

Homework-4

- 1) Which of the following is the square of an odd number?
(a) 2116 (b) 3844 (c) 1369 (d) 2500
- 2) The square of an even number is —
- 3) The square of an odd number is —
- 4) For any natural number n , sum of the first n odd numbers is —
- 5) For any natural number m ($m > 1$), — is a Pythagorean triplet
- 6) A number ending in — no. of zeroes is never a perfect square.
- 7) A number ending in —, —, — or — is never a perfect square
- 8) If x and y are two rational numbers ($x < y$), then — is a rational number between x and y .
- 9) Identify the property: if $\frac{a}{b}$ and $\frac{c}{d}$ are two rational numbers,
- (i) $(\frac{a}{b} + \frac{c}{d})$ is also a rational number
- (ii) $\frac{a}{b} + \frac{c}{d} = \frac{c}{d} + \frac{a}{b}$
- (iii) $(\frac{a}{b} + \frac{c}{d}) + \frac{e}{f} = \frac{a}{b} + (\frac{c}{d} + \frac{e}{f})$
- (iv) $\frac{a}{b} + 0 = 0 + \frac{a}{b} = \frac{a}{b}$
- (v) $\frac{a}{b} + -\frac{a}{b} = -\frac{a}{b} + \frac{a}{b} = 0$
- (vi) $(\frac{a}{b} \times \frac{c}{d})$ is also a rational no.
- (vii) $\frac{a}{b} \times \frac{c}{d} = \frac{c}{d} \times \frac{a}{b}$
- (viii) $(\frac{a}{b} \times \frac{c}{d}) \times \frac{e}{f} = \frac{a}{b} \times (\frac{c}{d} \times \frac{e}{f})$
- (ix) $\frac{a}{b} \times 1 = 1 \times \frac{a}{b} = \frac{a}{b}$
- (x) $\frac{a}{b} \times \frac{b}{a} = \frac{b}{a} \times \frac{a}{b} = 1$
- 10) Find the square root by prime factorisation method:
(i) 11025 (ii) 9216
- 11) Find the smallest number by which 252 must be multiplied to get a perfect square. Also, find the square root of the perfect square so obtained.
- 12) Find the smallest number by which 2925 must be divided to obtain a perfect square. Also find the square root of the perfect square so obtained.
- 13) 1225 plants are to be planted in a garden in such a way that each row contains as many plants as the no. of rows.

- Find the no. of rows and no. of plants in each row.
- 14) Find the least square number which is exactly divisible by each of the numbers 6, 9, 15 and 20.
 - 15) Write true or false
 - (i) number of digits in a perfect square is even
 - (ii) square of a prime number is prime
 - (iii) sum of two perfect square is a perfect square
 - (iv) difference of two perfect squares is a perfect square
 - (v) product of two perfect squares is a perfect square.
 - (vi) square of a proper fraction is less than the given fraction.
 - 16) Evaluate : (i) $141^2 - 140^2$ (ii) $92^2 - 91^2$
 - 17) Write a Pythagorean Triplet whose smallest member is 20
 - 18) Express 100 as the sum of 10 odd numbers
 - 19) Find three rational numbers between 4 and 5.
 - 20) The product of two rational numbers is $-\frac{16}{9}$. If one of them is $-\frac{4}{3}$, find the other.
 - 21) By what rational number should we multiply $-\frac{15}{56}$ to get $-\frac{5}{7}$?
 - 22) By what number should $-\frac{33}{8}$ be divided to get $-\frac{11}{2}$?
 - 23) The sum of two rational numbers is $-\frac{1}{2}$. If one of the numbers is $\frac{5}{6}$, find the other.
 - 24) What number should be added to $-\frac{5}{8}$ so as to get $-\frac{3}{2}$?
 - 25) What number should be subtracted from $-\frac{2}{3}$ to get $-\frac{1}{6}$?

