VIII Homework (Answers)

1) Write two rational numbers whose multiplicative inverse is same as they are.

Soln:- 1 and -1

2) Multiply $\frac{5}{8}$ by the reciprocal of $-\frac{3}{8}$

Soln:- $\frac{5}{8_1} \times -\frac{8^1}{3} = -\frac{5}{3}$

3) Using appropriate properties find:

$$-\frac{2}{3} \times \frac{3}{5} + \frac{5}{2} - \frac{3}{5} \times \frac{1}{6}$$

Soln:-

$$\frac{3}{5} \times \left(-\frac{2^{\times 2}}{3_{\times 2}} - \frac{1}{6}\right) + \frac{5}{2}$$

$$= \frac{3}{5} \times \left(\frac{-4-1}{6}\right) + \frac{5}{2} = \frac{3^1}{5_1} \times -\frac{5}{6_2} + \frac{5}{2}$$

$$= -\frac{1}{2} + \frac{5}{2} = \frac{4}{2} = \underline{\underline{2}}$$

4) Simplify and give the answer in standard form:

$$\left(\frac{3}{8} + \frac{5}{12}\right) \div \left(\frac{8}{-15} \times \frac{27}{16}\right)$$

Soln:-

$$\left(\frac{3^{\times 3}}{8_{\times 3}} + \frac{5^{\times 2}}{12_{\times 2}}\right) \div \left(\frac{8^1}{-15_5} \times \frac{27^9}{16_2}\right)$$

$$= \left(\frac{9+10}{24}\right) \div \left(-\frac{9}{10}\right)$$

$$= \frac{19}{24_{12}} \times -\frac{10^5}{9} = -\frac{95}{108}$$

5) Find the multiplicative inverse of
(i) $-\frac{4}{9} \times -\frac{3}{7}$ (ii) 2^{-3} (iii) 10^{-6}

Soln:- (i) $-\frac{4}{9_3} \times -\frac{3^1}{7} = \frac{4}{21}$

$\therefore$ The multiplicative inverse is $\frac{21}{4}$

(ii) $2^{-3} = \frac{1}{2^3} = \frac{1}{8}$

∴ The multiplicative inverse is 8

(iii) $10^{-6} = \frac{1}{10^6} = \frac{1}{1000000}$

∴ The multiplicative inverse is 1000000

6) Express 2048 as a power of 2

Soln:-

$2048 = \underline{\underline{2^{11}}}$

2	2048
2	1024
2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
	2

7) Evaluate (i) 3^{-3} (ii) $(-4)^{-3}$ (iii) $\frac{2}{2^{-3}}$ (iv) $\left(\frac{1}{2}\right)^{-5}$

Soln:-

(i) $3^{-3} = \frac{1}{3^3} = \underline{\underline{\frac{1}{27}}}$

(ii) $(-4)^{-3} = -\frac{1}{4^3} = \underline{\underline{-\frac{1}{64}}}$

(iii) $\frac{2}{2^{-3}} = 2 \times 2^3 = 2^4 = \underline{\underline{16}}$

(iv) $2^5 = 32$

8) Simplify: (a) $\left[\left(\frac{1}{3}\right)^{-2} - \left(\frac{1}{2}\right)^{-2}\right] \div \left(\frac{1}{4}\right)^{-3}$

(b) $(-3)^4 \times \left(\frac{5}{3}\right)^4$

Soln:-

(a) $\left(3^2 - 2^2\right) \div 4^3$

$= \frac{9-4}{64} = \underline{\underline{\frac{5}{64}}}$

(b) $(-3)^4 \times \frac{5^4}{3^4} = \frac{3^4 \times 5^4}{3^4} = 5^4 = \underline{\underline{625}}$

9) Find m such that $(-3)^{m+1} \times (-3)^5 = (-3)^7$

Soln:-

$(-3)^{m+1+5} = (-3)^7$

$\therefore m+6 = 7$

$\therefore m = 7-6$

$= \underline{\underline{1}}$

10) Answer the following :-

(i) What is the standard form of 602000000000000

(ii) What is the usual form of 1.0001×10^9

(iii) The size of a plant cell is 0.00001275m. Express this size in standard form.

Soln:- (i) 6.02×10^{15}

(ii) 1000100000

(iii) 1.275×10^{-5} m

11) What is the decimal number which when multiplied by itself gives 0.000729?

Soln:- Let the decimal number be x.

Then, $x \times x = 0.000729$

$$x^2 = \frac{729}{1000000}$$

$$\therefore x = \sqrt{\frac{729}{1000000}} = \frac{27}{1000} = 0.027$$

Hence the required decimal number is 0.027

12) How many natural numbers lie between the squares of 19 and 20?

