CHAROTAR ENGLISH MEDIUM SCHOOL
Answer Key

Std : 9 **Marks :** 50
Date : 22-10-18 **Sub : Mathematics** **Time:** 2 hours

Section A

- **Do as directed (Q. No. 1 to 10)** **(Each 1 mark)** **[10]**

1) Solve : $\overline{0.45}+\overline{0.23}$

Ans $\overline{0.45}+\overline{0.23}$ Or $\frac{45}{99}+\frac{23}{99}$

$=\overline{0.68}$ $=\frac{68}{99}$

2) π is irrational number . Give explanation of this statement.

Ans.

π is defined as the ratio of circumference (c) of a circle to its diameter (d). As seen in the process of successive magnification used to represent real numbers on the number line, we see that more and more accuracy can be obtained by successive magnification. But, since the real numbers exhibit gaps, we can never measure the exact length of the circumference and the diameter. Any one or both may be having length represented by an irrational number. Hence, there is no contradiction that π being the ratio of c and d is still an irrational number.

3) Give any two example of polynomials having degree 100.

Ans

$7x^{100}$, $\sqrt{2}x^{100}$, $4\pi x^{100}$ are a few examples of a monomial of degree 100.

4) $2^5 \times 2^8$ = ……..

Ans $2^5 \times 2^8$

$= 2^{5+8}$

$=2^{13}$

$=8192$

5) $\frac{5^{100}}{5^{25}}$ =.....

Ans 5^{100-25}

5^{75}

6) Give any two line equation passing through point (5,7) .

Ans x+y = 12 , y-x = 2 , 7x-5y = 0

7) State any one Euclid's axiom.

Ans : 1)Things which are equal to the same thing are equal to one another.

2) If equals are added to equals, the wholes are equal.

3) If equals are subtracted from equals, the remainders are equal.

4) Things which coincide with one another are equal to one another.

5)The whole is greater than the part.

6)Things which are double of the same things are equal to one another.

7) Things which are halves of the same things are equal to one another.

8) State linear pair axiom.

Ans If a ray stands on a line, then the sum of two adjacent angles so formed is 180°.

If the sum of two adjacent angles is 180°, then the non-common arms of the angles form a line

- **Write down true or false for following sentences and justify you answer:**

9) A surface is that which has breadth , length and height .

Ans False , A surface is that which has breadth , length only.

10) Only one line can pass through a point .

Ans False , An Infinite numbers of line can pass through a point

Section B

- **Answer the following questions in short with calculation : (Each 2 mark) [16]**

11) If the co ordinate of the two points are P(-2,3) and Q (-3,5) , then find out (abscissa of P) –(abscissa of Q) and (ordinate of P) – (ordinate of Q) .

Ans (abscissa of P) –(abscissa of Q)

= (-2) – (-3)

= **1**

(ordinate of P) – (ordinate of Q)

= (3) – (5)

= **-2**

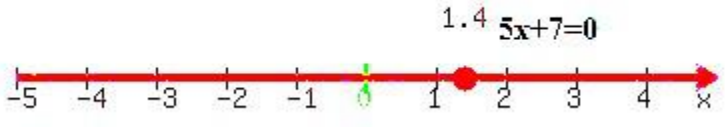
12) The geometrical representation of 5x+7=0 . Then write down equation for one variable and represent it on line.

Ans

5x+7 = 0

x = -7/5

x = 1.4



OR

12) If the linear equation is 2x = -5y then write down it in standard form and state the value of **a , b**, and **c .**

Ans 2x+5y+0=0

a=2 , **b**= 5 , **c**=0

13) A bag contains 3 Red , 4 White , and 5 Blue balls . A ball is drawn from the bag. Calculate the probability that the ball is Red .

Ans

Total no. of ball = 3+4+5 = 12

$$P(\text{Red ball}) = \frac{\text{No.of favorable outcome}}{\text{Total number of outcome}}$$

$$= \frac{3}{12} = \frac{1}{4} = \mathbf{0.25}$$

OR

The probability of an impossible event is 0.5 . True or False , Give the reason of it.

Ans

False , The probability of an impossible event is always 0.

14) There are 10 numbers 1,2,3, ….,10 given. The probability that one selected number is an odd number …….. .

