

# **Simple Equations**

### MATHEMATICAL REASONING

1. You are decorating a gift pack with 15 flowers. You want an equal number of flowers in each of the 3 rows on the gift pack. Which equation would you use to find the number of flowers, r, in each row?

(a) 
$$r+3=15$$
 (b)  $15+r=3$   
(c)  $3r=15$  (d)  $\frac{3}{r}=15$ 

- 2. The solution of the equation 10-3y=1 is y=\_\_\_\_. (a) 0 (b) 1
  - (c) 2 (d) 3
- **3.** 5 less than thrice a number and add 7. The result is 14. The number is \_\_\_\_\_. (a) 5 (b) 4 (c) 6 (d) 2
- **4.** Which of the given equation does not have 4 as the solution?
  - (a) p+5=9 (b) 14-p=10(c)  $\frac{20}{p}=4$  (d) 9p=36
- 184 is divided into two parts such that onethird of one part may exceed one -seventh of the other part by 8, then the greater part is\_\_\_\_.

(a) 72	(b) 110
(c) 112	(d) 114

- 6. If  $\frac{2x}{1+\frac{1}{1+\frac{x}{1-x}}}$  then find the value of x. (a) 1 (b) 4/3 (c) 1/3 (d) 2/3
- **7.** What is the value of p that makes the following expression true?

$$p - \{-4 - (2 - 8 \div 4)\} = 8$$
(a) -12 (b) -4  
(c) 4 (d) 12

**8.** If two third of a number, half of the same number and one-seventh of same number is added to itself, the result is 37. The number is

(a) 
$$14\frac{2}{97}$$
 (b)  $16\frac{2}{97}$   
(c)  $18\frac{2}{97}$  (d)  $15\frac{2}{97}$ 

9. If two supplementary angles differ by  $44^{\circ}$ , then one of the angles is \_\_\_\_\_. (a)  $102^{\circ}$  (b)  $65^{\circ}$ (c)  $112^{\circ}$  (d)  $72^{\circ}$ 

- 10. The value of x in  $\frac{3}{4}(7x-1) - \left(2x - \frac{1-x}{2}\right) = x + \frac{3}{2}$  is \_\_\_\_\_. (a) 2 (b) 3 (c) 1 (d) 0
- 11. If  $\frac{2}{5}(5x+1) + \frac{3}{5} = 1$ , then what is the value of x? (a)  $\frac{-1}{5}$  (b) 1 (c) 0 (d)  $\frac{1}{5}$

**12.** If  $\frac{9}{5}$  of a number is 45, what is  $\frac{1}{5}$  of the same number? (a) 5 (b) 25 (c) 30 (d) 81

**13.** Solve for  $x: \frac{6x-2}{9} + \frac{3x+5}{18} = \frac{1}{3}$ . (a)  $\frac{1}{3}$  (b)  $\frac{2}{3}$ (c)  $\frac{3}{5}$  (d)  $\frac{8}{3}$  **14.** Which of the following statement do not hold in solving the equation 15 + 3x = 3?

(a) $3x = 3 - 15$	(b) $15 - 3 = -3x$
(c) $15 \pm \frac{3x}{-3}$	(d) $\frac{15}{3x} + \frac{3x}{3x} - \frac{3}{3x}$
(c) $13 + \frac{3}{3} = 3$	(u) $\frac{1}{3} + \frac{1}{3} = \frac{1}{3}$

**15.** Form an equation of the form ax + b = c, where a, b and c are constants, such that the solution of the equation is x = 4.

(a) 2x+5=15 (b) 7x+2=10(c) 5x+4=16 (d) 3x+4=16

# **EVERY DAY MATHEMATICS**

- 16. Ram's father's age is 3 years more than two times Ram's age. Ram's father is 45 years old. Form an equation to find Ram's age. (a) 2x+3=45 (b) 3x+2=45(c) 6x+3=45 (d) 5x+1=45
- **17.** A shopkeeper sells bananas in two types of boxes, one small and one large. A large box contains as many as 6 small boxes plus 2 loose bananas. Form an equation which gives the number of bananas in each small box, if the number of bananas in 1 large box is 50.

(a) $3x+1=50$	(b) $x + 1 = 20$
(c) $6x + 2 = 50$	(d) $2x+1=20$

**18.** The people of Delhi planted trees in a garden. Some of the trees were fruit trees. The number of non-fruit trees were 3 more than four times the number of fruit trees. What was the number of fruit trees planted, if the number of non, fruit trees planted was 87?

