	—	—

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25. Complete the table and find the solution of the equation $z/3 = 4$ using the table.

z	8	9	10	11	12	13	14	15	16	–	–	–	–
$\frac{z}{3}$	$2\frac{2}{3}$	3	$3\frac{1}{3}$	–	–	–	–	–	–	–	–	–	–

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26. Complete the table and find the solution to the equation $m - 7 = 3$.

m	5	6	7	8	9	10	11	12	13	–	–
$m-7$	–	–	–	–	–	–	–	–	–	–	–

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27. Solve the following riddles, you may yourself construct such riddles.

Who am I?

Go round a square

Counting every corner

Thrice and no more!

Add the count to me

To get exactly thirty four!

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28. Solve the following riddles, you may yourself construct such riddles.

Who am I?

For each day of the week

Make an upcount from me

If you make no mistake

You will get twenty three!

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29. Solve the following riddles, you may yourself construct such riddles.

Who am I?

I am a special number

Take away from me a six!

A whole cricket team

You will still be able to fix!

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30. Solve the following riddles, you may yourself construct such riddles.

Who am I?

Tell me who I am

I shall give a pretty clue!

You will get me back

If you take me out of twenty two!

Watch Video Solution

Exercise Multiple Choice Questions Level I

1. Evaluate the expression $\frac{16}{x} + 2y$ for $x = 8$ and $y = 3$.

A. 10

B. 8

C. 12

D. 6

Answer:

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2. What will not be the statement for the algebraic expression 20z?

A. The product of z and 20

B. z multiplied by 20

C. 20 times z

D. 20 divided by z

Answer:

Watch Video Solution

3. Find p, if $16 + p = 20$ using trial and error method.

A. 14

B. 4

C. 26

D. -26

Answer:

Watch Video Solution

4. What is the equation for 20 more than a number y equals 18?

A. $y - 20 = 18$

B. $y + 20 = 18$

C. $y - 18 = 20$

D. $20y = 18$

Answer:

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5. Find out the variable and constant in the expression $20x - 11y$.

A. $20, 11$ are constants, $-x, y$ are variables

B. $-20, 11$are constants, x, y are variables

C. $20, (-11)$ are constants, x, y are variables

D. None of these

Answer:

Watch Video Solution

6. For which equation $c = 5$is not a solution?

A. $2c + 1 = 11$

B. $2c - 1 = 10$

C. $3c + 2 = 17$

D. $\frac{c}{5} = +1 = 2$

Answer:

Watch Video Solution

7. If $a = 1/2, b = 1/4$, then value of the expression $16a + 8b - 10$is ____

A. 1

B. -1

C. 0

D. -2

Answer:

Watch Video Solution

8. 15 taken away from the product of x and y is written as

A. $15 - xy$

B. $xy - 15$

C. $15 - x / y$

D. $x / y - 15$

Answer:

Watch Video Solution

9. 10 chocolates are divided among 2 people. What will be the equation so that chocolates are divided equally, if each person gets x chocolates?

A. $x = 10 \div 2$

B. $x = 2 \div 10$

C. $x = 10 \times 2$

D. $x = 6$

Answer:

Watch Video Solution

10. $\frac{1}{3}$ of a number 'n' is 56. What is $\frac{1}{8}$ of the number?

A. 80

B. 21

C. 36

D. 42

Answer:

Watch Video Solution

11. If you take out twenty from me, I get halved.

What am I?

A. 20

B. 40

C. 10

D. 80

Answer:

 Watch Video Solution

12. Find the solution of the equation $5x - 10 = 15$ by trial and error method.

A. 1

B. -1

C. -5

D. 5

Answer:

Watch Video Solution

13. Number to be added on RHS of equation to find the value of $'y'$ in $y - 8 = 6$ is:

A. -8

B. $+8$

C. 0

D. 6

Answer:

Watch Video Solution

14. Which one of the following is an equation?

A. $20 = 5y$

B. $\frac{3q}{2} < 5$

C. $(t - 7) > 5$

D. $4s + 5$

Answer:

Watch Video Solution

15. x bananas are distributed among 8 children equally. Each child gets _____bananas.

