VIII Homework (Answers)

1) State true or false :
(a) The cube of a number is always positive
(b) If the square of a number ends with 5, its cube ends with 25.

Soln:- (a) False
eg:- $(-4)^3 = -64$
(b) False
eg:- $15^3 = 3375$

2) Find the smallest number to be multiplied to 9720 to make it a perfect cube.

Soln:- $9720 = \underline{2\times2\times2} \times \underline{3\times3\times3} \times 3\times3\times5$

$9720\times3\times5\times5 = \underline{2\times2\times2} \times \underline{3\times3\times3} \times \underline{3\times3\times3} \times \underline{5\times5\times5}$

$\sqrt[3]{729000} = 2\times3\times3\times5$

$= \underline{90}$

∴ The required smallest number to be multiplied $= 3\times5\times5$

$= \underline{75}$

2	9720
2	4860
2	2430
5	1215
3	243
3	81
3	27
3	9
	3

3) Find the smallest number that 68,600 must be divided with to make it a perfect cube.

Soln:- $68600 = \underline{2\times2\times2} \times \underline{7\times7\times7} \times 5\times5$

$\frac{68600}{25} = \underline{2\times2\times2} \times \underline{7\times7\times7}$

$\sqrt[3]{2744} = 2\times7 = \underline{14}$

∴ The required number to be divided $= 25$

2	68600
7	34300
7	4900
7	700
2	100
2	50
5	25
	5

4) Find the value of $\sqrt[3]{\sqrt[3]{a^{27}}}$

Soln:- $a^{27\times\frac{1}{3}\times\frac{1}{3}} = \underline{a^3}$

5) The volume of a cube is $512\ m^3$. Find the length of its side.

Soln:- Volume of a cube $= a^3 = 512$

$\therefore a = \sqrt[3]{512} = 8\ m$

Hence, the length of its side = 8m

6) Find the value of x for the expression $3^{5x-1} \div 27 = 3^{-5}$

Soln:-

$$\frac{3^{5x-1}}{27} = 3^{-5}$$

$$\Rightarrow 3^{5x-1} = \frac{27}{3^5}$$

$$\Rightarrow 3^{5x-1} = \frac{27}{243} = \frac{1}{9} = \frac{1}{3^2}$$

$$\Rightarrow 3^{5x-1} = 3^{-2}$$

$$\therefore 5x - 1 = -2$$

$$5x = -2 + 1 = -1$$

$$x = \frac{-1}{5}$$

7) What is the value of K if 3856000 can be written as $K \times 10^n$, where n is 5?

Soln:-

$$3856000 = 38.56 \times 10^5$$

$$\therefore K = 38.56$$

8) Evaluate : $\left(6^{-1} + 8^{-1} + 12^{-1}\right)^0$

Soln:-

$$\left(\frac{1}{6} + \frac{1}{8} + \frac{1}{12}\right)^0 = 1 \quad [\because x^0 = 1]$$

9) Express 300970000 in standard form.

Soln:- $300970000 = 3.0097 \times 10^8$

10) What is the reciprocal of $\left(\frac{8}{5}\right)^{-4}$?

$$\left(\frac{8}{5}\right)^{-4} = \left(\frac{5}{8}\right)^4 = \frac{5^4}{8^4} = \frac{625}{4096}$$

11) The sum of the exterior angles of a quadrilateral is always equal to : (a) 144° (b) 36° (c) 316° (d) 360°.

Soln:- 360° (d)

12) Which is not a quadrilateral ?

(a) Square (b) rectangle (c) trapezium (d) hexagon

Soln:- hexagon (d)

13) Find the square root of the following numbers by long division:

(a) 14641 (b) 15376 (c) 47961 (d) 10609

Soln:- (a) $\sqrt{14641} = \underline{\underline{121}}$

```
          121
      ---------
   1 | 1 46 41
     | 1
     ---------
  22 |   46
     |   44
     ---------
 241 |    241
     |    241
     ---------
            0
```

(b) $\sqrt{15376} = \underline{\underline{124}}$

```
          124
      ---------
   1 | 1 53 76
     | 1
     ---------
  22 |   53
     |   44
     ---------
 244 |    976
     |    976
     ---------
            0
```

(c) $\sqrt{47961} = \underline{\underline{219}}$

```
          219
      ---------
   2 | 4 79 61
     | 4
     ---------
  41 |   79
     |   41
     ---------
 429 |   3861
     |   3861
     ---------
            0
```

(d) $\sqrt{10609} = \underline{\underline{103}}$

```
          103
      ---------
   1 | 1 06 09
     | 1
     ---------
 203 |   0609
     |    609
     ---------
            0
```

14) The product of two numbers is 1296. If one number is 16 times the other, find the numbers

Soln:- Let the numbers be x and $16x$

$$x \times 16x = 1296$$

$$16x^2 = 1296$$

$x^2 = \frac{1296}{16} = 81$

$\therefore x = \sqrt{81} = 9$

Hence, the required numbers are 9 and $16 \times 9 = 144$

15) Find the least six-digit number which is a perfect square. Also, find its square root.

