CHAPTER-3-SQUARES AND SQUARE ROOTS

EXERCISE 3(A)

1. (i)

Solution:

59

$$(59)^2 = 59 \times 59$$
$$= 3481$$

(ii)

Solution:

6.3

$$(63)^2 = 6.3 \times 63$$
$$= 39.69$$

(iii)

Solution:

15

$$(15)^2 = 15 \times 15$$
$$= 225$$

2. (i)
Solution:

11025

$$\sqrt{11025} = \sqrt{\overline{3 \times 3} \times \overline{5 \times 5} \times \overline{7 \times 7}}$$
$$= \sqrt{3^2 \times 5^2 \times 7^2}$$
$$= 3 \times 5 \times 7$$
$$= 105$$

(ii)
Solution:
396900

$$\sqrt{39600} = \sqrt{3 \times 3 \times 3 \times 3 \times 7 \times 7 \times 2 \times 5 \times 2 \times 5}$$
$$= \sqrt{2^2 \times 3^2 \times 3^2 \times 5^2 \times 7^2}$$
$$= 2 \times 3 \times 3 \times 5 \times 7$$
$$= 630$$

Square root of $194481 = 441$

3. (i)

Solution:

Given number $= 2592$

Factor of 2592

$$2592 = 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3$$
$$= 2 \times \overline{2 \times 2} \times \overline{2 \times 2} \times \overline{3 \times 3} \times \overline{3 \times 3}$$

Here prime factor 2 is not paired so we need to pair it.

Required smallest number $= 2$

(ii)

Solution:

Given number $= 12708$

Factor of 12748

$$12748 = \overline{2 \times 2} \times 3187$$

Here prime factor 3187 is not paired so we need to pair it.

Required smallest number $= 3187$

4.

Solution:

Given number $= 10368$

Factor of 10368

$$10368 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3$$
$$= \overline{2 \times 2} \times \overline{2 \times 2} \times \overline{2 \times 2} \times 2 \times \overline{3 \times 3} \times \overline{3 \times 3}$$

Here prime factor 2 is not paired so we will divide it by by 2.

Smallest required number $= 2$

Then factor become: $\overline{2 \times 2} \times \overline{2 \times 2} \times \overline{2 \times 2} \times \overline{3 \times 3} \times \overline{3} \times 3$

Square root of remaining number

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

$= 72$

Square root of remaining number

$= 72$

5. (i)

Solution:

0.1764

$$0.1764 = \frac{1764}{10000}$$

Now write factor of both numerator and denominator

$$\frac{1764}{10000} = \frac{2 \times 2 \times 3 \times 3 \times 7 \times 7}{10 \times 10 \times 10 \times 10}$$

$$= \frac{\overline{2 \times 2} \times \overline{3 \times 3} \times \overline{7 \times 7}}{\overline{10 \times 10} \times \overline{10 \times 10}}$$

$$\sqrt{0.1764} = \sqrt{\frac{\overline{2 \times 2} \times \overline{3 \times 3} \times \overline{7 \times 7}}{\overline{10 \times 10} \times \overline{10 \times 10}}}$$

$$= \frac{2 \times 3 \times 7}{10 \times 10}$$

$$= 0.42$$

Square root of $0.1764 = 0.42$

(ii)
Solution:

$$96\frac{1}{25}$$

$$96\frac{1}{25} = \frac{2401}{25}$$

Now write the factor of both numerator and denominator.

$$\frac{2401}{25} = \frac{7 \times 7 \times 7 \times 7}{5 \times 5}$$

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

$$= 9.8$$

Square root of $96\frac{1}{25} = 9.8$

(iii)
Solution:

0.0169

$$0.0169 = \frac{169}{10000}$$

Now,

Write the factor of both numerator and denominator.