A. $8x$

B. $(x + 8)$

C. $(x \div 8)$

D. $(x - 8)$

Answer:

Watch Video Solution

16. If we divide the sum of three numbers a, b and c by 8, we get 4. We can represent this statement algebraically as _____.

A. $\frac{a+b+c}{8}$

B. $(a+b+c) \times 8 = 4$

C. $\frac{a+b+c}{8} = 4$

D. $\frac{a+b+c}{4} = 18$

Answer:

Watch Video Solution

17. Commutative property of multiplication can be expressed using x and y as _____

A. $x \times y = y \times y$

B. $x \times y = y \times x$

C. $x \times y = x \times x$

D. $y \times x = y \times x$

Answer:

Watch Video Solution

18. What is the value $\frac{4m-3}{6}$ when $m = 9$?

A. 36

B. $\frac{33}{6}$

C. $\frac{14}{6}$

D. $\frac{39}{6}$

Answer:

Watch Video Solution

19. Write in statement form: $a - \frac{3}{2} = b$

A. a plus $\frac{3}{2}$ equals b

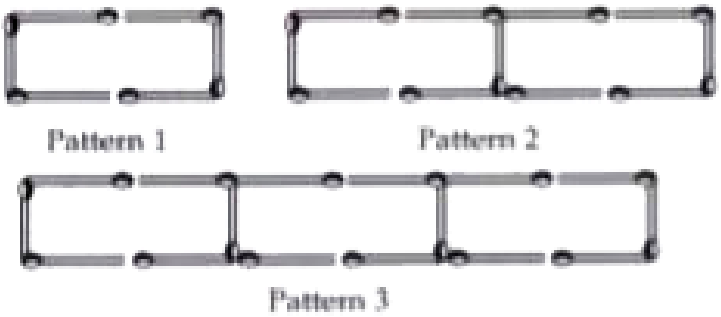
B. $\frac{3}{2}$ subtracted from a equals b

C. a subtracted from $\frac{3}{2}$ equals b

D. None of these

Answer:

20. Find the number of matchsticks used in n^{th} pattern.



A. $5n + 1$

B. $3n + 1$

C. $2n + 1$

D. $2n + 2$

Answer:

Watch Video Solution

21. Which of the following equations have a = 3 as its solution?

A. $6a + 9 = 21$

B. $a - 12 = 17$

C. $5a = 20$

D. $2a + (-3) = 3$

Answer:

Watch Video Solution

22. " 12 less than 10 times x" is written as

A. $12 - 10x$

B. $10x - 12$

C. $12 < 10x$

D. $10x + 12$

Answer:

Watch Video Solution

23. 6 times x to which 2 is added is

A. $2x - 6$

B. $2x + 6$

C. $6x + 2$

D. $2 - 6x$

Answer:

Watch Video Solution

24. The sum of 4 times a number and -6 is 10. What is the number?

A. 6

B. -4

C. 4

D. 10

Answer:

Watch Video Solution

25. A cake shop cuts a cake into 6 slices. One slice costs Rs. 35. Which equation would you use to find the cost x of the whole cake?

A. $35x = 6$

B. $6x = 35$

C. $x = 6 \times 35$

D. $x = \frac{35}{6}$

Answer:

Watch Video Solution

26. Half of c subtracted from the sum of a and b is written as

A. $\frac{a+b-c}{2}$

B. $b+c-\frac{a}{2}$

C. $a+c-\frac{c}{2}$

D. $a+b=\frac{b}{2}$

Answer:

Watch Video Solution

27. 'x exceeds y by 7' can be expressed as

A. $x + y = 7$

B. $x = y + 7$

C. $x - y = 0$

D. $x + y = 0$

Answer:

Watch Video Solution

28. A number divided by 10 then 4 is subtracted from it gives 2. The number is

A. 12

B. 60

C. 15

D. 10

Answer:

Watch Video Solution

29. 'One third of a number added to itself gives 8' can be expressed as

A. $\frac{x}{3} + 8 = x$

B. $\frac{x}{3} + x = 8$

C. $3x + 8 = x$

D. $x + 8 = 3x$

Answer:

Watch Video Solution

30. The expression for '3 times x from which 5 is subtracted' is

A. $3x - 5$

B. $3x + 5$

C. $x - 8$

D. $x + 5$

Answer:

Watch Video Solution

31. Which of the following is an equation in a variable?

A. $2 + x < 10$

B. $3 > 12 - x$

C. $x - 1 = 7$

D. $2 + 7 = 7 + 2$

Answer:

Watch Video Solution

32. Which of the following values is correct for the equation $p - 16 = -42$?

A. $p = 26$

B. $p = -26$

C. $p = 3$

D. $p = -2$

Answer:

Watch Video Solution

33. If $\frac{1}{3}x + 5 = 17$, find the value of x.

A. 36

B. 12

C. 46

D. 15

Answer:

Watch Video Solution

34. '7 taken away from the sum of x and y' can be expressed as

A. $x + y - 7$

B. $7 - (x + y)$

C. $\frac{x + y}{7}$

D. $\frac{7}{x + y}$

Answer:

Watch Video Solution

35. The algebraic expression for '4 times x taken away from one-third of y' is written as

A. $4x-\frac{y}{3}$

B. $\frac{y}{3}-4x$

C. $4y-3x$

D. $4x-3y$

Answer:

Watch Video Solution

Exercise Multiple Choice Questions Level Ii

1. Write the expression for the difference of x and y is divided by 4, where x is greater than y'.

A. $x - y \div 4$

B. $(x - y) = 4$

C. $(y - x) = 4$

D. none of these

Answer:

Watch Video Solution

2. 10 subtracted from three-fourth of x is equal to 5. This statement can be expressed in equation form as

A. $10 - \frac{3x}{4} = 5$

B. $\frac{3x}{4} - 5 = 10$

C. $\frac{3x}{4} - 10 = 5$

D. $\frac{4x}{3} - 10 = 5$

Answer:

Watch Video Solution

3. Represent the following expression algebraically. A number, x decreased by the sum of 2y and 5.

A. $(2y + 5) - x$

B. $x - (2y + 5)$

C. $x - 2y + 5$

D. $(x + 2y) - 5$

Answer:

Watch Video Solution

4. The length of a rectangular plot is l and the breadth is three times the length. What is the perimeter of a plot?

A. $2l + b$

B. $2(l + 2b)$

C. $2(l + 3b)$

D. $8l$

Answer:

Watch Video Solution

5. The number 6 when added to a product of the number k and 4, results in 50. Which of these equation represents the relation? Also the solution for k.

A. $6 + 4k = 50, 11$

B. $4k - 6 = 50, 12$

C. $4(k + 6) = 50, 11$

D. $(6 + 4)k = 50, 15$

Answer:

Watch Video Solution

6. One pencil costs Rs. 3 and one pen costs Rs. 25. The total cost of x pencils and y pens is

A. $(3x + 5y)$

B. $3(x + y + 25)$

C. $(3x + 25y)$

D. $(3x + y + 25)$

Answer:

Watch Video Solution

7. Riya spends Rs. p daily and saves Rs. r per week. In What is her income (in Rs.) for two weeks?

A. $p + r$

B. $7p + 7r$

C. $14p + 2r$

D. $14p + 7r$

Answer:

Watch Video Solution

8. Think of a number. Multiply it by 5. Subtract 5 from the result. Divide the result by 5. If adding 5 to the result you get 5, then find the number.

A. 1

B. 5

C. 4

D. 9

Answer:

Watch Video Solution

9. If 8 pens cost Rs. w, find the cost of 5 such pens.

A. Rs. 40 w

B. $Rs.\left(\frac{5w}{8}\right)$

C. $Rs.\left(\frac{80w}{5}\right)$

D. $Rs.\left(\frac{w}{40}\right)$

Answer:

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10. "The sum of twice a number subtracted from 5 and thrice the same number added to 4" can be expressed as

A. $(2x + 5) - (4 - 3x)$

B. $(2x - 5) + (4 - 3x)$

C. $(2x - 5) + (4 + 3x)$

D. $(5 - 2x) + (3x + 4)$

Answer:

Watch Video Solution

11. Twice a number added to 3 times itself equal to 95. Find the number.

A. 19

B. 5

C. 18

D. 45

Answer:

Watch Video Solution

12. Rehan attended a basketball camp for two weeks. His parents paid Rs. 50, which was $\frac{1}{3}$ the cost of attending the camp. Rehan had saved money to pay the rest of the cost. Which equation can be used to find c, the entire cost of attending the camp?

