

Algebra

MATHEMATICAL REASONING

- **1.** The equation for the statement; 'Half of a number added to 10 is 15' is ____.
 - (a) $\frac{x}{2} = 10 + 5$ (b) $\frac{x}{2} + 10 = 15$ (c) $\frac{x}{2} + 15 = 10$ (d) $\frac{x}{2} = 10 + 15$
- When Raju multiplies a certain number by 17 and adds 4 to the product, he gets 225. Find the number.
 (a) 13
 (b) 14
 - $\begin{array}{c} (a) 13 \\ (c) 15 \\ (d) 16 \\ \end{array}$
- **3.** Equation for the statement 'Thrice the length (*l*) of a room is 340 metres' is ____. (a) 3l = 430 (b) 3l = 340(c) 3 + l = 340 (d) 3l + 340 = 0
- 4. If five times of a number is 80, then the number is ____.
 (a) -16
 (b) 1
 (c) 16
 (d) 40
- 5. An algebraic expression 11 y can be written in statement as ____.
 (a) 11 less than y (b) y less than 11
 (c) y more than 11 (d) y divided by 11
- 6. Which equation justifies the given statement?
 "Perimeter of an equilateral triangle is three times its side 1"
 (a) 1×1×1
 (b) 3×3×3

(a) I×I×I	$(b) 3 \times 3 \times 3$
(c) 3×1	(d) $3 + l$

7. Twelve less than 3 times a number is 27. The number is _____.

(a) 29	 (b) 39
(c) 65	(d) 13

8. Value of x in $14\left(\frac{x}{2}-2\right)+4=4$ is_____. (a) 7 (b) 4 (c) 14 (d) 12

9. To get the value of 'y', the number to be multiplied on either side of equation $\frac{y}{10} = \frac{3}{2}$ is

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(a) -10	(b) 10
(c) 3	(d) 0

- **10.** In $\frac{2}{3}p 2\frac{1}{2} = 3\frac{1}{2}$, the value of p is_____. (a) -9 (b) 6 (c) 9 (d) 0
- 11. Power of a variable in a linear equation is
 (a) Zero
 (b) One
 (c) Two
 (d) Three
- **12.** The breadth of a rectangle is *w* cm and the length is 5 times as long as its breadth. What is the perimeter of the rectangle?
 - (a) $5w^2cm$ (b) 12w cm(c) (10+2w)cm (d) $(25+w^2)cm$
- **13.** The number of girls in a class is 3 times the number of boys. Which of the following cannot be the total number of students in the class?
 - (a) 24 (b) 32 (c) 36 (d) 41
- **14.** The algebraic expression for the statement "Product of x and reciprocal of a, subtracted from the product of y and reciprocal of b" is

(a)
$$\frac{y}{b} - \frac{x}{a}$$
 (b) $\frac{y-x}{a-b}$
(c) $xa - yb$ (d) $\frac{1}{yb - xa}$

15. The algebraic expression for the statement 'thrice of x is added to y multiplied by itself' is

(a)
$$3x + 2y$$
 (b) $3x + y^2$
(c) $3(x + y^2)$ (d) $3x + y$

- **16.** If a = b, then ax =____. (a) a + x (b) bx(c) b - x (d) $b \div x$
- 17. Which of the following equations has x = 2 as a solution?
 (a) x + 2 = 5
 (b) x 2 = 0
 (c) 2x + 1 = 0
 (d) x + 3 = 6
- **18.** The equation _____ and 2x + 2 = 0 have the same solution. (a) x - 1 = 0 (b) x + 1 = 0
 - (c) x 2 = 0 (d) x + 2 = 0
- **19.** If $\frac{3}{4}x + 8 = 17$, then the value of x is__. (a) - 12 (b) 36 (c) 12 (d) - 36
- **20.** The method of finding solution by trying out various values for the variable is called
 - (a) Error method
 - (b) Trial and error method
 - (c) Testing method
 - (d) Checking method

EVERYDAY MATHEMATICS

- **21.** I had Rs.350 with me. I gave Rs. $\left(\frac{x}{2}\right)$ to Amit, Rs. $\left(\frac{x}{3}\right)$ to Shreya and I am left with Rs. $\left(\frac{x}{3}\right)$. The amount I gave to Amit is ____. (a) Rs. 150 (b) Rs. 100
 - (c) Rs. 250 (d) Rs. 200

- **22.** Preeti travelled 3x km distance by walk, 9y km by cycle and 5 km by bus. The total distance covered by Preeti is ____. (a) (3x - 9y + 5) km (b) (3x + 9y + 5)km(c) (3x - 9y - 5)km (d) (9x + 3y - 5)km
- **23.** Aanya got 5 marks in Science test. Her friend Sneha got 'x' marks more than Aanya. How many marks did they get altogether? (a) $5 \times x$ (b) 5 + x(c) 10 + x (d) 2x + 5
- **24.** Meera bought packs of trading cards that contain 10 cards each. She gave 7 cards to her friend.

x = Number of packs of trading cards

Which expression shows the number of cards left with Meera?