Soln:- Least six-digit number = 100000.

$$\begin{array}{r|l} & 317 \\ \hline 3 & \overline{100000} \\ & 9 \\ \hline 61 & 100 \\ & 61 \\ \hline 627 & 3900 \\ & 4389 \\ \hline & 489 \end{array}$$

$\therefore$ The least six-digit number which is a perfect square

$= 100000 + 489$

$= 100489$

Hence, $\sqrt{100489} = 317$

16) The area of a square field is 15265 m^2. Find the cost of fencing the field at the rate of Rs 10/m

Soln:- Area of a square field = Side × Side = 15265

$\Rightarrow Side^2 = 15265$

$\therefore$ Length of side of the square field $= \sqrt{15265}$

$= 123.55$ m

Perimeter of the field $= 123.55 \times 4$

Then, Cost of fencing = Rate × length of side × 4

$= 10 \times 123.55 \times 4$

$= ₹\ 4942$

$$\begin{array}{r|l} & 123.55 \\ \hline 1 & \overline{15265.0000} \\ & 1 \\ \hline 22 & 52 \\ & 44 \\ \hline 243 & 865 \\ & 729 \\ \hline 2465 & 13600 \\ & 12325 \\ \hline 247105 & 127500 \\ & 123525 \end{array}$$

17) Which of the following are Pythagorean Triplets?

(a) (6, 8, 10) (b) (9, 81, 82). (c) (15, 85, 87). (d) (18, 80, 82)

Soln:- (a) $6^2 + 8^2 = 36 + 64 = 100 = 10^2$

$\therefore$ (6, 8, 10) forms a Pythagorean triplet

(b) $9^2 + 81^2 = 81 + 6561 = 6642 \neq 82^2$

$\therefore$ (9, 81, 82) does not form a Pythagorean triplet.

(c) $15^2+85^2 = 225+7225 = 7450 \neq 87^2$

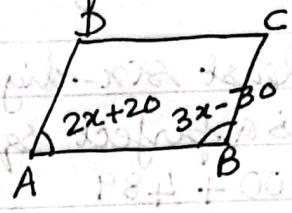
$\therefore$ (15, 85, 87) does not form a Pythagorean Triplet.

(d) $18^2+80^2 = 324+6400 = 6724 = 82^2$

$\therefore$ (18, 80, 82) forms a Pythagorean Triplet.

18) In a parallelogram ABCD, if the measures of adjacent angles A and B are $2x+20$ and $3x-30$ respectively, find the measure of all its angles.

Soln:- Since the adjacent angles of a parallelogram are supplementary,



$\angle A + \angle B = 180^\circ$

$\Rightarrow 2x+20+3x-30 = 180^\circ$

$\Rightarrow 5x-10 = 180^\circ$

$\Rightarrow 5x = 190$

$\therefore x = \frac{190}{5} = 38^\circ$

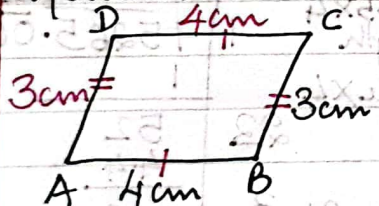
Thus, $\angle A = 2x+20^\circ = 2\times 38^\circ + 20^\circ = 96^\circ$ //

$\angle A = \angle C = 96^\circ$

$\angle B = \angle D = 3\times 38^\circ - 30 = 84^\circ$ //

19) Two adjacent side of a parallelogram measure 4cm and 3cm. Find its perimeter.

Soln:-



Perimeter = AB + BC + DC + AD

$= 4+3+4+3$

$= 14\text{cm}$ //

20) Find the number of sides of a regular polygon if each of its interior angles measures 135°.

