

NOTES

CLASS 7

MATHS

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SIMPLE EQUATIONS

I. Important Concepts / Results

An equation is a condition on a variable. A variable is something that can vary. It assumes different numerical values; its value is not fixed. These are usually denoted by letters of the English alphabet, such as x , y , z , l , m , n , p , etc. From variables, we form expression by performing operation like addition, subtraction, multiplication and division on them.

What Equation Is?

An equation is a condition on a variable. The condition is that two expressions should have equal value. Note at least one of the two expressions must contain the variable.

An equation remains the same when the expressions on the left and on the right are interchanged. This property is often useful in solving equations.

Solving an Equation

For any balanced numerical equation, if we either:

- add the same number to both sides,
- or subtract the same number from both sides,
- or multiply by the same number to both sides,
- or divide by the same number both its sides, the balance is undisturbed.

Examples

i) MCQ

1) Write the Simple equation of the statement “The sum of three times x and 10 is 13”

- a) $3x + 10 = 13$ b) $3x - 10 = 13$ c) $3x + 13 = 10$ d) None

Ans :- a) $3x + 10 = 13$

2) Write the Simple equation of the statement “Taking away 5 from x gives 10”

- a) $x + 5 = 10$ b) $x - 10 = 5$ c) $x - 5 = 10$ d) None

Ans: - c) $x - 5 = 10$

3) Write the Simple equation of the statement “Add 1 to three times p to get 7”

- a) $1 + p = 7$ b) $3 + p = 7$ c) $7 + p = 3$ d) $1 + 3p = 7$

Ans: - d) $1 + 3p = 7$

4) The solution of the equation $x + 3 = 0$ is

- a) 3 b) - 3 c) 0 d) 1

Ans: - b) -3

5) The solution of the equation $7n + 5 = 12$ is

- a) 0 b) -1 c) 1 d) 5

Ans :c) 1



ii) Case Study Based Questions:-

NUMBER GAME

1. I am a number. If you multiply me by 3 and subtract 2 from me, I become 10 more than my double. What is my value?

- (a) 4 (b) 8 (c) 10 (d) 12

Ans: d) 12

2. What minimum positive integral value must be added to the number obtained in question 1 to make it a perfect cube.

- (a) 15 (b) 4 (c) 3 (d) 13

Ans: a) 15

3. If 6 is added, only to the right hand side of the equation obtained in question 1, will the value of the number also increase by 6. Justify your answer.

Ans: - Yes, Justification: $3x-2=2x+10+6 \Rightarrow x=18=12+6$

Short Answer type Questions:-

1) Write the following statements in the form of equations:

(i) The sum of three times x and 11 is 32.

(ii) If you subtract 5 from 6 times a number, you get 7.

Solution:

(i) Three times x is $3x$. Sum of $3x$ and 11 is $3x + 11$. The sum is 32.

The equation is $3x + 11 = 32$.

(ii) Let us say the number is z ; z multiplied by 6 is $6z$. Subtracting 5 from $6z$, one gets $6z - 5$.

The result is 7. The equation is $6z - 5 = 7$

2) Convert the following equations in statement form: (i) $x - 5 = 9$ (ii) $5p = 20$

Solution: (i) Taking away 5 from x gives 9.

(ii) Five times a number p is 20.

3) Solve : $x + 5 = 7$

Solution: add -5 on both sides, we get $x + 5 - 5 = 7 - 5$

$$x = 2$$

Long Answer type Questions

1) Find a number, such that one-fourth of the number is 3 more than 7.

Solution :

Let us take the unknown number to be y ; one-fourth of y is $\frac{y}{4}$

This number $\frac{y}{4}$ is more than 7 by 3.

Hence we get the equation for y as $\frac{y}{4} - 7 = 3$

To solve this equation, first transpose 7 to RHS We get, $\frac{y}{4} = 3 + 7 = 10$.

We then multiply both sides of the equation by 4, to get

$\frac{y}{4} \times 4 = 10 \times 4$ or $y = 40$ (the required number)



2) Raju's father's age is 5 years more than three times Raju's age. Find Raju's age, if his father is 44 years old.