(a) 42	(b) 21
(c) 40	(d) 62

- **19.** The teacher tells the class that the highest marks obtained by a student in her class is four times the lowest marks plus 6. The highest score is 65. Form the equation which will calculate the lowest marks.
  - (a) 6m + 4 = 65 (b) 4m + 65 = 6
  - (c) 4m+6=65 (d) 6m+65=4

20. There are some lotus flowers in a pond and some bees are hovering around. If one bee lands on each flower, one bee will be left. If two bees land on each flower, one flower will be left. Then, the number of flowers and bees respectively are \_\_\_\_.

(a) 3, 4
(b) 4, 3

(a) 
$$3, 4$$
 (b)  $4, 3$   
(c)  $2, 3$  (d)  $3, 2$ 

#### **ACHIEVERS SECTION (HOTS)**

21. A number consists of two digits whose sum is 9. If 27 is added to the number, its digits are interchanged. Which of the given steps is CORRECT to find the number? Step 1: Let the unit's digit be x Step 2: Then, ten's digit = (9-x)∴ Number =  $10 \times (9-x) + x$  $\Rightarrow 90 - 10x + x = (90 - 9x)$ Step 3: Adding 27 to the number 90 - 9x, we get 117 - 9x

**Step 4:** Number with digits interchanged is 10x + (9 - x) = 9x + 9

**Step 5:** 117-9x=9x+9 **Step 6:** Therefore unit's digit = 6 and ten's digit = 3 **Step 7:** Hence the number = 36. (a) Only Step 4 (b) Both Step 1 and Step 2 (c) Step 1, 2, 3 and 4

(d) All steps are correct

### **22.** Select the INCORRECT statement.

(a) In an equation, to maintain the balance or equality, any number added to one side must also be added to the other side.

(b) Anything subtracted from one side of an equation must also be subtracted from the other side.

(c) If one side of an equation is multiplied by a number, the other side must also be multiplied by the same number.

(d) If one side of an equation is divided by a number, the other side must also be multiplied by the same number.

**23.** Sum of two numbers is 45. One is twice the other.

(a) If smaller number is l, find the other number.

(b) Find the equation formed.

(c) Find the numbers.

(a)	(b)	(c)
(a) 2 <i>l</i>	l + 2l = 45	10,35
(b) 2 <i>l</i>	l + 2l = 45	15,30
(c) $l+2$	45 + l + 2 = l	15,30
(d) <i>ll</i> 2	45 + l/2 - l = 0	25,20

**24.** In a quiz, 40 prizes consisting of 1st and 2nd prizes only are to be given. 1st and 2nd prizes are worth Rs. 2500 and Rs. 1500, respectively.

If the total prize money is Rs. 85,000, then

- (i) the equation formed is
- (ii) the number of 1st prizes are
- (iii) the number of 2nd prizes are

(i)	(ii)	(iii)
(a) $2500x + 1500(40 - x) = 85000$	25	15
(b) $2500x - 1500(40 - x) = 85000$	36	4
(c) $2500x \times 1500(x-40) = 85000$	20	20
(d) $2500x - 1500(x - 40) = 85000$	15	25

**25.** Match the following.

Column-I	Column-II
(i) Arjun's father's age is 5 years more than four times Arjun's age. Find Arjun's age, if his father is 37 years old.	(p) 9
(ii) Ramesh says that he has 8 note books more than four times the number of notebooks Anuj has. Ramesh has 48 notebooks. How many notebooks does Anuj have?	(q) 8
(iii) Varun says that he has 11 erasers more than five times the number of erasers erasers. How many erasers does Sameer have?	(r) 10

(a) (i) –	→ (q).	(ii) $\rightarrow$	(p), (iii	$i) \rightarrow ($	r)
(b) (i) -	$\rightarrow$ (q),	(ii) $\rightarrow$	(r), (iii	$) \rightarrow (r$	<b>)</b> )
(c) (i) -	→ (p),	(ii) $\rightarrow$	(q), (i	ii) $\rightarrow$	(r)
(d) (i) -	$\rightarrow$ (p)	, (ii) →	(r), (i	ii) $\rightarrow$	(q)

