VIII Homework-5

1) 9811 men are to be arranged in rows to form a perfect square. Find the number of men in each row and the number left out.
2) In a school, all children were made to stand in a square formation. Out of 3050 children, 25 were left after forming the square. How many children are there in each row.
3) Find the least number which must be subtracted from 194491 to make it a perfect square.
4) Find the smallest square number divisible by each of the numbers 8, 9 and 10.
5) Find the least number which must be added to 92700 to make it a perfect square.
6) The side of a square is 8cm. find the length of the diagonal.
7) The area of a square field is 2047.5625 m^2. Find the length of each side of the field.
8) Find the square root of (i) $\frac{121}{10000}$ (ii) $205\frac{4}{9}$
9) Find the square root by division method : 11025
10) Find the length of a diagonal of a rectangle of length 16m and width 12m.
11) 484 plants are to be planted in a garden in such a way that each row contains as many plants as the number of rows. Find the number of rows and the number of plants in each row.
12) Find the smallest number by which 14700 should be divided so that it becomes a perfect square. Also, find the square root of the number obtained.
13) Find the smallest number by which 2016 should be multiplied so that it becomes a perfect square. Also, find the square root of the number obtained.
14) Find the the square root by prime factorisation :
(a) 2304 (b) 11664.

15) Find the least number of four digits which is a perfect square. Also find the square root of the number so obtained.

16) Find the greatest number of five digits which is a perfect square. Also find the square root of the number so obtained.

17) The area of a square field is 60025 m^2. A man cycles along its boundary at 18 km/hr. In how much time will he return to the starting point?

VIII H.W-5

1) Total no. of men = 9811

∴ No. of men in each row = 99
No. of men left out = 10

```
      99
   ---------
9 | 98 11
    81
   ------
189 | 1711
      1701
   ------
        10
```

```
  8 8
  1 8 9
      9
  -----
  1 7 0 1
```

2) No. of children made to stand in square formation
= 3050 − 25 = 3025.

∴ No. of children in each row = $\sqrt{3025}$ = 55

```
      55
   ---------
5 | 30 25
    25
   ------
105 | 525
      525
   ------
        0
```

```
    2
  1 0 5
      5
  -----
  5 2 5
```

3)

```
      441
   ---------
4 | 19 44 91
    16
   ------
84 | 344
     336
   ------
881 | 891
      881
   ------
       10
```

```
    1
  8 4
  4
  -----
  3 3 6
  8 8 2
    2
  -----
  1 7 6 4
```

Thus the required least number to be subtracted = 10

4) LCM (8, 9, 10) = 360

$360 = 3 \times 3 \times 2 \times 2 \times 2 \times 5$

$360 \times 2 \times 5 = 3 \times 3 \times 2 \times 2 \times 2 \times 2 \times 5 \times 5$

∴ The least required square number
$= 360 \times 2 \times 5 = 3600$ //

```
2 | 360
2 | 180
2 |  90
5 |  45
3 |   9
      3
```

```
2 | 8, 9, 10
2 | 4, 9, 5
3 | 2, 9, 5
    2, 3, 5
```

5) $305^2 = 93025$

$\therefore$ The required least number to be added

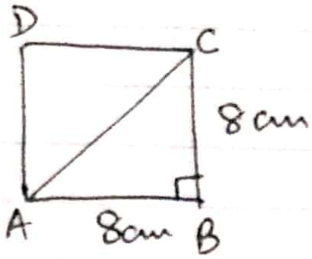
$= 93025 - 92700$

$= \underline{325}$

Division for $\sqrt{92700}$ (quotient 304):

	304
3	$\overline{9}\,\overline{27}\,\overline{00}$
	9
604	2700
	2416

Rough work: $604 \times 4 = 2416$; $305 \times 305 = 93025$

6) 

Since ABCD is a square,

$\angle B = 90^\circ$.

Using Pythagoras Theorem in rt. $\triangle ABC$,

$AC^2 = AB^2 + BC^2 = 8^2 + 8^2 = 64 + 64$

$= 128$

$\therefore AC = \sqrt{128}$

$= 11.3$ cm

	11.3
1	$\overline{1}\,\overline{28}.\overline{00}$
	1
21	28
	21
223	700
	669

Rough work: $223 \times 3 = 669$

Thus the length of the diagonal = $\underline{11.3 \text{ cm}}$

7) area of a square field = side × side = $2047.5625\,m^2$

$\therefore$ length of each side $= \sqrt{2047.5625}$

$= \underline{45.25\,m}$

	45.25
4	$\overline{20}\,\overline{47}.\overline{56}\,\overline{25}$
	16
85	447
	425
902	2256
	1804
9045	45225
	45225
	0

Rough work: $85 \times 5 = 425$; $902 \times 2 = 1804$; $9045 \times 5 = 45225$

8) (i) $\sqrt{\frac{121}{10000}} = \frac{11}{100} = \underline{\underline{0.11}}$