Solution :

The equation that gives Raju's age is $3y + 5 = 44$

To solve it, we first transpose 5, to get $3y = 44 - 5 = 39$

Dividing both sides by 3, we get $y = 13$

Hence Raju's age is 13 years.

III. Questions for Practice

i) MCQ

1. Write the following statement in the form of equation one eight of x is 5 more than 3.

(a) $x/8 + 5 = 3$ (b) $x/8 - 3 = 5$ (c) $3/x - 8 = 5$ (d) $x/8 - 5 = 3$

2. Add 9 to three times P to get 100.

(a) $3P + 9 = 100$ (b) $3P - 100 = 9$ (c) $3P + 100 = 9$ (d) $3P - 9 = 100$

3. Shweta's mother's age is 7 years more than four times of shweta's age. Shweta's mother's age is 55 years old. Set up an equation to find shweta's age.

(a) $4m + 7 = 55$ (b) $4m - 7 = 55$ (c) $4m + 55 = 7$ (d) $4m - 55 = 7$

4. the sum of three times x and 13 is 34.

(a) $3x - 13 = 34$ (b) $3x + 13$ (c) $3x - 34 = 3$ (d) $3x + 13 = 34$

5. Choose the correct value of variable which satisfy following equation.

$$4n + 17 = 25$$

(a) 1(b) 2(c) 3(d) 4

6. Write the following equation in statement forms. $7x + 8 = 53$

(a) Seven times of x plus 8 gives 53(b) 8 times of y plus + 7 gives = 53

(c) Seven times of x plus 9 gives 63(d) 8 times of x minus 7 gives 53

7. Solve $3P - 6 = 18$ and find the value of P?

(a) 4(b) 2(c) 8(d) 3

8. Solve $m/5 + 20 = 45$ find the value of m?

(a) $m = 45$ (b) $m = 20$ (c) $m = 120$ (d) $m = 125$

9. Solve the following equation $2(x + 5) = 14$

(a) 3(b) 4(c) 2(d) 1

10. Solve the equation $x/7 + 20 = 34$

(a) 98(b) 72(c) 84(d) 70



ii) Short Answer Type Questions:-

1. Solve the following equation.

Add 6 to four times a number you get 62.

2. Solve the equation $x/7 + 20 = 34$

3. In an isosceles triangle, the base angles are equal. The vertex angle is 80° . What are the base angles of the triangle?

4. If $k + 7 = 10$, find the value of $9k - 50$.

5. If 5 is added to twice a number, the result is 29. Find the number.

6. Write the following statements in the form of equations.

One-fourth of a number is 2 more than 5.

7. Convert the following equations in statement form:

(a) $5x = 20$

(b) $3y + 7 = 1$

Long Answer type Questions:-

1. The sum of three consecutive multiples of 2 is 18. Find the numbers.

2. Each of the 2 equal sides of an isosceles triangle is twice as large as the third side. If the perimeter of the triangle is 30 cm, find the length of each side of the triangle.

3. A man travelled two-fifth of his journey by train, one-third by bus, one-fourth by car and the remaining 3 km on foot. What is the length of his total journey?

4. The length of a rectangle is twice its breadth. If its perimeter is 60 cm, find the length and the breadth of the rectangle.

5. Solve $4(m + 3) = 18$

6. Set up the equation and solve the following statement

Anwar thinks of a number. If he takes away 7 from $\frac{5}{2}$ of the number, the result is 23

Case Study Based Questions:-

1. BANANAS

A school was celebrating Republic day. On that day, school decided to give some refreshment to the students after all the events. They decided to give 2 bananas per student. But, on the celebration day, 300 students were absent. As a result, each student got 1 extra banana.

a) Find the minimum number of bananas school has to bring for total 's' number of students.

b) Find total number of students in the school.

c) Suppose on that day 600 students were absent then how many extra bananas will each student get?

d) School funded Rs3000 for the bananas. The cost of one banana is Rs2. After some discount, seller got ready to give the minimum number of bananas required by the school for Rs 3000. Find the cost of one banana.