Ans. Given numbers are 1 , 2 , 3 ,4 , 5 , 6 , 7 , 8 , 9 , 10

Odd number : 1 , 3 ,5 , 7 , 9

$$P(\text{odd number}) = \frac{\text{No.of favorable outcome}}{\text{Total number of outcome}}$$

$$= \frac{5}{10} = \frac{1}{2} = \mathbf{0.5}$$

15) List out Euclid's any four Postulates .

Ans

1. A straight line may be drawn between any two points.

2. A piece of straight line may be extended indefinitely.
3. A circle may be drawn with any given radius and an arbitrary center.
4. All right angles are equal.
5. If a straight line crossing two straight lines makes the interior angles on the same side less than two right angles, the two straight lines, if extended indefinitely, meet on that side on which are the angles less than the two right angles

OR

15) How would you rewrite Euclid's fifth Postulate with figure so that it would be easier to understand ?

Ans

When a straight line l falls on two other straight lines m and n, it makes four interior angles. If the sum of two interior angles on the same side of line l is 180°, then lines m and n will never intersect each other, i.e., lines m and n are parallel lines.

16) Simplify : $2^{\frac{2}{3}} \times 2^{\frac{1}{5}}$

Ans

$$= 2^{\frac{2}{3}} \times 2^{\frac{1}{5}}$$

$$= 2^{\left(\frac{2}{3}+\frac{1}{5}\right)}$$

$$= 2^{\left(\frac{2\times 5 + 1\times 3}{3\times 5}\right)}$$

$$= 2^{\left(\frac{10+3}{15}\right)}$$

$$= 2^{\frac{13}{15}}$$

17) Write down the degree of the polynomials:

1) $5t - \sqrt{7}$ 2) $10 - y^4$

Ans $5t - \sqrt{7}$: degree 1

$10 - y^4$: degree 4

18) Give difference between line, Ray , and line segment.

Ans

Line-segment	Ray	Line
1. It has two end points.	**1.** Ray has one starting point and another near the arrowhead.	**1.** There are no end points in a line.
2. The length of a line-segment is definite. So, it can be measured.	**2.** It has a starting point but no other end point. So, its length cannot be measured.	**2.** There are no end points. So, length of a line cannot be measured.
3. The symbol of a line-segment is $\overline{\quad}$	**3.** The symbol of a ray is →	**3.** The symbol of a line is ↔

Section C

- **Calculate and give the answers of following questions . (Each 3marks) [12]**

19) Prove that $\frac{1}{\sqrt{9}-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-\sqrt{4}} - \frac{1}{\sqrt{4}-\sqrt{3}} + \frac{1}{\sqrt{3}-\sqrt{2}} - \frac{1}{\sqrt{2}-1} = 2$