$$\frac{169}{10000} = \frac{\overline{13 \times 13}}{\overline{10 \times 10} \; \overline{10 \times 10}}$$

$$= \frac{13}{10 \times 10}$$

$$= 0.13$$

Square root of $0.0169 = 0.13$

6. (i)
Solution:

$$\sqrt{\frac{14.4}{22.5}}$$

$$\sqrt{\frac{144 \times 10}{225 \times 10}} = \sqrt{\frac{144}{225}}$$

$$\sqrt{\frac{144}{225}} = \sqrt{\frac{12 \times 12}{15 \times 15}}$$

$$\sqrt{\frac{12 \times 12}{15 \times 15}} = \sqrt{\frac{12 \times 12}{15 \times 15}}$$

$$\frac{12}{15} = 0.8$$

$$= 0.8$$

$$\sqrt{\frac{14.4}{22.5}} = 0.8$$

(ii)
Solution:

$$\sqrt{\frac{0.225}{28.9}}$$

$$\sqrt{\dfrac{0.225 \times 10}{289 \times 100}}$$

$$\sqrt{\dfrac{225 \times 10}{289 \times 1000}} = \sqrt{\dfrac{225}{289 \times 100}}$$

$$\sqrt{\dfrac{225}{289 \times 100}} = \sqrt{\dfrac{15 \times 15}{17 \times 17 \times 10 \times 10}}$$

$$\dfrac{15}{17 \times 10} = 0.1071$$

$$\sqrt{\dfrac{0.225}{28.9}} = 0.1071$$

(iii)

Solution:

$$\sqrt{\dfrac{25}{32} \times 2\dfrac{13}{18} \times 0.25}$$

$$= \sqrt{\frac{25}{32} \times \frac{49}{18} \times \frac{25}{100}}$$

$$= \sqrt{\frac{5 \times 5}{2 \times 2 \times 2 \times 2 \times 2} \times \frac{7 \times 7}{2 \times 3 \times 3} \times \frac{5 \times 5}{10 \times 10}}$$

$$= \sqrt{\frac{\overline{5 \times 5} \times \overline{7 \times 7} \times \overline{5 \times 5}}{\overline{2 \times 2} \times \overline{2 \times 2} \times \overline{2 \times 2} \times \overline{3 \times 3} \times \overline{10 \times 10}}}$$

$$= \frac{5 \times 7 \times 5}{2 \times 2 \times 2 \times 3 \times 10}$$

$$= \frac{175}{240}$$

$$= 0.723$$

$$\sqrt{\frac{25}{32} \times 2\frac{13}{18} \times 0.25} = 0.723$$

(iv)

Solution:

$$\sqrt{1\frac{4}{5} \times 14\frac{4}{44} \times 2\frac{7}{55}}$$

$$\sqrt{\frac{9}{5} \times \frac{637}{44} \times \frac{117}{55}}$$

$$\sqrt{\frac{3 \times 3}{5} \times \frac{7 \times 7 \times 13}{2 \times 2 \times 11} \times \frac{3 \times 3 \times 13}{5 \times 11}}$$

$$\sqrt{\frac{\overline{3 \times 3} \times \overline{7 \times 7} \times \overline{3 \times 3} \times \overline{13 \times 13}}{\overline{5 \times 5} \times \overline{2 \times 2} \times \overline{11 \times 11}}}$$

$$= \frac{3 \times 7 \times 3 \times 13}{5 \times 2 \times 11}$$

$$= \frac{819}{110}$$

$$= 7.445$$

$$\sqrt{1\frac{4}{5} \times 14\frac{21}{44} \times 2\frac{7}{55}} = 7.445$$

7. (i)

Solution:

$$\sqrt{3^2 \times 6^3 \times 24}$$

$$\sqrt{3^2 \times (2 \times 3)^3 \times 2 \times 2 \times 2 \times 3}$$

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

$$\sqrt{\overline{2 \times 2} \times \overline{2 \times 2} \times \overline{2 \times 2} \times \overline{3 \times 3} \times \overline{3 \times 3} \times 3 \times 3}$$

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

$$= 216$$

$$\sqrt{3^2 \times 6^3 \times 24} = 216$$

Value of $\sqrt{3^2 \times 6^3} \times 24 = \underline{216}$

(ii)