2. SPORTS CLUB

Rajeev pays Rs225 in advance on his account at a sports club. Each time, he visits the club, Rs 9 is deducted from the account.

a) Which of the following equations represent the balance "x" left in his account after "t" number of days?



- (a) $t=225+9x$ (b) $x=9+225t$ (c) $x=225-9t$ (d) $t=225-9x$
 b) How much balance (in Rs) is left in Rajeev's account after 20 visits?
 (a) 54 (b) 45 (c) 36 (d) 60
 c) After how many days, Rajeev have to recharge his account?

Answers for III. Questions for Practice

MCQ	<u>S.A</u>	<u>L.A</u>	Case Study Based Questions
1) b	1) 14	1) 4, 6, 8	1) a) $2x$
2) a	2) 98	2) 6, 12, 12	b) $2x/(x-300)$
3) a	3) 50	3) 180 km	c) 4
4) d	4) $k = -23$	4) 10, 20	d) 1.66 approx
5) b	5) 12	5) $3/2$	
6) a	6) $\frac{1}{4}x = 7$	6) 23	2) a) c
7) c	7) (a) Five times a number x gives 20. (b) Add 7 to three times a number y gives 1.		b) b
8) d			c) 25 days
9) c			
10) a			

Chapter Test Marks : 20

I Choose the correct answer:-

2 x 1 = 2 marks

1. Add 9 to three times P to get 100.

(a) $3P + 9 = 100$ (b) $3P - 100 = 9$ (c) $3P + 100 = 9$ (d) $3P - 9 = 100$

3. Shweta's mother's age is 7 years more than four times of shweta's age. Shweta's mother's age is 55 years old. Set up an equation to find shweta's age.

(a) $4m + 7 = 55$ (b) $4m - 7 = 55$ (c) $4m + 55 = 7$ (d) $4m - 55 = 7$

II. Answer the following :

3 X 2 = 6 Marks

3. If $k + 7 = 10$, find the value of $9k - 50$.

4. If 5 is added to twice a number, the result is 29. Find the number.

5. Write the following statements in the form of equations.

One-fourth of a number is 2 more than 5.

III. Answer the following:-

3 x 4 = 12 Marks

6. A man travelled two-fifth of his journey by train, one-third by bus, one-fourth by car and the remaining 3 km on foot. What is the length of his total journey?

7. The length of a rectangle is twice its breadth. If its perimeter is 60 cm, find the length and the breadth of the rectangle.

8. Solve $4(m + 3) = 18$



I Choose the correct answer:-**4 x 1 = 4 marks**

- 1)) Write the Simple equation of the statement “ The sum of three times x and 10 is 13”
 a) $3x + 10 = 13$ b) $3x - 10 = 13$ c) $3x + 13 = 10$ d) None
- 2) Write the Simple equation of the statement “ Taking away 5 from x gives 10”
 a) $x + 5 = 10$ b) $x - 10 = 5$ c) $x - 5 = 10$ d) None
- 3) Write the Simple equation of the statement “ Add 1 to three times p to get 7”
 a) $1 + p = 7$ b) $3 + p = 7$ c) $7 + p = 3$ d) $1 + 3p = 7$
- 4) The solution of the equation $x + 3 = 0$ is
 a) 3 b) - 3 c) 0 d) 1

II. Answer the following :**3 X 2 = 6 Marks**

5. Solve the following equation.

Add 6 to four times a number you get 62.

6. Solve the equation $x/7 + 20 = 34$ 7. In an isosceles triangle, the base angle are equal. The vertex angle is 80° . What are the base angles of the triangle?**III. Answer the following:-3x 4 = 12Marks**

8. The sum of three consecutive multiples of 2 is 18. Find the numbers.

9. Set up the equation and solve the following statement

Anwar thinks of a number. If he takes away 7 from $\frac{5}{2}$ of the number, the result is 23

10. Raju's father's age is 5 years more than three times Raju's age. Find Raju's age, if his father is 44 years old.

Case Study Based Questions :-**2 x 4 = 8 marks****11. BANANAS**

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