A. $c = 50 \times \frac{1}{3}$

B. $c = 50 \times 3$

C. $c = \dfrac{1}{(50 \times 3)}$

D. $c = 3 \times \dfrac{1}{50}$

Answer:

Watch Video Solution

13. If $x = -3$ and $y = -4$, then the value of $24x - 42y + 27$ is

A. -69

B. 123

C. -213

D. 213

Answer:

Watch Video Solution

14. "The sum of 3 subtracted from 3 times p^2 and the 17 subtracted from $12q^2$ can be expressed as

A. $3p^2 + 12q^2 + 20$

B. $3p^2 - 3 + 12q^2$

C. $3p^2 + 12q^2 - 20$

D. $p^2 + 12q^2 - 20$

Answer:

Watch Video Solution

15. 5 subtracted from twice a number gives 17 times that number. Find the number.

A. $-\frac{1}{5}$

B. 2

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

D. 18

Answer:

 Watch Video Solution

Exercise Match The Following

1. Match the equations with their solutions.

List-I		List-II	
(P)	$\frac{2t}{10} = 5$	1.	-4
(Q)	$5a + 18 = -2$	2.	30
(R)	$30y = 60$	3.	25
(S)	$\frac{x}{2} - 5 = 10$	4.	2

A. $P-3, Q-1, R-2, S-4$

B. $P-3, Q-1, R-4, S-2$

C. $P-2, Q-3, R-1, S-4$

D. $P-3, Q-4, R-1, S-2$

Answer:

Watch Video Solution

2. Match the statements given in the List-I with the equations given in List-II.

	List-I		List-II
(P)	Four times a number x increased by 3 gives 19.	1.	$3x - 4 = 16$
(Q)	Think of a number, divide it by 5 and add 11. The result is 23.	2.	$4x + 3 = 19$
(R)	15 multiplied by x equals 20.	3.	$\frac{x}{5} + 11 = 23$
(S)	A number multiplied by 3 and then subtracted by 4 gives 16 as result.	4.	$15x = 20$

A. $P - 3, Q - 1, R - 2, S - 4$

B. $P-1, Q-4, R-3, S-2$

C. $P-2, Q-3, R-4, S-1$

D. $P-4, Q-1, R-3, S-2$

Answer:

Watch Video Solution

Exercise Assertion Reason Type

1. Assertion : The variable and constants of the algebraic expression $5x+2$ is 5, 2 and x

respectively.

Reason : Variables are the alphabets used to represent unknown numbers and constants have the fixed value.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer:

Watch Video Solution

2. Assertion : If $p = 4, q = 7$. Then the value of $p \times q$ is 21.

Reason : The expression indicates multiplication of p and q.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer:

3. Assertion : $x + x = 2x$

Reason : A number is being added to itself is actually a twice of that number.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer:

4. Assertion : $2x + 3 = 8 = 2x + 3 - 3 = 8 - 3$

$\Rightarrow 2x = 5 \Rightarrow x = \frac{5}{2}$

Reason : If we add/ subtract a number to L.H.S. of an equation then, we should add/ subtract the same number to R.H.S. to balance an equation.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer:

5. Assertion : $2x < 12$ is not an equation.

Reason : An equation, must have a equality sign.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

Answer:

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Exercise Comprehension Type

1. Think of a number. Multiply it by 4.Subtract 2 from the result. Divide the result by 2. Add 6 to the result.

Let the number be $x = 16$, then twice the result is

A. 47

B. 37

C. 74

D. 31

Answer:

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2. Think of a number. Multiply it by 4.Subtract 2 from the result. Divide the result by 2. Add 6 to the result.

