VIII HW - 21st February (Squares and Square Roots)

1) The number of digits in the square root of 390625 are
(a) 3 (b) 4 (c) 5 (d) 6

2) The natural numbers between 11^2 and 12^2 are
(a) 1 (b) 16 (c) 22 (d) infinite

3) The square of 11111 is
(a) 123454321 (b) 1234321 (c) 321231 (d) 1223311

4) $\sqrt{1.6} \times \sqrt{1.6} =$
(a) 25.6 (b) 1.6 (c) 2.56 (d) 3.2

5) $\sqrt{0.8} \times \sqrt{1.8} =$
(a) 0.08 (b) 2.34 (c) 1.2 (d) 1.1

6) The least number that must be subtracted from 202 to make it a perfect square is
(a) 6 (b) 8 (c) 14 (d) 10

7) $\sqrt{0.9}$ is equal to (a) 0.3 (b) 0.94 (c) 0.03 (d) 0.33

8) The least number that must be added to 435 to make it a perfect square is
(a) 4 (b) 8 (c) 3 (d) 6

9) Which of the following is a Pythagorean triplet?
(a) 7, 9, 11 (b) 8, 15, 17 (c) 17, 21, 29 (d) 2, 3, 5

10) Which of the following number is a perfect square?
(a) 192 (b) 441 (c) 327 (d) 333

11) The smallest number by which 1875 must be divided to obtain a perfect square is (a) 5 (b) 2 (c) 3 (d) 7

12) Which of the following are squares of even numbers?
(a) 123 (b) 6084 (c) 3657 (d) 2116

13) Which of the following ends with digit 1?
(a) $(127)^2$ (b) $(73)^2$ (c) $(61)^2$ (d) $(109)^2$

14) The smallest number by which 72 must be multiplied to obtain a perfect square is (a) 2 (b) 5 (c) 3 (d) 4

15) The area of a square field is 196 sq.m. Its each side is
(a) 16m (b) 13m (c) 17m (d) 14m

True or False

1) The square of a prime number is prime.
2) There is no square number between 50 and 60.

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3. All Square numbers are positive.
4. The product of two square numbers is a square number.
5. The difference between two square numbers is a square number.
6. The sum of two square number is a square number.
7. A number ending with even number of zeroes is always a perfect square.
8. The Square of a natural number (other than one) is either a multiple of 3 or exceeds the multiple of 3 by 1.

Fill in the blanks :

1) If $\sqrt{x} = y$; then $y^2 =$ ___
2) upto 100, there are only ___ numbers which are perfect squares.
3) A rational number whose square is $\frac{81}{64}$ is ___
4) The numbers 57 and 246 when divided by 4 leave the remainder ___ and ___ respectively.
5) The sum of first 19 odd natural numbers is ___
6) A number ending with an odd number of zeroes is ___ a perfect square.
7) ___ numbers have no square root in the system of rational numbers.
8) A number ending with ___, ___, ___ or 8 is never a perfect square.
9) Find the square root of the following numbers by prime factorisation method :
   (i) 5184 (ii) 1521 (iii) 3136
10) Without adding, find the sum of $1+3+5+7+\cdots+23$
11) Prove that (10, 24, 26) is a Pythagorean triplet.
12) How many non-square numbers lie between the squares of the following?
   (i) 36 and 35 (ii) 100 and 101 (iii) 80 and 81
13) Find the square root ~~of~~ by division method (upto 3 decimal places) (i) 5329 (ii) 58081 (iii) 27
14) Find the least number which must be added to 8400 to obtain a perfect square. Find the square root of this

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perfect square number.

15) Evaluate : (i) $\frac{105^2 - 104^2}{6^2 - 5^2}$ (ii) $2881^2 - 2880^2$

16) In an auditorium, the number of rows is equal to the number of chairs in each row. If the capacity of the auditorium is 3025, find the number of chairs in each row.

17) Find the least square number which is exactly divisible by each of the numbers 8, 12, 15 and 20.

18) Find a number whose one-third multiplied by its one-ninth becomes 108.

19) Find the largest 5-digit number which is a perfect square.

20) Find a number whose one fourth multiplied on its one-sixth becomes 486.

21) Find the least number of four digits which is a perfect square.