Soln:- each exterior angle $= 180^\circ - 135^\circ$ (linear pair)

$= 45^\circ$

no. of sides, $n = \frac{360^\circ}{\text{each exterior angle}}$

$= \frac{360^\circ}{45^\circ} = 8$ sides //

21) The perimeter of a parallelogram is 140cm. If one of its sides is greater than the other by 10cm, find the length of each of its sides

Soln:- Let the sides of the parallelogram be x cm and $(x+10)$ cm

Then, Perimeter $= 2(x + x + 10) = 140$

$\Rightarrow 2x + 10 = 70$

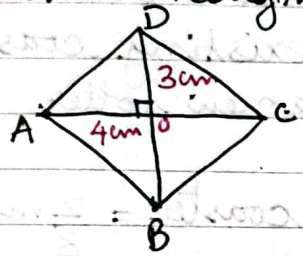
$\Rightarrow 2x = 60$

$\therefore x = \frac{60}{2} = 30$

Hence, the lengths of each of its sides $= 30$cm and $x + 10 = 40$cm

22) The diagonals of a rhombus measure 6cm and 8cm. Find the length of its sides.

Soln:-



We know that the diagonals of a rhombus bisect each other at 90°.

Using Pythagoras Theorem in $\triangle AOD$,

$AD^2 = OA^2 + OD^2 = 4^2 + 3^2 = 16 + 9 = 25$

$\therefore AD = \sqrt{25} = 5$cm

Hence, the length of its sides $= 5$cm //

23) The product of two rational numbers is $\frac{-14}{27}$. If one of the numbers is $\frac{7}{9}$, find the other.

Soln:- Let the required number be x.

Then, $x \times \frac{7}{9} = \frac{-14}{27}$

$\therefore x = \frac{-\cancel{14}^{2}}{\cancel{27}_{3}} \times \frac{\cancel{9}^{1}}{\cancel{7}_{1}} = \frac{-2}{3}$

Hence, the other number is $\frac{-2}{3}$

24) Find ten rational numbers between $\frac{-2}{5}$ and $\frac{1}{2}$

Soln:-

$\frac{-2 \times 2}{5 \times 2}$, $\frac{1 \times 5}{2 \times 5}$

$\frac{-4}{10}$, $\frac{5}{10}$

$\frac{-4 \times 10}{10 \times 10}$, $\frac{5 \times 10}{10 \times 10}$

$\frac{-40}{100}$, $\frac{50}{100}$

$\therefore$ Ten rational numbers are $\frac{-39}{100}, \frac{-37}{100}, \frac{-33}{100}, \frac{-29}{100}, \frac{-23}{100}, \frac{39}{100}, \frac{37}{100}, \frac{33}{100}, \frac{29}{100}, \frac{23}{100}$.

25) The cost of $\frac{19}{4}$ meters of wire is ₹ $17\frac{1}{2}$. find the cost of one meter of wire.

Soln:-

Cost of $\frac{19}{4}$ m wire = ₹ $\frac{35}{2}$

$\therefore$ Cost of 1m wire = $\frac{35}{2} \div \frac{19}{4}$

$= \frac{35}{2_1} \times \frac{4^2}{19} = \frac{70}{19}$

$= ₹\ 3\frac{13}{19}$

26) Roller coaster at an amusement park is $\frac{2}{3}$m high. If a new roller coaster is built that is $\frac{3}{5}$ times the height of the existing coaster, what will be the height of the new roller coaster?

Soln:- Height of the existing roller coaster = $\frac{2}{3}$ m

$\therefore$ Height of the new roller coaster = $\frac{3^1}{5} \times \frac{2}{3_1}$

$= \frac{2}{5}$ m

27) If 16 shirts of equal size can be made of 24m of cloth, how much cloth is needed to make one such shirt?

Soln:- length of cloth for 16 shirts = 24 m

$\therefore$ length of cloth needed for 1 shirt = $\frac{24^3}{16_2}$

$= \frac{3}{2}$ m

XII. H.W – 21

22) Solve $2y+9=4$ (a) $-5/2$ (b) $1/2$ (c) 2 (d) $2/3$

Soln:- $2y = 4-9 = -5$

$y = -\frac{5}{2}$ (a)

23) Solve : $x = \frac{4}{5}(x+10)$ (a) 20 (b) 10 (c) 0 (d) 2.