VIII Homework - 4 (Answers)

- 1) 1369 (c)
- 2) even
- 3) odd
- 4) n^2
- 5) $(2m, m^2-1, m^2+1)$
- 6) odd
- 7) 2, 3, 7, 8
- 8) $\frac{x+y}{2}$

- 9) (i) closure property of addition of rational numbers
 (ii) Commutative property of addition.
 (iii) Associative property of addition
 (iv) Property of 0 (additive identity for rational no.s)
 (v) additive inverse
 (vi) closure property of multiplication of rational no.s
 (vii) Commutative property of multiplication.
 (viii) associative property of multiplication.
 (ix) Property of 1 (multiplicative identity)
 (x) multiplicative inverse (reciprocal)

10) (i) $11025 = 5 \times 5 \times 3 \times 3 \times 7 \times 7$
 $\sqrt{11025} = 5 \times 3 \times 7 = \underline{105}$

$$\begin{array}{r} 5 \overline{)11025} \\ \underline{5} \\ 60 \\ \underline{5} \\ 105 \\ \underline{105} \\ 0 \end{array}$$

(ii) 9216
 $= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3$
 $\sqrt{9216} = 2 \times 2 \times 2 \times 2 \times 2 \times 3$
 $= \underline{96}$

$$\begin{array}{r} 2 \overline{)9216} \\ \underline{2} \\ 72 \\ \underline{2} \\ 56 \\ \underline{2} \\ 36 \\ \underline{2} \\ 16 \\ \underline{2} \\ 12 \\ \underline{2} \\ 6 \\ \underline{2} \\ 3 \end{array}$$

$$\begin{array}{r} 2 \overline{)18} \\ \underline{2} \\ 9 \\ \underline{3} \\ 3 \end{array}$$

$$11) 252 = 2 \times 2 \times 3 \times 3 \times 7$$

$$252 \times 7 = 2 \times 2 \times 3 \times 3 \times 7 \times 7$$

$$\sqrt{1764} = 2 \times 3 \times 7 = \underline{42}$$

$$\begin{array}{r} 2 \overline{)252} \\ 2 \overline{)126} \\ 3 \overline{)63} \\ 3 \overline{)21} \\ 7 \end{array}$$

∴ The required smallest number
= 7

$$\sqrt{1764} = 42 //$$

$$12) 2925 = 5 \times 5 \times 3 \times 3 \times 13$$

$$2925 \div 13 = 5 \times 5 \times 3 \times 3 \times 13 \times 13$$

$$\sqrt{225} = 5 \times 3 = \underline{15}$$

$$\begin{array}{r} 5 \overline{)2925} \\ 5 \overline{)585} \\ 3 \overline{)117} \\ 3 \overline{)39} \\ 13 \end{array}$$

∴ The required smallest number = 15

$$\sqrt{225} = 15 //$$

13) Let the no. of rows and no. of plants in each row be x .

$$\text{Then } x \times x = 1225$$

$$x^2 = 1225$$

$$\therefore x = \sqrt{1225}$$

$$= \sqrt{5 \times 5 \times 7 \times 7}$$

$$= 5 \times 7 = \underline{35}$$

Hence the no. of rows = 35

no. of plants in 1 row = 35

$$14) \text{ LCM}(6, 9, 15, 20) = 3 \times 5 \times 2 \times 3 \times 2$$

$$= \underline{180}$$

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

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

$$\sqrt{900} = 2 \times 3 \times 5 = \underline{30}$$

$$\begin{array}{r} 2 \overline{)180} \\ 2 \overline{)90} \\ 3 \overline{)45} \\ 5 \overline{)15} \\ 3 \end{array}$$

$$\begin{array}{r} 3 \overline{)6, 9, 15, 20} \\ 5 \overline{)2, 3, 5, 20} \\ 2 \overline{)2, 3, 1, 4} \\ 3 \overline{)1, 3, 1, 2} \\ 2 \overline{)1, 1, 1, 2} \\ 1, 1, 1, 1 \end{array}$$

Hence the required least square number is 900.