The number is $x = 10$, then the result is a/an

A. even number

B. odd number

C. negative integer

D. prime number

Answer:

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3. Think of a number. Multiply it by 4.Subtract 2 from the result. Divide the result by 2. Add 6 to the result.

If the number is c, then expression will be

A. $(c \times 2 + 2 \div 2) - 6$

B. $[(c - 4) \div 6) \div 2$

C. $2c \div 2 + 6$

D. $[\{(c \times 4) - 2\} \div 2] + 6$

Answer:

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4. The perimeter of a square = 4s

Area of a square = $s \times s$

Perimeter of a rectangle = $2(l + b)$

Area of a rectangle = $l \times b$

The perimeter of a square = 24 units. The side of a square is

A. 6 units

B. 12 units

C. 4 units

D. 8b units

Answer:

Watch Video Solution

5. The perimeter of a square = 4s

Area of a square = $s \times s$

Perimeter of a rectangle = $2(l + b)$

Area of a rectangle = $l \times b$

If length is thrice of the breadth of a rectangular hall. Find the perimeter of the rectangle.

A. 3b units

B. 21 units

C. 412 units

D. 8b units

Answer:

Watch Video Solution

6. The perimeter of a square = 4s

Area of a square = $s \times s$

Perimeter of a rectangle = $2(l + b)$

Area of a rectangle = $l \times b$

The side of a square is $12.5x$ m. Find the area of a square, when x = 2.

A. $\frac{1}{4}$ sq.m

B. $\frac{1}{16}$

C. $\frac{1}{8}$

D. $\frac{1}{64}$ sq.m

Answer:

Watch Video Solution

Exercise Subjective Problems Very Short Answer Type

1. Write the following statements as algebraic expression.

Three times 'a' less than three fourth of 16.

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2. Write the following statements as algebraic expression.

The product of a variable (x) and minus six, subtracted from twelve.

Watch Video Solution

3. The side of a square is s cm. Express the perimeter of the square in terms of s.

Watch Video Solution

4. "25 taken away from the product of x and y" is written in the form of algebraic expression as _____.

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5. The length of a rectangular wall is l cm, the breadth is 2b. Find the area of the wall.

Watch Video Solution

6. If $a = -2, b = -3, c = 2$then find the value of $\frac{ab}{c} + 9$?

Watch Video Solution

7. Solve : $-2(x + 1) = 17$

Watch Video Solution

8. Express the following statement in the form of algebraic expression:

"Each girl eats 5 toffees. How many toffees do m girls eat?

Watch Video Solution

9. Write the expression for "s multiplied by 9".

Watch Video Solution

10. Write the statement for given expression $\frac{P}{5} + 1$.

Watch Video Solution

11. Evaluate the expression $7x + 21$ when $x = 50$

.

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Exercise Subjective Problems Short Answer Type

1. If $q = 5$ and $p = -3$, then find the value of the following expressions.

$q + 3p - 10$

Watch Video Solution

2. If $q = 5$ and $p = -3$, then find the value of the following expressions.

$8q + 9p - 17$

Watch Video Solution

3. Find the value of the expression $3ab - 4a + 5$,if $a = 4$ and $b = 2$.

Watch Video Solution

4. If $a = 2$and $b = 8$, then find the value of

$\frac{b}{a} + 9$

Watch Video Solution

5. If $a = 2$and $b = 8$, then find the value of

$10 - 6ab$

Watch Video Solution

6. Let x be the number. When it is multiplied by 3, then the result is 18. Find out twice of the same number

Watch Video Solution

7. What is the solution of the equation "20 is subtracted from z gives 15"?

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8. Look at the patterns and fill up the missing boxes. State the rule which connects the quantities in the different columns. Find the generalised statement for n in each case.

a	15	14	13	12	11	10	n
b	10	9	8	7			

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9. Translate the statement into an equation and then find the number.

"I think a number, divide it by 4 and add 11. The result is 17."

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10. A troop of soldiers is standing in rows. In each row, there are 27 soldiers. Find the rule that can be used to calculate the total number of soldiers.

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11. The product of two numbers is 18. If one of the numbers is a, then find the other number in terms of a.

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12. If $x = 1, y = 2, z = 5$, then find the value of $3x - 2y + 4z$.