Soln:- We know that there are $2n$ natural numbers between the squares of n and $n+1$, then the no. of natural numbers lie between 19^2 and 20^2

$$= 2 \times 19 = \underline{38}.$$

13) Choose the Pythagorean triplet if one of the members is 14.

Soln:- We know that $(2m, m^2-1, m^2+1)$ forms a Pythagorean triplet.

Let $2m = 14$

$\Rightarrow m = 7$

Then $m^2 - 1 = 49 - 1 = 48$

$m^2 + 1 = 49 + 1 = 50$

$\therefore (14, 48, 50)$ forms the Pythagorean Triplet.

14) Find the smallest square number that is divisible by each of the numbers 8, 15 and 20.

Soln:- LCM (8, 15, 20) = 120

$120 = \underline{2\times2}\times\underline{2}\times\underline{3}\times\underline{5}$

$120\times2\times3\times5 = \underline{2\times2}\times\underline{2\times2}\times\underline{3\times3}\times\underline{5\times5}$

∴ The required smallest square number $= 120\times2\times3\times5$

$= \underline{3600}$

5	8, 15, 20
4	8, 3, 4
	2, 3, 1

2	120
2	60
2	30
3	15
	5

15) Find the square root by factorization method :
(a) 729 (b) 1764

Soln:- (a) $729 = \underline{3\times3}\times\underline{3\times3}\times\underline{3\times3}$

$\therefore \sqrt{729} = 3\times3\times3 = \underline{27}$

3	729
3	243
3	81
3	27
3	9
	3

(b) $1764 = \underline{2\times2}\times\underline{3\times3}\times\underline{7\times7}$

$\therefore \sqrt{1764} = 2\times3\times7 = \underline{42}$

2	1764
2	882
3	441
7	147
7	21
	3

16) Find the square root by division method :
(a) 3481 (b) 2304

Soln:- (a) $\sqrt{3481} = \underline{59}$

	59
5	3481
	25
109	981
	981
	0

(b) $\sqrt{2304} = \underline{48}$

	48
4	2304
	16
88	704
	704
	0

17) Find the square root : (a) 151.29 (b) 44.89

Soln:- (a) $\sqrt{151.29} = \underline{12.3}$

	12.3
1	151.29
	1
22	51
	44
243	729
	729
	0

(b) $\sqrt{44.89} = \underline{6.7}$

	6.7
6	44.89
	36
127	889
	889
	0

18) For the following, find the smallest number by which it should be multiplied so as to get a square number. Also, find the square root of the square number so obtained.

(a) 180 (b) 2400 (c) 768

Soln:- $180 = 2 \times 2 \times 3 \times 3 \times 5$

$180 \times 5 = 2 \times 2 \times 3 \times 3 \times 5 \times 5$

$\sqrt{900} = 2 \times 3 \times 5$

$= 30$

2 | 180
2 | 90
5 | 45
3 | 9
3

∴ The required number to be multiplied is 5

Hence, the required square number is 900

∴ $\sqrt{900} = 30$

(b) $2400 = 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 2 \times 3$

$2400 \times 2 \times 3 = 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 2 \times 2 \times 3 \times 3$

$\sqrt{14400} = 2 \times 2 \times 5 \times 2 \times 3$

$= 120$

2 | 2400
2 | 1200
2 | 600
2 | 300
2 | 150
5 | 75
5 | 15
3

∴ The required number to be multiplied is $2 \times 3 = 6$.

Hence, the required square number is 14400.

∴ $\sqrt{14400} = 120$

(c) $768 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3$

$768 \times 3 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3$

$\sqrt{2304} = 2 \times 2 \times 2 \times 2 \times 3$

$= 48$

2 | 768
2 | 384
2 | 192
2 | 96
2 | 48
2 | 24
2 | 12
2 | 6
3

∴ The required number to be multiplied is 3.

Hence, the required square number is 2304.

∴ $\sqrt{2304} = 48$

19) The volume of cubical box is 1728 cubic.cm. Find the length of edge of the box.

Soln:- Volume of a cube = side × side × side

$side^3 = 1728$

∴ $side = \sqrt[3]{1728} = 2 \times 2 \times 3 = 12\ cm$

2 | 1728
2 | 864
2 | 432
2 | 216
2 | 108
2 | 54
3 | 27
3 | 9
3

Hence the length of edge of the box = 12cm//

20) Find the Cubes of the following:-

(a) 0.3 (b) 0.8 (c) 0.001

Soln:- $(0.3)^3 = 0.027$

$(0.8)^3 = 0.512$

$(0.001)^3 = 0.000000001$

21) Find the cube roots of the following:-

(a) 1728 (b) 3375

Soln:- (a) $\sqrt[3]{1728} = 2\times2\times2\times2\times2\times2\times3\times3\times3$

$= 2\times2\times3$

$= 12$

2 | 1728	5 | 3375
2 | 864	5 | 675
2 | 432	5 | 135
2 | 216	3 | 27
2 | 108	3 | 9
2 | 54	3
3 | 27	
3 | 9	
3	

(b) $3375 = 5\times5\times5\times3\times3\times3$

$\sqrt[3]{3375} = 5\times3 = 15$

22) Find the smallest number by which the following numbers may be multiplied so that the product is a perfect cube.