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VIII HW – 21st February (Answers)

1) $\overline{39}\,\overline{06}\,\overline{25}$
3 digits (a)

2) The no. of natural numbers between n^2 and $(n+1)^2$ is $2n$
$\therefore 11 \times 2 = 22$ (c)

3) 12345432 (a)

4) $\sqrt{1.6} \times \sqrt{1.6} = 1.6$ (b)

5) $\sqrt{0.8} \times \sqrt{1.8} = \sqrt{0.8 \times 1.8} = \sqrt{1.44} = 1.2$ (c)

6) 6 (a)

7) 0.94 (b)

$$\begin{array}{r|l} & 14 \\ \hline 1 & 2\overline{02} \\ & 1 \\ \hline 24 & 102 \\ & 96 \\ \hline & 6 \end{array}$$

8) $435 + 6 = 441$ (d)

9) $8, 15, \overline{17}$ (b)
$\because 8^2 + 15^2 = 64 + 225 = 289 = 17^2$

10) 441 (b)

11) $1875 = \underline{5 \times 5} \times \underline{5 \times 5} \times 3$ (c)

$$\begin{array}{r|l} 5 & 1875 \\ \hline 5 & 375 \\ \hline 5 & 75 \\ \hline 5 & 15 \\ \hline & 3 \end{array}$$

12) 6084 (b)
2116 (d)

13) $(61)^2$ (c)
$(109)^2$ (d)

14) $72 = \underline{2 \times 2} \times \underline{3 \times 3} \times 2$ (a)

$$\begin{array}{r|l} 2 & 72 \\ \hline 2 & 36 \\ \hline 2 & 18 \\ \hline 3 & 9 \\ \hline & 3 \end{array}$$

15) Area of square field = side^2 = 196 m^2
$\therefore$ side = $\sqrt{196}$
= 14m (d)

True or false

1) False
$5^2 = 25$, not a prime number.

2) True

3) True

4) True
$4 \times 9 = 36$, which is a square number.

5) False
$9-4=5$, is not a square number.

6) False
$9+4=13$, is not a square number.

7) False
1500 is not a perfect square.

8) True
$6^2=36$, a multiple of 3
$7^2=49$, exceeds the multiple of 3 by 1.

Fill in the blanks

1) $\sqrt{x}=y$
$(\sqrt{x})^2=y^2 \Rightarrow y^2=\underline{\underline{x}}$

2) 10

3) $\frac{9}{8}$

4) 1,2

5) The sum of first n odd natural numbers is n^2
$19^2=361$

6) never

7) negative

8) 2,3,7

9) (i) $5184=\underline{2}\times\underline{2}\times\underline{2}\times\underline{2}\times\underline{2}\times\underline{2}\times\underline{3}\times\underline{3}\times\underline{3}\times\underline{3}$

$\sqrt{5184}=2\times2\times2\times3\times3$
$=8\times9=\underline{\underline{72}}$

2	5184
2	2592
2	1296
2	648
2	324
2	162
3	81
3	27
3	9
3	

3	1521
3	507
13	169
	13

2	3136
2	1568
2	784
2	392
2	196
2	98
7	49
	7

(ii) $\frac{1521}{\sqrt{1521}}=\underline{3\times3}\times\underline{13\times13}$
$\sqrt{1521}=3\times13=\underline{\underline{39}}$

(iii) $\frac{3136}{\sqrt{3136}}=\underline{2\times2}\times\underline{2\times2}\times\underline{2\times2}\times\underline{7\times7}$
$\sqrt{3136}=2\times2\times2\times7=8\times7=\underline{\underline{56}}$

10) Sum of first n odd natural numbers is n^2
$\therefore 1+3+5+7+9+11+13+15+17+19+21+23=12^2=\underline{\underline{144}}$

11) $10^2+24^2 = 100+576 = 676 = 26^2$

Thus, (10, 24, 26) forms a Pythagorean Triplet.

12) There are 2n non-Square numbers lie between n^2 and $(n+1)^2$.