Soln:- $5x = 4(x+10)$

$5x = 4x+40$

$5x-4x = 40$

$x = 40$ (c)

24) Solve : $5t-3 = 3t-5$ (a) -1 (b) 1 (c) 0 (d) 2

Soln:- $5t-3t = -5+3$

$2t = -2$

$t = \frac{-2}{2} = -1$ (a)

25) If 15 is subtracted from a number, it becomes -5. This statement in the form of an equation is

(a) $x+15=-5$ (b) $x-15=5$ (c) $x+15=5$ (d) $x-15=-5$

Soln:- Let the number be x.

$x-15 = -5$ (d)

26) The sum of three consecutive multiples of 7 is 357. Find the smallest multiple (a) 112 (b) 126 (c) 119 (d) 116.

Soln:- Let the consecutive multiples of 7 be x, $x+7$ and $x+14$.

Then, $x+x+7+x+14 = 357$

$3x+21 = 357$

$3x = 357-21 = 336$

$x = \frac{336}{3} = 112$ (a)

27) The number 299 is divided into two parts in the ratio 5:8. The product of the numbers is

(a) 21140 (b) 21294 (c) 21160 (d) 31294

Soln:- Let the 2 parts be $5x$ and $8x$.

Then $5x+8x = 299$

$13x = 299$

$x = \frac{299}{13} = 23$

$\therefore$ The product $= 5x \times 8x$

$= 40 \times 23 \times 23$

$= 21160$ (c)

28) The present age of Sahil's mother is three times the present age of Sahil. After 5 years their age will add to 66 years. Find their present ages.

(a) 28 years, 42 years (b) 14 years, 56 years

(c) 28 years, 56 years (d) 14 years, 42 years

Soln:- Let Sahil's age be x.

Then, mother's age $= 3x$

After 5 years, Sahil's age $= x+5$

mother's age $= 3x+5$

Thus, $x+5+3x+5 = 66$

$4x+10 = 66$

$4x = 56$

$x = \frac{56}{4} = 14$

Hence, their present ages $= 14$ yrs and $14 \times 3 = 42$ yrs

(d)

29) The sum of two digit number and the number formed by interchanging its digit is 110. If ten is subtracted from the first number, the new number is 4 more than 5 times of the sum of the digits in the first number. Find the first number

(a) 46 (b) 48 (c) 64 (d) 84

Soln:- Let the no. in the units place be y and that in the ten's place be x.

T	O
x	y

Then original number $= 10x+y$

reversed number $= 10y+x$

Thus, $10x+y+10y+x = 110$

$11x+11y = 110$

$11(x+y) = 110$

$x+y = 10 \longrightarrow (1)$

Also, $10x+y-10 = 5(x+y)+4$

$\Rightarrow 10x+y-10 = 5x+5y+4$

$\Rightarrow 5x-4y-14 = 0$

$\Rightarrow 5x-4y = 14 \longrightarrow (2)$

From eq: (1), $y = 10 - x \rightarrow (3)$

On substituting (3) in (2), $5x - 4(10-x) = 14$

$5x - 40 + 4x = 14$

$9x = 14 + 40 = 54$

$x = \frac{54}{9} = \underline{\underline{6}}$

$y = 4$ //

$\therefore$ The first number = 64 (c)

30) Let the number be x.

Then, $\frac{2}{3} \times x = x - 20$

$2x = 3(x-20)$

$2x = 3x - 60$

$2x - 3x = -60$

$-x = -60$

$\therefore x = 60$ (a)

Q:) If $(\frac{2}{3})^{rd}$ of a number is 20 less than the original number, then the number is

(a) 60 (b) 40 (c) 80 (d) 120

31) The numerator of a fraction is 4 less than the denominator. If the numerator is decreased by 2 and denominator is increased by 1, then the denominator is eight times the numerator. Find the fraction.

(a) $\frac{4}{12}$ (b) $\frac{3}{13}$ (c) $\frac{3}{7}$ (d) $\frac{11}{7}$

Soln: Let the fraction be $\frac{x}{y}$

Then, $x = y - 4 \longrightarrow (1)$

$x - 2 ; y + 1$

$\therefore y + 1 = 8(x-2)$

$\Rightarrow y + 1 = 8x - 16$

$\Rightarrow 8x - y = 17$

$\Rightarrow 8(y-4) - y = 17$

$\Rightarrow 8y - 32 - y = 17$

$\Rightarrow 7y = 49$

$y = \frac{49}{7} = 7$ //

$x = 7 - 4 = 3$ //

$\therefore$ The fraction $= \frac{3}{7}$ (c)