(ii) $\sqrt{205\frac{4}{9}} = \sqrt{\frac{1849}{9}}$

$= \frac{43}{3}$

$= \underline{\underline{14.33}}$

$$\begin{array}{r|l} & 43 \\ \hline 4 & \overline{18}\,\overline{49} \\ & 16 \\ \hline 83 & 249 \\ & 249 \\ \hline & 0 \end{array}$$

$$\begin{array}{r} 205\frac{4}{9} \\ \hline 1845 \end{array}$$

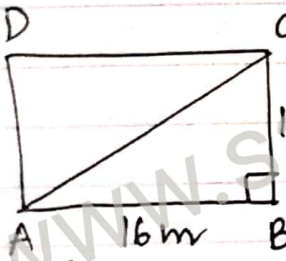
$$\begin{array}{r} 83\frac{3}{3} \\ \hline 249 \end{array}$$

9) $\sqrt{11025} = \underline{\underline{105}}$

$$\begin{array}{r|l} & 105 \\ \hline 1 & \overline{1}\,\overline{10}\,\overline{25} \\ & 1 \\ \hline 205 & 1025 \\ & 1025 \\ \hline & 0 \end{array}$$

$$\begin{array}{r} 205\frac{5}{5} \\ \hline 1025 \end{array}$$

10)



Since ABCD is a rectangle, $\angle B = 90°$.

Using Pythagoras Theorem in rt. ΔABC,

$AC^2 = AB^2 + BC^2 = 16^2 + 12^2 = 256 + 144 = 400$

$\therefore AC = \sqrt{400} = 20m$

Thus the length of the diagonal = 20m

11) Total no. of plants = 484

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

Then, $x \times x = 484$

$x^2 = 484$

$x = \sqrt{484} = 22$

$\therefore$ No. of rows = 22

No. of plants in each row = 22

12) $14700 = 7\times7\times5\times5\times2\times2\times3$

$\frac{14700}{3} = 7\times7\times5\times5\times2\times2$

$\sqrt{4900} = 7\times5\times2$

$= 70$

$7\,|\,14700$; $7\,|\,2100$; $3\,|\,300$; $5\,|\,100$; $5\,|\,20$; $2\,|\,4$; 2

∴ The required smallest no. to be divided = 3

$\sqrt{4900} = 70$ //

13) $2016 = 2\times2\times2\times2\times3\times3\times7\times2$

$2016\times7\times2 = 2\times2\times2\times2\times3\times3\times7\times7\times2\times2$

$\sqrt{28224} = 2\times2\times3\times7\times2$

$= 168$

$2\,|\,2016$; $2\,|\,1008$; $2\,|\,504$; $2\,|\,252$; $2\,|\,126$; $3\,|\,63$; $3\,|\,21$; 7

∴ The required smallest no. to be multiplied = $7\times2 = 14$

$\sqrt{28224} = 168$ //

14) (a) $\sqrt{2304} = \sqrt{2\times2\times2\times2\times2\times2\times2\times2\times3\times3}$

$= 2\times2\times2\times2\times3$

$= 48$

$2\,|\,2304$; $2\,|\,1152$; $2\,|\,576$; $2\,|\,288$; $2\,|\,144$; $2\,|\,72$; $2\,|\,36$; $2\,|\,18$; $3\,|\,9$; 3

(b) $\sqrt{11664} = \sqrt{2\times2\times2\times2\times3\times3\times3\times3\times3\times3}$

$= 2\times2\times3\times3\times3$

$= 108$

$2\,|\,11664$; $2\,|\,5832$; $2\,|\,2916$; $2\,|\,1458$; $3\,|\,729$; $3\,|\,243$; $3\,|\,81$; $3\,|\,27$; $3\,|\,9$; 3

15) Least four digit number = 1000

$32^2 = 1024$

Thus, $1024 - 1000 = 24$

∴ The required least perfect square number of four digits = $1000 + 24 = 1024$

Also, $\sqrt{1024} = 32$ //

$3\,|\,1000$; 9; $61\,|\,100$; 61; 39

31

32; 32; 64; 96; 102

16) Greatest five digit number = 99999

Thus, 99999 − 143 = 99856

∴ the greatest five digit perfect square no. = 99856

Also, $\sqrt{99856} = 316$ //

```
      316
   3 | 99999
     | 9
  61 | 99
     | 61
 626 | 3899
     | 3756
     | 143
```

17)

area of square field = 60025 m^2

$S \times S = 60025$

$S^2 = 60025$

$S = \sqrt{60025}$

$= 245m = 0.245km$

```
      245
   2 | 60025
     | 4
  44 | 200
     | 176
 485 | 2425
     | 2425
     | 0
```

Speed of cycling = 18 km/hr

Perimeter of square field = $4 \times S = 4 \times 0.245 = 0.98km$

Time taken to return to the starting point = $\frac{\text{Distance}}{\text{Speed}} = \frac{0.98}{18}$ hours

$= \frac{98}{1800} \times 60 \text{ min}$

$= \frac{98 \times 2}{30 \times 2} = \frac{196}{60}$

$= 3 \text{ min } 16 \text{ sec}$

```
      3
  60 | 196
     | 180
     | 16
```