(a) 1323 (b) 243 (c) 392

Soln:- $1323 = 3\times3\times3\times7\times7$

$1323\times7 = 3\times3\times3\times7\times7\times7$

$\sqrt[3]{9261} = 3\times7 = 21$

∴ The required number to be multiplied $= 7$

3 | 1323
3 | 441
7 | 147
7 | 21
3

Hence $\sqrt[3]{9261} = 21$.

(b) $243 = 3\times3\times3\times3\times3$

$243\times3 = 3\times3\times3\times3\times3\times3$

$\sqrt[3]{729} = 3\times3 = 9$

3 | 243
3 | 81
3 | 27
3 | 9
3

∴ The required number to be multiplied is 3

(c) $392 = 2\times2\times2\times7\times7$

$392\times7 = 2\times2\times2\times7\times7\times7$

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

∴ The required number to be multiplied = 14

2 | 392
2 | 196
2 | 98
7 | 49
7

23) Find the smallest number by which the following numbers may be divided to obtain a perfect cube
(a) 243 (b) 625 (c) 432

Soln:- (a) $243 = 3\times3\times3\times3\times3$

$\frac{243}{9} = 3\times3\times3$

$\therefore \sqrt[3]{27} = 3$

3	243
3	81
3	27
3	9
	3

Hence, the required smallest number to be divided $= 3\times3 = 9$

(b) $625 = 5\times5\times5\times5$

$\frac{625}{5} = 5\times5\times5$

$\sqrt[3]{125} = 5$

Hence, the required smallest number to be divided $= 5$

(c) $432 = 2\times2\times2\times2\times3\times3\times3$

$\frac{432}{2} = 2\times2\times2\times3\times3\times3$

$\sqrt[3]{216} = 2\times3 = 6$

2	432
2	216
2	108
2	54
3	27
3	9
	3

Hence, the required smallest number to be divided $= 2$

24) The sides of a pentagon are produced in order. Which of the following is the sum of its exterior angles?
(a) 540° (b) 180° (c) 720° (d) 360°

Soln:- Sum of exterior angle of a polygon $= 360°$ (d)

25) Diagonals of which of the following quadrilaterals do not bisect it into two congruent triangles?
(a) rhombus (b) trapezium (c) square (d) rectangle

Soln:- Trapezium (b)

26) $n = 6$

Sum of interior angles of a hexagon $= (n-2)\times180°$.

$= 4\times180° = 720°$

Then, $150° + 95° + 80° + 135° + 125° + x = 720°$

$\therefore$ The sixth angle $= 720 - 585 = 135°$

0:26) Five angles of a hexagon are 150°, 95°, 80°, 135° and 125°. Find the sixth angle

27) The measure of each interior angle of a regular polygon is 140°. Then, the number of sides of that regular polygon is _____

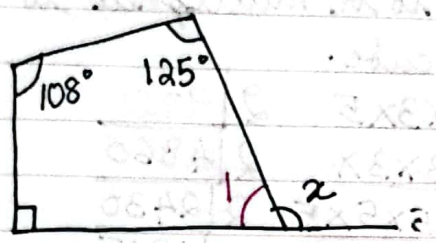
Soln:- exterior angle = 180° − 140° = 40°. (linear pair)

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

$= \frac{360^\circ}{40^\circ} = \underline{\underline{9 \text{ sides}}}$

28) Find the unknown angles.

(a)



find the value of x.

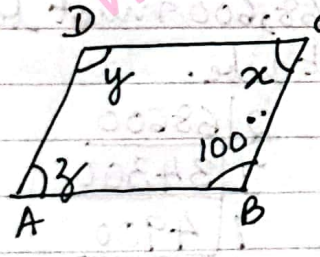
Soln:- Using angle sum property of a quadrilateral,

$\angle 1 + 90^\circ + 108^\circ + 125^\circ = 360^\circ$

$\therefore \angle 1 = 360^\circ - 323^\circ = \underline{37^\circ}$

$\therefore x = 180^\circ - \angle 1 = 180^\circ - 37^\circ = \underline{143^\circ}$ (linear pair)

(b)



ABCD is a parallelogram. Find the values of x, y and z.

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

$x + 100^\circ = 180^\circ$

$\therefore x = 180^\circ - 100^\circ = 80^\circ$

Since the opposite angles are equal in a parallelogram,

$x = z = \underline{\underline{80^\circ}}$

$y = \underline{\underline{100^\circ}}$