Solution:

$$\sqrt{(0.5)^3 \times 6 \times 35}$$

$$\sqrt{\left(\dfrac{5}{10}\right)^{3} \times 2 \times 3 \times 35}$$

$$\sqrt{\dfrac{5^{3}}{10^{3}} \times 2 \times 3 \times 35}$$

$$\sqrt{\dfrac{5 \times 5 \times 5}{10 \times 10 \times 10} \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3}$$

$$\sqrt{\dfrac{5 \times 5 \times 5}{10 \times 10 \times 10} \times 3 \times 3 \times 3 \times 3 \times 3 \times 3}$$

$$\sqrt{\dfrac{\overline{5 \times 5} \times \overline{3 \times 3} \times \overline{3 \times 3} \times \overline{3 \times 3}}{\overline{10 \times 10}}}$$

$$= \dfrac{5 \times 3 \times 3 \times 3}{10}$$

$$= \dfrac{135}{10}$$

$$= 13.5$$

(iii)

Solution:

$$\sqrt{\left(5+\dfrac{71}{25}\right) \times \dfrac{0.169}{1.6} \times \dfrac{10}{1000}}$$

$$\sqrt{\dfrac{196}{25} \times \dfrac{169}{16} \times \dfrac{10}{1000}}$$

$$\sqrt{\dfrac{14 \times 14}{5 \times 5} \times \dfrac{13 \times 13}{4 \times 4} \times \dfrac{1}{10 \times 10}}$$

$$=\dfrac{14 \times 13}{5 \times 4 \times 10}$$

$$=\dfrac{182}{200}$$

$$=0.91$$

(iv)

Solution:

$$\sqrt{5\left(2\dfrac{3}{4}\dfrac{-3}{10}\right)}$$

$$= \sqrt{5\left(\frac{11}{4} - \frac{-3}{10}\right)}$$

$$= \sqrt{5\left(\frac{\sqrt{11} \times 5 - 3 \times 2}{20}\right)}$$

$$= \sqrt{5\frac{(55 - 6)}{20}}$$

$$= \sqrt{\frac{5 \times 49}{20}}$$

$$= \sqrt{\frac{5 \times 7 \times 7}{5 \times 2 \times 2}}$$

$$= \frac{7}{2}$$

$$= 3.5$$

(v)

Solution:

$$\sqrt{248 + \sqrt{52 + \sqrt{144}}}$$

$$= \sqrt{248 + \sqrt{52 + \sqrt{12 \times 12}}} \qquad \left\{ \sqrt{144} = 12 \right.$$

$$= \sqrt{248 + \sqrt{52 + 12}}$$

$$= \sqrt{248 + \sqrt{64}}$$

$$= \sqrt{248 + \sqrt{8 \times 8}}$$

$$= \sqrt{248 + 8} \qquad \left\{ \sqrt{64} = 8 \right.$$

$$= \sqrt{256}$$

$$= \sqrt{16 \times 16}$$

$$= 16$$

8.

Solution:

Let number of days in tour be $= x$ so according to question.

Rupees he spend every day $= x$

Total amount he spend $= x \times x$

$$= x^2$$

And given total amount $= 1296$ so both are equal.

$$x^2 = 1296$$

$$x = \sqrt{1296}$$

$$= 36$$

He spend total 36 days in tour.

9.

Solution:

Let total rows $= x$

So total column will be also x

Total student in x rows and x columns $= x^2$

16 student left out of total 745 student

Student in respected row, columns

$= 745 - 16$

$= 729$

According to question

$x^2 = 729$

$x = \sqrt{729}$

$\quad = 27$

Required number of rows $\underline{\underline{= 27}}$

10. (i)

Solution:

Mirror image of 12 is 21

Square of $12 = 144$

And square of $21 = 441$

Their square 144 and 441 is also mirror image of each other

(ii)

Solution:

Mirror image of 112 is 211

Square of $112 = 12544$

And square of $221 = 44521$

So 12544 and 44521 are mirror image of each other.

11.