(i) $2\times35 = 70$

(ii) $2\times100 = 200$

(iii) $2\times80 = 160$

13) (i) $\sqrt{5329} = \underline{\underline{73}}$

$$\begin{array}{r|l} & 73 \\ \hline 7 & \overline{53}\,\overline{29} \\ & 49 \\ \hline 143 & 429 \\ & 429 \\ \hline & 0 \end{array}$$

$$\begin{array}{r} 143 \\ \hline 3 \\ \hline 429 \end{array}$$

(ii) $\sqrt{58081} = \underline{\underline{241}}$

$$\begin{array}{r|l} & 241 \\ \hline 2 & \overline{58}\,\overline{81} \\ & 4 \\ \hline 44 & 180 \\ & 176 \\ \hline 481 & 481 \\ & 481 \\ \hline & 0 \end{array}$$

(iii) $\sqrt{27} = \underline{\underline{5.196}}$

$$\begin{array}{r|l} & 5.196 \\ \hline 5 & \overline{27}.\overline{00}\,\overline{00}\,\overline{00} \\ & 25 \\ \hline 101 & 200 \\ & 101 \\ \hline 1029 & 9900 \\ & 9261 \\ \hline 10386 & 63900 \\ & 62316 \\ \hline \end{array}$$

14) $$\begin{array}{r|l} & 92 \\ \hline 9 & \overline{84}\,\overline{00} \\ & 81 \\ \hline 182 & 300 \\ & 364 \\ \hline & 64 \end{array}$$

Thus, the least number to be added is 64.

$\therefore$ the perfect square number $= 8400+64 = 8464$

$\sqrt{8464} = \underline{\underline{92}}$

15) (i) $\dfrac{105^2-104^2}{6^2-5^2} = \dfrac{(105+104)(105-104)}{(6+5)(6-5)} = \dfrac{209\times1}{11\times1} = \underline{\underline{19}}$

(ii) $2881^2-2880^2 = (2881+2880)(2881-2880) = 5761\times1$

$= \underline{\underline{5761}}$

16) Let the no. of rows and no. of chairs in each row be x.

Then, $x \times x = 3025$

$x^2 = 3025$

$x = \sqrt{3025}$

$= \underline{\underline{55}}$

$$\begin{array}{r|l} & 55 \\ \hline 5 & \overline{30}\,\overline{25} \\ & 25 \\ \hline 105 & 525 \\ & 525 \\ \hline & 0 \end{array}$$

Hence, the no. of chairs in each row = 55

17) LCM (8, 12, 15, 20) = 120

$120 = \underline{2 \times 2} \times (2) \times (3) \times (5)$

$$\begin{array}{r|l} 2 & 8, 12, 15, 20 \\ \hline 2 & 4, 6, 15, 10 \\ 5 & 2, 3, 15, 5 \\ 3 & 2, 3, 3, 1 \\ & 2, 1, 1, 1 \end{array}$$

$$\begin{array}{r|l} 2 & 120 \\ \hline 2 & 60 \\ 2 & 30 \\ 3 & 15 \\ & 5 \end{array}$$

∴ The least square number.

$= 120 \times 2 \times 3 \times 5 = \underline{\underline{3600}}$

18) Let the number be x

$\frac{1}{3}x \times \frac{1}{9}x = 108$

$x^2 = 108 \times 3 \times 9 = 2916$

$x = \sqrt{2916}$

$= 54$

$$\begin{array}{r|l} & 54 \\ \hline 5 & \overline{29}\,\overline{16} \\ & 25 \\ \hline 104 & 416 \\ & 416 \\ \hline & 0 \end{array}$$

∴ The required number is 54

19) Largest 5-digit number is 99999

∴ The required Square number = 99999 − 143

$= \underline{\underline{99856}}$

$$\begin{array}{r|l} & 316 \\ \hline 3 & \overline{99}\,\overline{99}\,\overline{99} \\ & 9 \\ \hline 61 & 99 \\ & 61 \\ \hline 626 & 3899 \\ & 3756 \\ \hline & 143 \end{array}$$

20) Let the number be x.

$$\frac{1}{4}x \times \frac{1}{6}x = 486$$

$$x^2 = 486 \times 4 \times 6 = 11664$$

$$x = \sqrt{11664} = 108$$

$$\begin{array}{r|l} & 108 \\ \hline 1 & \overline{1}\,\overline{16}\,\overline{64} \\ & 1 \\ \hline 208 & 1664 \\ & 1664 \\ \hline & 0 \end{array}$$

$\therefore$ The required number is $\underline{\underline{108}}$

21) Least four digit number = 1000

$$\begin{array}{r|l} & 32 \\ \hline 3 & \overline{10}\,\overline{00} \\ & 9 \\ \hline 62 & 100 \\ & 124 \\ \hline & 24 \end{array}$$

$\therefore$ The required least four digit perfect square

$= 1000 + 24 = \underline{\underline{1024}}$