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Exercise Subjective Problems Long Answer Type

1. 7 times a number decreased by the sum of 2 and 15 equals 4. What is thrice the number?

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2. What is the solution of the equation $10m - 16n + 2p + 5$, if $m = 6, n = -4$ and $p = 3$?

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3. Write the following in algebraic form:

Seven added to, eight times a number divided by two.

Watch Video Solution

4. Write the following in algebraic form:

The 'a' is multiplied by twenty and added to the seven.

Watch Video Solution

5. Solve the equation by trial and error method

$2(x-1)=6$

Watch Video Solution

6. Solve the equation by trial and error method

$4(x-3)=8$

Watch Video Solution

7. The length of a box is 16 cm more than twice its width. If the width is y cm, what is its length? Find out the area of the box when $y = 1$.

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Exercise Integer Numerical Value Type

1. I am an integer. When you multiply me by 2 and subtract 10 from me, the result is 6. Who am I?

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2. The product of a number x and 7 is 56. Find the number.

Watch Video Solution

3. Find the value of $6x-2y+8$, when $x=5$ and $y=3$.

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4. The sum of two consecutive integers is 9. Find the smallest integer.

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5. solve $3(x-2)=6$

Watch Video Solution

6. If $x=1, y=2$and $z=5$, find the value of $3x-2y+z$.

Watch Video Solution

7. If $\frac{2}{5}$ of a number is 18. What will be the product of two digits of the number?

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8. Find the value of 'a' if the product of a and 10 equals 60.

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9. When you add -15 to a number, the result is 25.

Find the number.

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10. Find the value of v in equation $\frac{v}{3} + 2 = 4$

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Olympiad Hots Corner

1. Sahil tried to solve an equation but couldn't reach to the correct answer.

Following were the steps performed by him to solve the expression.

Solve for n: $3n + 5(n + 2) = 46$

Step 1 : $3n + 5n + 10 = 46$

Step 2: $8n + 10 = 46$

Step 3: $8n = 56$

Step 4: $n = \frac{56}{8} = 7$

Find the incorrect step.

A. Step 4

B. Step 3

C. Step 2

D. Step 1

Answer:

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2. If $a = 8$and $x = 4$, then the value of $\frac{3ax + 6x - 9}{3a - 4x - 2}$ is

A. $18\frac{1}{3}$

B. $19\frac{2}{7}$

C. $19\frac{1}{3}$

D. $18\frac{1}{2}$

Answer:

Watch Video Solution

3. The breadth of a rectangular bed sheet is 5 cm more than half the length of the bed sheet. What is the perimeter of the bed sheet, if the length is x cm?

A. $(3x + 12)cm$

B. $2(x + 5)cm$

C. $(3x + 10)cm$

D. $(4x + 12)cm$

Answer:

Watch Video Solution

4. The algebraic expression for the statement 'One-fifth of a number x is subtracted from the sum of b and thrice of c' is

A. $3(b+c)-\frac{x}{5}$

B. $(b+3c)-\frac{x}{5}$

C. $\frac{x}{5}-(b+3c)$

D. $\frac{x}{5}-3(b-3c)$

Answer:

Watch Video Solution

5. The sum of $\left(\frac{3}{5}\right)^{th}$ of a number and four times that number is 115. Find the number.

A. 10

B. 30

C. 23

D. 25

Answer:

Watch Video Solution

6. In a farm, there were 3c cows, 5p pigs and 11d ducks. Express in terms of c, d and p, the total

number of legs of the remaining animals, if 3 cows, 2 pigs and 4 ducks were sold.

A. $20c + 22p + 12d - 28$

B. $20c + 20p + 22d - 28$

C. $20c + 15p + 200 - 32$

D. $12c + 200 + 220 - 28$

Answer:

Watch Video Solution

7. Megha and Beena shared 272 beads. If Megha has thrice as many beads as Beena, how many beads does Megha have?

A. 68

B. 204

C. 104

D. 202

Answer:

Watch Video Solution

8. Maya has the equal number of Rs. 2 and 50 paise coins. The total value of the coins is Rs. 70. If she spent five 50 paise coins, how many 50 paise coins did she have left?