Solution:

The required smallest perfect square number divisible 3,4,5 and 6 is divisible by LCM of 3,4,5 and 6

LCM of 3,4,5 and $6 = 60$

Now,

Factor of 60

$60 = \overline{2 \times 2} \times \overline{3 \times 5}$

To make perfect square number divisible by 3,4,5 and 6 it must be multiply by 3×5

Required perfect square number

$$= 2 \times 2 \times 3 \times 5 \times 3 \times 3 \times 5$$
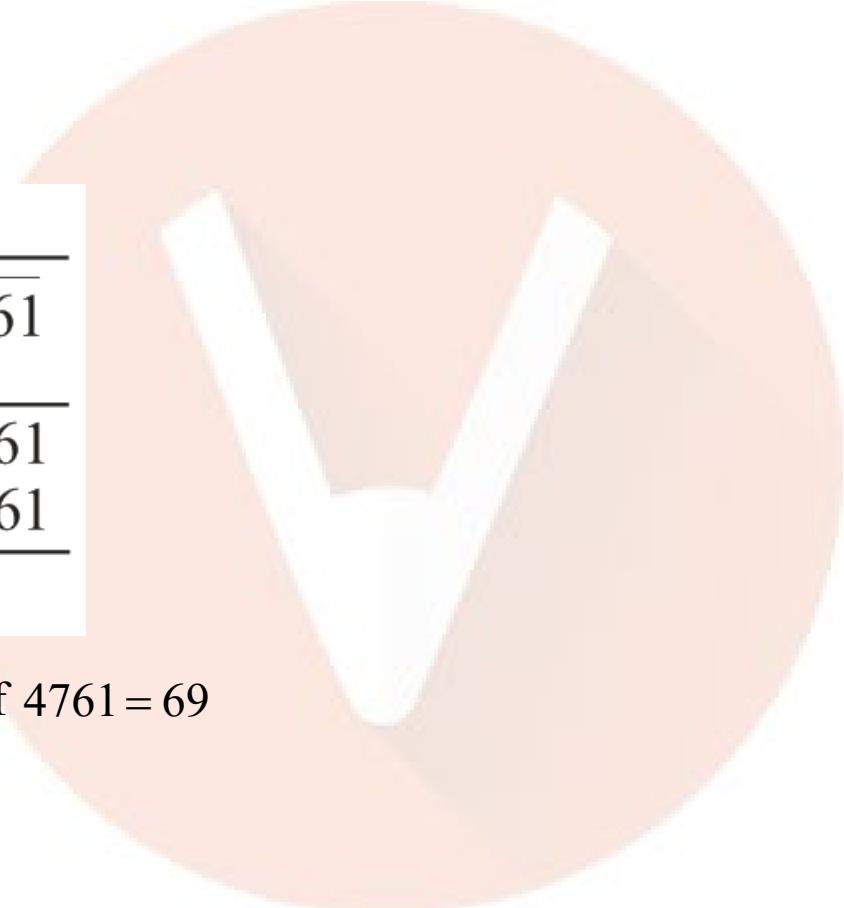
$$= 900$$

So required perfect square number $= 900$

CHAPTER-3-SQUARES AND SQUARE ROOTS

EXERCISE 3(B)

1. (i)

Solution:

4761

$$
\begin{array}{r|ll}
 & 6\ 9 \\
\hline
6 & \overline{47}\ \overline{61} \\
 & 36 \\
\hline
129 & 1161 \\
 & 1161 \\
\hline
 & \times \\
\end{array}
$$

Square root of $4761 = 69$

(ii)

Solution:

7744

```
              8 8
          ————————
    8  |  77  44
    8  |  64
   ————|————————
   168 |      1344
        |      1344
        |        ×
```

Square root of $7744 = 88$

Find square root:

(iii)

Solution:

15129

```
              1 2 3
           ————————————
    1   |  15 12 9
    1   |  1
   ————|————————————
   22  |  0 5 1
        |  4 4
   ————|————————————
   243 |      729
        |      729
        |      × ×
```

Square root of $15129 = 123$

(iv)