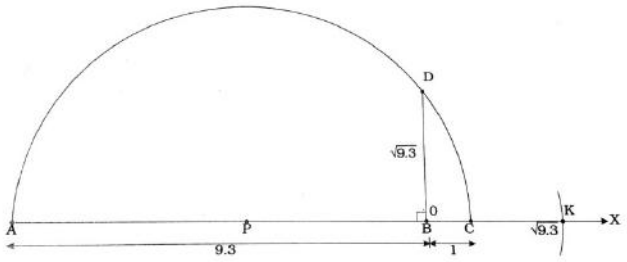
Ans

$$\text{L.H.S.} = \frac{1}{\sqrt{9}-\sqrt{8}} \times \frac{\sqrt{9}+\sqrt{8}}{\sqrt{9}+\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} \times \frac{\sqrt{8}+\sqrt{7}}{\sqrt{8}+\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} \times \frac{\sqrt{7}+\sqrt{6}}{\sqrt{7}+\sqrt{6}}$$
$$- \frac{1}{\sqrt{6}-\sqrt{5}} \times \frac{\sqrt{6}+\sqrt{5}}{\sqrt{6}+\sqrt{5}} + \frac{1}{\sqrt{5}-\sqrt{4}} \times \frac{\sqrt{5}+\sqrt{4}}{\sqrt{5}+\sqrt{4}} - \frac{1}{\sqrt{4}-\sqrt{3}} \times \frac{\sqrt{4}+\sqrt{3}}{\sqrt{4}+\sqrt{3}}$$
$$+ \frac{1}{\sqrt{3}-\sqrt{2}} \times \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}+\sqrt{2}} - \frac{1}{\sqrt{2}-\sqrt{1}} \times \frac{\sqrt{2}+\sqrt{1}}{\sqrt{2}+\sqrt{1}}$$
$$= \frac{\sqrt{9}+\sqrt{8}}{9-8} - \frac{\sqrt{8}+\sqrt{7}}{8-7} + \frac{\sqrt{7}+\sqrt{6}}{7-6} - \frac{\sqrt{6}+\sqrt{5}}{6-5} + \frac{\sqrt{5}+\sqrt{4}}{5-4} - \frac{\sqrt{4}+\sqrt{3}}{4-3} + \frac{\sqrt{3}+\sqrt{3}}{3-2} - \frac{\sqrt{2}+\sqrt{1}}{2-1}$$
$$= \frac{\sqrt{9}+\sqrt{8}}{1} - \frac{\sqrt{8}+\sqrt{7}}{1} + \frac{\sqrt{7}+\sqrt{6}}{1} - \frac{\sqrt{6}+\sqrt{5}}{1} + \frac{\sqrt{5}+\sqrt{4}}{1} - \frac{\sqrt{4}+\sqrt{3}}{1} + \frac{\sqrt{3}+\sqrt{3}}{1} - \frac{\sqrt{2}+\sqrt{1}}{1}$$
$$= \sqrt{9}+\sqrt{8}-\sqrt{8}-\sqrt{7}+\sqrt{7}+\sqrt{6}-\sqrt{6}-\sqrt{5}+\sqrt{5}+\sqrt{4}-\sqrt{4}-\sqrt{3}+\sqrt{3}+\sqrt{2}-\sqrt{2}-\sqrt{1}$$
$$= \sqrt{9}-\sqrt{1}$$
$$= 3-1$$
$$= 2$$
$$= \text{R.H.S.}$$

OR

19) Represent $\sqrt{9.3}$ on number line with appropriate calculation

Ans



Steps of construction :

(1) Draw ray AX.

(2) Mark B on ray AX such that AB = 9.3 cm.

(3) Mark C on ray BX such that BC = 1 cm.

(4) By drawing perpendicular bisector of seg AC, obtain its midpoint P.

(5) Draw a semicircle with centre P and radius AP.

(6) Draw perpendicular to seg AC at B intersecting the semicircle at D.

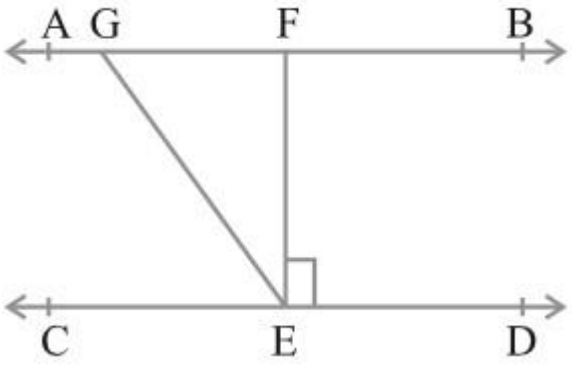
(7) Then, BD = $\sqrt{9.3}$.

20) Evaluate 105 × 106 without multiplying directly.

Ans

$$\begin{aligned} 105 \times 106 &= (100 + 5) \times (100 + 6) \\ &= (100)^2 + (5 + 6)(100) + (5 \times 6) \\ &= 10000 + 1100 + 30 \\ &= \mathbf{11130} \end{aligned}$$

21) In figure if AB || CD, EF $\perp$ CD and $\angle GED = 126^\circ$, find $\angle AGE$, $\angle$ GEF and $\angle FGE$.



Ans

Here, AB ‖ CD and GE is transversal for them.

$\therefore \angle AGE$ and $\angle GED$ are equal alternate interior angles.

$\therefore \angle GED = \angle AGE$

$\therefore \angle \mathbf{AGE = 126^\circ}$ (Given : $\angle GED = 126^\circ$)

EF ⊥ CD

$\therefore \angle FED = 90^\circ$

$\angle GEF + \angle FED = \angle GED$ (Adjacent angles)

$\therefore \angle GEF + 90^\circ = 126^\circ$

$\therefore \angle GEF = 126^\circ - 90^\circ$

$\therefore \mathbf{\angle GEF = 36^\circ}$

Ray GE stands on line AF.