A. 18

B. 23

C. 28

D. 46

Answer:

Watch Video Solution

9. Ali will be 6y years old after 6 years. How old was Ali, 4y years ago?

A. $6y - 6$

B. $10y - 6$

C. $2y - 6$

D. $2y + 6$

Answer:

Watch Video Solution

10. Priya had Rs. 50. After buying 5 identical pens, she has Rs. y left. The cost of 1 pen in terms of y is

A. $Rs.\left(\frac{50-y}{5}\right)$

B. $Rs.\left(50-\frac{y}{5}\right)$

C. $Rs.(50-5y)$

D. $Rs.\left(\frac{50y}{5}\right)$

Answer:

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11. On Monday, there were thrice as many peanuts in Sack X as Sack Y. On Tuesday, 3952 peanuts from Sack X were sold. Now, there were thrice as many peanuts in Sack Y as Sack X. How many peanuts were there in Sack X at first?

A. 4644

B. 6644

C. 4446

D. 4466

Answer:

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12. Mayank is $1\frac{2}{5}$ times as tall as Vansh. If Mayank is 38 cm taller than Vansh, then what is Mayank's height?

A. 133 cm

B. 123 cm

C. 95 cm

D. 129 cm

Answer:

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13. Three boys and four girls shared 198 sweets. Each girl received twice as many sweets as each boy. How many sweets did each girl receive?

A. 36

B. 18

C. 24

D. 30

Answer:

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14. Abhay found the perimeter of a square to be 12 metres. Which of the following could be used to find the length (l) of one side of the square?

A. $l = 4 \times 12$

B. $l = 12 \div 4$

C. $l = 4 + 12$

D. $l = 4 - 12$

Answer:

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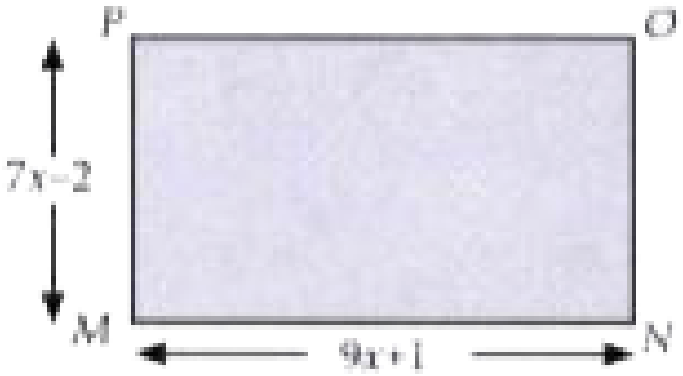
15. In the given rectangle MNOP, if length is increased by 2x units and breadth is decreased by 3x units, then find the new perimeter.



A. $(28x + 2)$ units

B. $(30x + 2)$ units

C. $(30x - 2)$ units

D. $(28x - 2)$ units

Answer:

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16. There are three numbers A, B and C. A is double of B and C is 65, which is 17 less than A. What is the value of B ?

A. 41

B. 40

C. 36

D. 42

Answer:

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17. Write the following statement using arithmetical numbers, literal numbers and arithmetical operations.

'17 more than 3 times the product of two numbers I and m'

A. $3lm + 17$

B. $3lm - 17$

C. $\frac{3lm}{17}$

D. $17 \times 3(l + m)$

Answer:

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18. Prachi took a total of 2 hours to write 30 party invitations. Which of the following equations can be used to find m, the number of minutes Prachi took to write 1 invitation?

A. $(60 \div 30) \div 2 = m$

B. $(60 \times 30) + 2 = m$

C. $(60 \div 2) \times 30 = m$

D. $(60 \times 2) \div 30 = m$

Answer:

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19. If $(k-8)$ is the highest common factor of 56 and 77, then the value of k is

A. 7

B. 11

C. 15

D. 16

Answer:

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20. If one-third of a tank holds 80 litres of water, then the quantity of water that half of the tank holds is

A. $\frac{80}{3}$ litres

B. 100 litres

C. 120 litres

D. 240 litres

Answer:

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