ANSWER KEY				
<b>1.</b> C	<b>2.</b> D	<b>3.</b> B	<b>4.</b> C	<b>5.</b> C
<b>6</b> . D	<b>7.</b> C	<b>8.</b> B	<b>9.</b> C	<b>10.</b> C
<b>11.</b> C	<b>12.</b> A	<b>13.</b> A	<b>14.</b> C	<b>15.</b> D
<b>16.</b> A	17. C	<b>18.</b> B	<b>19.</b> C	<b>20</b> . A
<b>21</b> . D	<b>22</b> . D	<b>23.</b> B	<b>24</b> . A	<b>25.</b> B

## SOLUTION

1. (c): Total number of flowers = Number of rows × number of flowers in each row  $15 = 3 \times r \implies 3r = 15$ 

2. (d): 
$$10-3y=1 \Rightarrow 3y=10-1 \Rightarrow 3y=9$$
  
 $\Rightarrow y = \frac{9}{3} = 3$ 

3. (b): Let the number be x.  
According to question, 
$$(3x-5)+7=14$$
  
 $\Rightarrow 3x+2=14 \Rightarrow 3x=14-2 \Rightarrow 3x=12$   
 $\Rightarrow x = \frac{12}{3} = 4$ 

4. (c): (A) 
$$p+5=9 \Rightarrow p=9-5=4$$
  
(b)  $14-p=10 \Rightarrow p=14-10=4 \Rightarrow p=4$   
(c)  $\frac{20}{p} = \frac{4}{1} \Rightarrow 20 = 4p$  or  $4p = 20 \Rightarrow p=5$   
(d)  $9p = 36 \Rightarrow p = \frac{36}{9} = 4$ 

- $\therefore$  Option (C) does not have 4 as a solution.
- 5. (c): Let the one part be x. Then, the other part will be 184 - x. According to question,  $\frac{1}{3} \times x = \frac{1}{7}(184 - x) + 8 \Rightarrow \frac{x}{3} = \frac{184}{7} - \frac{x}{7} + 8$   $\Rightarrow \frac{x}{3} + \frac{x}{7} = \frac{184}{7} + 8 \Rightarrow \frac{10x}{21} = \frac{240}{7}$   $\Rightarrow x = \frac{240 \times 21}{7 \times 10} = 72$  : First part = 72 and second part = 184 - 72 = 112

6. (d): We have, 
$$\frac{2x}{1+\frac{1}{1+\frac{x}{1-x}}} = 1$$
  
 $\Rightarrow \frac{2x}{1+\frac{1}{1+\frac{x}{1-x}}} = 1 \Rightarrow \frac{2x}{1+1-x} = 1 \Rightarrow$   
 $\frac{2x}{1+\frac{1}{1-x+x}} = 1 \Rightarrow \frac{2x}{1+1-x} = 1 \Rightarrow$   
 $\frac{2x}{2-x} = 1$   
 $\Rightarrow 2x = 2-x \Rightarrow 3x = 2 \Rightarrow x = \frac{2}{3}$ 

- 7. (c) We have,  $p \{-4 (2 8 + 4)\} = 8$   $\Rightarrow p - \{-4 - (2 - 2)\} = 8$  $\Rightarrow p - (-4 - 0) = 8 \Rightarrow p + 4 = 8 \Rightarrow p = 4$
- 8. (b): Let the number be x. Then,  $\frac{2}{3}x + \frac{1}{2}x + \frac{1}{7}x + x = 37$   $\Rightarrow \frac{28x + 21x + 6x + 42x}{42} = 37$  $\Rightarrow 97x = 37 \times 42 \Rightarrow x = \frac{1554}{97} \Rightarrow x = 16\frac{2}{97}$
- 9. (c): Let first angle be x. Then, other angle will be  $(44^{\circ} + x)$ Now,  $x + (44^{\circ} + x) = 180^{\circ} \Rightarrow 2x = 136^{\circ} \Rightarrow x = 68^{\circ}$   $\therefore$  First angle =  $68^{\circ}$ and second angle =  $(68 + 44)^{\circ} = 112^{\circ}$ .
- **10.** (c): We have,

$$\frac{3}{4}(7x-1) - \left(2x - \frac{1-x}{2}\right) = x + \frac{3}{2}$$
$$\Rightarrow \left(\frac{21}{4}x - \frac{3}{4}\right) - \left(\frac{4x-1+x}{2}\right) = x + \frac{3}{2}$$
$$\Rightarrow \frac{21}{4}x - \frac{3}{4} - \frac{5x-1}{2} = x + \frac{3}{2}$$
$$\Rightarrow \frac{21x-10x-4x}{4} = \frac{6+3-2}{4} \Rightarrow x = 1$$