$\therefore \angle AGE + \angle FGE = 180^\circ$ (Angles of linear pair)

$\therefore 126^\circ + \angle FGE = 180^\circ$

$\therefore \angle FGE = 180^\circ - 126^\circ$

$\therefore \mathbf{\angle FGE = 54^\circ}$

22) A tyre manufacturing company kept a record of the distance covered before a tyre needed to be replaced. The table shows the results of 1000 cases.

Distance (in km)	less than 4000	4000 to 9000	9001 to 14000	more than 14000
Frequency	20	210	325	445

If you buy a tyre of this company, what is the probability that :

(i) it will need to be replaced before it has covered 4000 km?

(ii) it will last more than 9000 km?

(iii) it will need to be replaced after it has covered somewhere between 4000 km and 14000 km?

Ans

(i) The total number of trials = 1000.

The frequency of a tyre that needs to be replaced before it covers 4000 km is 20.

So, P (tyre to be replaced before it covers 4000 km) = $\frac{20}{1000}$ = **0.02**

(ii) The frequency of a tyre that will last more than 9000 km is 325 + 445 = 770

So, P (tyre will last more than 9000 km) = $\frac{770}{1000}$ = **0.77**

(iii) The frequency of a tyre that requires replacement between 4000 km and 14000 km is 210 + 325 = 535.

So, P (tyre requires replacement between 4000 km and 14000 km) = $\frac{535}{1000}$ = **0.535**

Section D

- **Give the answer in detailed. (Each 4 marks) [08]**

23) The taxi fare in a city is as follows: For the first kilometre, the fares is Rs 8 and for the subsequent distance it is Rs 5 per km. Taking the distance covered as x km and total fare as Rs y, write a linear equation for this information, and draw its graph.

Ans

Let the total distance covered be x km and the total fare be ₹ y. Now, the fare for the first km is ₹ 8 and for the remaining $(x-1)$ km, it is ₹ 5 per km. Hence, the total fare will turn out to be ₹ $[8 + 5(x-1)]$. Hence, we get the equation as

$8 + 5(x-1) = y$

$\therefore\ 8 + 5x - 5 = y$

$\therefore\ \mathbf{5x - y + 3 = 0}$

To draw the graph of this equation, we find three solutions of the equation by expressing the equation in the form $y = 5x + 3$.

Note : Distance travelled cannot be zero or negative. Hence, we choose only positive values of x.

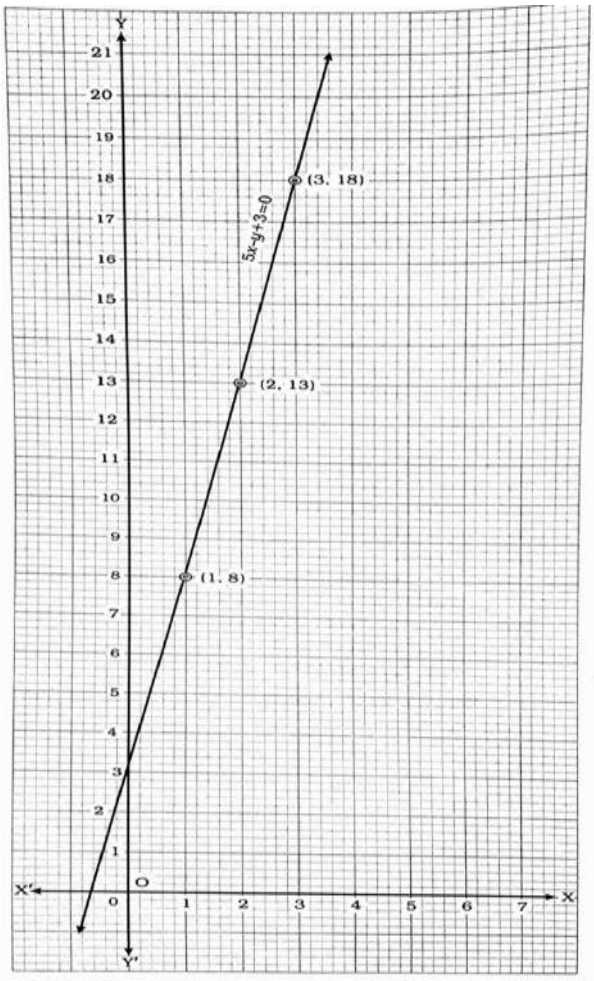
For $x = 1$, $y = 5(1) + 3 = 8$.