(a) $10x - 7$	(b) $7x - 8$
(c) $5 - 10x$	(d) $8 - 5x$

25. Jaya's score in Mathematics is 30 more than two third of her score in English. If her score in English is x, find her score in Mathematics.

(a)
$$\frac{2}{3}(x+30)$$
 (b) $\frac{2x}{3}+30$
(c) $\frac{2x}{3}-30$ (d) $30-\frac{2x}{3}$

ACHIEVERS SECTION (HOTS)

26. Ashima bought 23 things from the market. She bought five more jeans than shirts and two fewer watches than jeans. If x represents the number of shirts in total, then which sentence can be used to find how many of each thing are bought?

(a)
$$x + (x+5) + (x+3) = 23$$

(b) $x + (x-5) + (x-3) = 23$

- (c) (x+5) + (x+3) = 23
- (d) x + (x + 3) = 23

27. Fill in the blanks.

(i) An expression with a variable, constant and the sign of equality is called an <u>P</u>.
(ii) 8 more than 2 times the number x can be written in algebraic form as <u>Q</u>.

(iii) An equation is a condition on a \underline{R} .

	Р	Q	R
(a)	variable	8x + 2	equation
(b)	equation	2x + 8	variable
(c)	equation	2x - 8	variable
(d)	variable	2x + 8	equation

- **28.** Which of the following equations does not have a solution in integers?
 - (a) x+1=1 (b) x-1=3(c) 2x+1=6 (d) 1-x=5
 - (c) 2x + 1 = 0 (d) 1 = x = 0
- **29.** State 'T' for true and 'F' for false.
 - P. x = 15 is the solution of the equation 41 x = 25.

Q. An equation is an algebraic expression which involves an "equal to" sign.

R. 'x exceeds y by 7' can be expressed as x = y + 7.

	Ρ	Q	R
(a)	F	Т	Т
(b)	F	Т	F
(c)	Т	F	Т
(d)	Т	Т	Т

30. Match the following.

Column – I	Column – II			
(i) The total mass of 3 boxes is 5 kg. The mass of two of the boxes is x kg each. The mass of third box is	(a) <i>x</i> -11			
(ii) Sid had x eggs. He used 5 eggs to bake a cake and gave 6 eggs to his neighbour. The number of eggs left with him is	(b) $\frac{x}{3}$			
(iii) Mohit had Rs. x . He gave the money to his 3 sisters equally. Each girl get Rs.	(c) $5-2x$			
(a) (i) \rightarrow (c), (ii) \rightarrow (a),(iii) \rightarrow (b) (b) (i) \rightarrow (b), (ii) \rightarrow (c),(iii) \rightarrow (a) (c) (i) \rightarrow (c), (ii) \rightarrow (b),(iii) \rightarrow (a)				

(d) (i)
$$\rightarrow$$
 (a), (ii) \rightarrow (b), (iii) \rightarrow (c)

ANSWER KEY									
1.	В	2.	А	3.	В	4.	С	5.	В
6.	С	7.	D	8.	В	9.	В	10.	С
11.	В	12.	В	13.	D	14.	А	15.	В
16.	В	17.	В	18.	В	19.	С	20.	В
21.	А	22.	В	23.	С	24.	А	25.	В
26 .	А	27.	В	28 .	С	29.	А	30 .	А

HINTS & EXPLANATIONS

- 1. (b) : Let the number be x. $\therefore \frac{x}{2} + 10 = 15$
- **2.** (a) : Let the numbers be x. According to question, 17x + 4 = 225

$$\Rightarrow 17x = 225 - 4 = 221 \Rightarrow x = \frac{221}{17} = 13$$

- **3.** (b) : Let *l* be the length of a room. $\therefore 3l = 340$
- 4. (c) : Let the number be x. According to question, $5x = 80 \Rightarrow x = 16$
- **5.** (b)
- **6.** (c)
- 7. (d) : Let the number be x. According to question, $3x - 12 = 27 \Rightarrow 3x = 39$ $\Rightarrow x = \frac{39}{3} = 13$
- 8. (b): We have, $14\left(\frac{x}{2}-2\right)+4=4$ $\Rightarrow 14\left(\frac{x-4}{2}\right)=0 \Rightarrow 7(x-4)=0$ $\Rightarrow x-4=0 \Rightarrow x=4$

9. (b) : We have,
$$\frac{y}{10} = \frac{3}{2}$$

$$\Rightarrow 10 \times \frac{y}{10} = 10 \times \frac{3}{2} \Rightarrow y = 15$$

10. (c) : We have, $\frac{2}{3}p - 2\frac{1}{2} = 3\frac{1}{2}$ $\Rightarrow \frac{2}{3}p - \frac{5}{2} = \frac{7}{2} \Rightarrow \frac{2}{3}p = \frac{7}{2} + \frac{5}{2} = \frac{12}{2} = 6$ $\Rightarrow p = \frac{6 \times 3}{2} = 9$

11. (b)

- **12.** (b) : We have, breadth = w cm \therefore Length = 5w cm So, perimeter = $2(5w + w) = 2 \times 6w$ = 12w cm
- **13.** (d) : Let the number of boys be x. \therefore Number of girls = 3x If x + 3x = 41 $\Rightarrow 4x = 41 \Rightarrow x = \frac{41}{4}$

And we know that the number of students can't be in fraction.