- 11. (c): We have,  $\frac{2}{5}(5x+1) + \frac{3}{5} = 1$   $\Rightarrow 2x + \frac{2}{5} + \frac{3}{5} = 1 \Rightarrow 2x + \frac{5}{5} = 1 \Rightarrow 2x + 1 = 1$  $\Rightarrow 2x = 0 \Rightarrow x = 0$
- 12. (a): Let the number be x. Then,  $\frac{9}{5}$  of  $x = 45 \Rightarrow \frac{9}{5} \times x = 45$   $\Rightarrow x = 45 \times \frac{5}{9} = 25$   $\therefore$  Number = 25 Now,  $\frac{1}{5}$  of the number  $=\frac{1}{5} \times 25 = 5$

13. (a): We have,  

$$\frac{6x-2}{9} + \frac{3x+5}{18} = \frac{1}{3}$$

$$\Rightarrow \frac{2(6x-2) + (3x+5)}{18} = \frac{1}{3}$$

$$\Rightarrow \frac{12x-4+3x+5}{18} = \frac{1}{3} \Rightarrow \frac{15x+1}{18} = \frac{1}{3}$$

$$\Rightarrow 45x+3=18 \Rightarrow 45x=15$$

$$\Rightarrow x = \frac{15}{45} = \frac{1}{3}$$

- 14. (c): The given equation 15 + 3x = 3 can be expressed as, 3x = 3 15 or 15 3 = -3x or  $\frac{15}{3} + \frac{3x}{3} = \frac{3}{3}$  but not  $15 + \frac{3x}{3} = 3$ . ∴ Option (c) is incorrect.
  15. (d): (A)  $2x + 5 = 15 \Rightarrow 2x = 10 \Rightarrow x = 5$ 
  - (b)  $7x+2=10 \Rightarrow 7x=8 \Rightarrow x=\frac{8}{7}$ (c)  $5x+4=16 \Rightarrow 5x=12 \Rightarrow x=\frac{12}{5}$ (d)  $3x+4=16 \Rightarrow 3x=12 \Rightarrow x=4$
- 16. (a): Let Ram's age be x years Ram's father's age = (2x+3) years According to question, 2x+3=45

- **17.** (c): Let the number of bananas in each small box be x. Number of small boxes = 6 According to question, 6x+2=50
- **18.** (b): Let the number of fruit trees planted be *x*. According to question, 4x+3=87

 $\Rightarrow 4x = 87 - 3 \Rightarrow 4x = 84 \Rightarrow x = \frac{84}{4} = 21$ 

- **19.** (c): Let the lowest marks obtained by a student be m. According to question, 4m+6=65
- **20.** (a)
- **21.** (d)
- **22.** (d)
- **23.** (b): First number = 1 Second number = 21 According to question,  $l+2l=45 \Rightarrow 3l=45 \Rightarrow 1=15$ So, numbers are 15, 30.
- 24. (a): Let the number of 1st prizes be x, Then the number of 2nd prizes = 40 - xAccording to the question, 2500(x) + 1500(40 - x) = 85000  $\Rightarrow 2500x + 60000 - 1500x = 85000$   $\Rightarrow 1000x = 25000 \Rightarrow x = 25$ So, number of 1st prizes = 25Number of 2nd prizes = 40 - 25 = 15
- **25.** (b): (i) Let Arjun's age be x. So, Arjun's father's age = 4x+5According to question, 4x+5=37 $\Rightarrow 4x=37-5 \Rightarrow 4x=32 \Rightarrow x=8$ (ii) Let Anuj has x notebooks. So, Ramesh has (4x+8) notebooks According to question, 4x+8=48 $\Rightarrow 4x=48-8 \Rightarrow 4x=40$  $\Rightarrow x=10$ (ii) Let Sameer has x erasers. So, Varun has (5x+11) erasers.

According to question,  $5x+11=56 \Longrightarrow 5x=56-11 \Longrightarrow 5x=45$  $\Rightarrow x=9$