- 15) (i) False, eg:- 625 is a perfect square with odd no. of digit
 (ii) False, eg:- $5 \times 5 = 25$, 25 is not a prime number.
 (iii) False, eg:- $16 + 4 = 20$, which is not a perfect square.
 (iv) False, eg:- $16 - 4 = 12$, which is not a perfect square
 (v) True, eg:- $16 \times 4 = 64$, which is a perfect square
 (vi) True, eg:- $(\frac{1}{2})^2 = \frac{1}{4}$, which is less than $\frac{1}{2}$

16) (i) $141^2 - 140^2 = (141+140)(141-140)$
 $= 281 \times 1 = \underline{281}$

(ii) $92^2 - 91^2 = (92+91)(92-91)$
 $= 183 \times 1 = \underline{183}$

17) We know that for any natural number m ($m > 1$)
 $(2m, m^2-1, m^2+1)$ forms a Pythagorean triplet.

* $2m = 20$

$m = 10$

* $m^2 - 1 = 10^2 - 1 = 100 - 1 = 99$

* $m^2 + 1 = 10^2 + 1 = 100 + 1 = 101$

$(20, 99, 101)$ is the required Pythagorean Triplet.

18) $100 = 10^2 = 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19$

19) Three rational numbers between 4 and 5
 are

$$\frac{4 \times 4}{1 \times 4}$$

$$\frac{5 \times 4}{1 \times 4}$$

$$\frac{16}{4}$$

$$\frac{20}{4}$$

$$\frac{17}{4}, \frac{18}{4}, \frac{19}{4} \text{ or } \frac{17}{4}, \frac{9}{2}, \frac{19}{4}$$

20) Let the other number be x

Then, $x \times -\frac{4}{3} = -\frac{16}{9}$

$$x = -\frac{16}{4 \times 3} \times -\frac{3}{4} = \frac{4}{3}$$

\therefore The other number is $\underline{\underline{\frac{4}{3}}}$

21) Let the required number be x

$$\text{Then, } -\frac{15}{56} \times x = -\frac{5}{7}$$

$$x = -\frac{5^1}{7^1} \times -\frac{56^8}{15^3} = \frac{8}{3}$$

\therefore The required rational number is $\frac{8}{3}$

22) Let the required number be x

$$\text{Then, } -\frac{33}{8} \div x = -\frac{11}{2}$$

$$\Rightarrow -\frac{33}{8} \times \frac{1}{x} = -\frac{11}{2}$$

$$\Rightarrow \frac{1}{x} = -\frac{11^1}{2^1} \times -\frac{8^4}{33^3} = \frac{4}{3}$$

$$\therefore x = \frac{3}{4}$$

\therefore The required number is $\frac{3}{4}$

23) Let the other number be x

$$\text{Then, } \frac{5}{6} + x = -\frac{1}{2}$$

$$\Rightarrow x = -\frac{1^{\times 3}}{2^{\times 3}} \frac{5}{6} = -\frac{3-5}{6} = -\frac{8^4}{6^3} = -\frac{4}{3}$$

\therefore The other number is $-\frac{4}{3}$

24) Let the required number be x

$$\text{Then, } -\frac{5}{8} + x = -\frac{3}{2}$$

$$\Rightarrow x = -\frac{3^{\times 4}}{2^{\times 4}} \frac{5}{8} = -\frac{12+5}{8} = -\frac{17}{8}$$

\therefore The required number is $-\frac{17}{8}$

25) Let the required number be x

$$\frac{-2}{3} - x = -\frac{1}{6}$$

$$\Rightarrow -x = -\frac{1}{6} + \frac{2 \times 2}{3 \times 2} = -\frac{1+4}{6} = \frac{3}{6} = \frac{1}{2}$$

$$\therefore x = \underline{\underline{-\frac{1}{2}}}$$

\therefore The required number is $-\frac{1}{2}$.

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