14. (a)

15. (b) : $3(x) + y \times y = 3x + y^2$

16. (b)

17. (b) : (a) Putting x=2 in x+2, we get $2 + 2 = 4 \neq 5$ (b) Putting x=2 in x - 2, we get 2 - 2 = 0(c) Putting x=2 in 2x + 1, we get $2 \times 2 + 1 = 5 \neq 0$ (d) Putting x=2 in x+3, we get $2 + 3 = 5 \neq 6$ Thus, the above conditions shows that x = 2is the solution of x - 2 = 0 only. 18. (b) : x + 1 = 0 \Rightarrow x+1-1=0-1 [Subtracting 1 from both sides] $\Rightarrow x = -1$...(i) and $2x+2=0 \Rightarrow 2x+2-2=0-2$ [Subtracting 2 from both sides]

 $\Rightarrow 2x = -2 \Rightarrow x = -1 \qquad \dots (ii)$ Thus, from (i) and (ii), Both equations have the same solution.

19. (c) :We have,
$$\frac{3}{4}x + 8 = 17$$

 $\Rightarrow \frac{3}{4}x = 17 - 8 = 9 \Rightarrow x = \frac{9 \times 4}{3} = 12$

20. (b)

21. (a) : According to question, we have

$$\frac{x}{2} + \frac{x}{3} + \frac{x}{3} = \text{Rs.350}$$

$$\Rightarrow \frac{3x + 2x + 2x}{6} = \text{Rs.350}$$

$$\Rightarrow 7x = 6 \times 350 = \text{Rs.2100}$$

$$\Rightarrow x = \frac{2100}{7} = \text{Rs.300}$$

Now, amount given to Amit

$$= \operatorname{Rs.}\left(\frac{x}{2}\right) = \operatorname{Rs.}\left(\frac{300}{2}\right) = \operatorname{Rs.}150$$

- **22.** (b) : Total distance covered by Preeti = (3x + 9y + 5) km
- (c) : Marks obtained by Aanya = 5 Marks obtained by Sneha = x + 5
 ∴ Marks obtained by both of them = 5 + (x + 5) = x + 10
- **24.** (a) : Number of cards in pack = 10 \therefore Number of cards in x packs = 10x \therefore Number of cards left with Meera = 10x - 7
- **25.** (b) : Jaya's score in English = x \therefore Jaya's score in Mathematics = $\frac{2x}{3} + 30$
- **26.** (a) : Number of shirts bought by Ashima = x \therefore Number of jeans bought by her = x + 5 \therefore Number of watches bought by her = (x+5)-2 = x+3 \therefore Total number of things bought by her = x + (x+5) + (x+3) = 23

27. (b)

(c) : (a) x + 1 = 128. $\Rightarrow x+1-1=1-1$ [Subtracting 1 from both sides] \Rightarrow *x* = 0, which is an integer (b) x - 1 = 3 $\Rightarrow x - 1 + 1 = 3 + 1$ [Adding 1 to both sides] \Rightarrow *x* = 4, which is an integer. (c) 2x + 1 = 6 $\Rightarrow 2x+1-1=6-1$ [Subtracting 1 from both sides] $\Rightarrow 2x = 5$ $\Rightarrow \frac{2x}{2} = \frac{5}{2}$. [Dividing both sides by 2] $\Rightarrow x = \frac{5}{2},$ which is not an integer. (d) 1 - x = 5 $\Rightarrow 1 - x - 1 = 5 - 1$ [Subtracting 1 from both sides] $\Rightarrow -x = 4$ $\Rightarrow -(-x) = -4$ [Multiplying both sides by (-1)] \Rightarrow *x* = -4, which is an integer. Thus, the above conditions show that equation 2x + 1 = 6 does not have a solution in integers. (a) :(P) $41 - x = 25 \implies 41 - x - 41 = 25 - 41$ 29.

- (a) $(x^{r}) 41 x = 23 \implies 41 x 41 = 23 41$ $\implies -x = -16$ [Multiplying both sides by (-1)] $\implies -(-x) = -(-16) \implies x = 16$
- **30.** (a) : (i) Mass of 3 boxes = 5 kg \Rightarrow Mass of 2 boxes + Mass of third box = 5 $\Rightarrow 2x$ + Mass of third box = 5 \Rightarrow Mass of third box = 5 - 2x (ii) Total number of eggs = x Number of eggs used =5+6=11 \therefore Number of eggs left with Sid = x - 11 (iii) Rs. x is equally divided among three girls. So, each girl get Rs. $\frac{x}{3}$.