For $x = 2$, $y = 5(2) + 3 = 13$.

For $x = 3$, $y = 5(3) + 3 = 18$.

We represent these solutions in the tabular form as below :

x	1	2	3
y	8	13	18



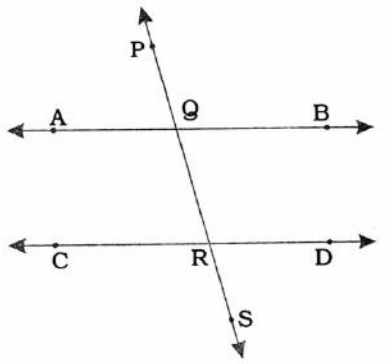
24) Prove that , If a transversal intersects two parallel lines, then each pair of alternate interior angles is equal.

Ans

If a transversal intersects two parallel lines, then each pair of alternate interior angles is equal.

Given : Transversal PS of AB ∥ CD intersects AB and CD at Q and R respectively.

To prove : $\angle BQR = \angle QRC$ and $\angle AQR = \angle QRD$.



Proof : Transversal PS intersects parallel lines AB and CD at Q and R respectively.

$\therefore \angle PQA = \angle QRC$

(Corresponding angles axiom)

Also, $\angle PQA = \angle BQR$

(Vertically opposite angles)

$\therefore \angle BQR = \angle QRC$

Similarly, it can be proved that

$\angle AQR = \angle QRD$.

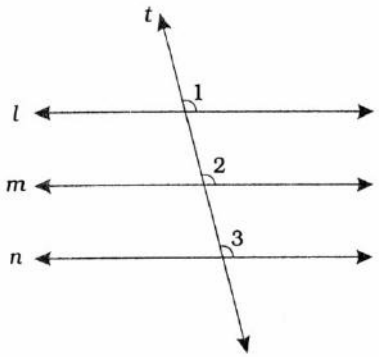
OR

24) Prove that , Lines which are parallel to the same line are parallel to each other.

Ans : Lines which are parallel to the same line are parallel to each other.

Given : $m \parallel l$ and $n \parallel l$.

To prove : $m \parallel n$.



Proof : Draw a transversal t intersecting all the three lines l, m and n.

$m \parallel l$ and t is their transversal.

$\therefore \angle 1 = \angle 2$ (Corresponding angles)

$n \parallel l$ and t is their transversal.

$\therefore \angle 1 = \angle 3$ (Corresponding angles)

$\therefore \angle 2 = \angle 3$

But, $\angle 2$ and $\angle 3$ are corresponding angles formed by transversal t of lines m and n and they are equal.

$\therefore m \parallel n$ (Axiom 6.4)

25) Verify that $x^3 + y^3 + z^3 - 3xyz = \frac{1}{2}(x + y + z)\left[(x - y)^2 + (y - z)^2 + (z - x)^2\right]$

$$\text{R.H.S.} = \frac{1}{2}(x + y + z)\,[(x - y)^2 + (y - z)^2 + (z - x)^2]$$
$$= \frac{1}{2}(x + y + z)\,(x^2 - 2xy + y^2 + y^2 - 2yz + z^2 + z^2 - 2zx + x^2)$$
$$= \frac{1}{2}(x + y + z)\,(2x^2 + 2y^2 + 2z^2 - 2xy - 2yz - 2zx)$$
$$= (x + y + z)\,(x^2 + y^2 + z^2 - xy - yz - zx)$$
$$= x\,(x^2 + y^2 + z^2 - xy - yz - zx) + y\,(x^2 + y^2 + z^2 - xy - yz - zx) + z\,(x^2 + y^2 + z^2 - xy - yz - zx)$$
$$= x^3 + xy^2 + xz^2 - x^2y - xyz - zx^2 + x^2y + y^3 + yz^2 - xy^2 - y^2z - xyz + x^2z + y^2z + z^3 - xyz - yz^2 - z^2x$$
$$= x^3 + y^3 + z^3 - 3xyz$$
$$= \text{L.H.S.}$$

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