Solution:

$$
\begin{array}{r|l}
 & 0.54 \\
\hline
5 & 0.\overline{29}\,\overline{16} \\
 & 25 \\
\hline
104 & 416 \\
 & 416 \\
\hline
 & \times
\end{array}
$$

Square root of $0.2916 = 0.54$

(v)

Solution:

0.035

$$
\begin{array}{r|l}
 & 0.035 \\
\hline
3 & 0.\overline{00}\,\overline{12}\,\overline{25} \\
 & 9 \\
\hline
65 & 325 \\
 & 325 \\
\hline
 & \times
\end{array}
$$

Square root of $0.001225 = 0.035$

(vi)

Solution:

0.023104

```
               0.152
          ————————————
   1   |  0.023104
       |  1
   ————————————————————
   25  |    131
       |    125
   ————————————————————
  302  |        604
       |        604
   ————————————————————
       |          ×
```

Square root of $0.023104 = 0.152$

(vii)

Solution:

27.3529

```
              5.23
          ————————————
   5   |  27.3529
       |  25
   ————————————————————
  102  |    235
       |    204
   ————————————————————
 1043  |     3129
       |     3129
   ————————————————————
       |       ×
```

Square root of $27.3529 = 5.23$

2. (i)

Solution:

4.2025

```
            2.05
        ┌─────────
     2  │ 4.2025
        │ 4
        ├─────────
   405  │   2025
        │   2025
        ├─────────
        │     ×
```

Square root of $4.2025 = 2.05$

(ii)

Solution:

531.7636

```
        23.06
    ‾‾‾‾‾‾‾‾‾‾
  2 |531.7636
    |4
    ‾‾‾‾‾
 43 |131
    |129
    ‾‾‾‾‾‾‾‾‾‾
4606| 27636
    | 27636
    ‾‾‾‾‾‾‾‾‾‾
    |   ×
```

Square root of $531.7636 = 23.06$

(iii)

Solution:

0.007225

```
        0.085
     ‾‾‾‾‾‾‾‾‾‾‾
  8 |0.007225
    |   64
    ‾‾‾‾‾‾‾‾‾‾‾
165 |    825
    |    825
    ‾‾‾‾‾‾‾‾‾‾‾
    |     ×
```

Square root of $0.007225 = 0.085$

3.(i)

Solution:

245 correct to two places of decimal

$\overline{2}\overline{45}.\overline{00}\overline{00}$

```
            15.65
        ┌─────────────
    1   │ 245.0000
        │ 1
        ├─────────────
   25   │ 145
        │ 125
        ├─────────────
  306   │ 2000
        │ 1836
        ├─────────────
 3125   │ 16400
        │ 15625
        ├─────────────
        │   775
```

Square root of 245 up to two place of decimal $= 15.65$

(ii)

Solution:

496

```
        22.27
     _____
   2|496.0000
    |4
    |____
 42| 96
   | 84
   |_____
442| 1200
   |  884
   |_____
4447| 31600
    | 31129
    |_____
    |   471
```

Square root of 496 up to two places decimal = 22.27

(iii)

Solution:

82.6

```
         9.08
      _____
    9|82.6000
     |81
     |____
 180| 160
    |   0
    |_____
1808| 16000
    | 14464
    |_____
    |  1536
```

Square root of 82.6 up to two decimal $= 9.08$

(iv)

Solution:

0.065

$$
\begin{array}{r|l}
 & 0.254 \\
\hline
2 & \overline{0.06}\,\overline{50}\,\overline{00}\,\overline{00} \\
 & 4 \\
\hline
45 & 250 \\
 & 225 \\
\hline
504 & 2500 \\
 & 2016 \\
\hline
 & 484
\end{array}
$$

Square root of 0.065 up to three decimal $= 0.254$

(v)

Solution:

5.2005

```
        2.28
      _____
    2 | 5.200500
      | 4
      |_____
   42 | 120
      | 84
      |_____
  448 | 3605
      | 3584
      |_____
      | 21
```

Square root of 5.2005 up to two decimal = 2.28

(vi)

Solution:

0.602

```
        0.77
      _____
    7 | 0.6020.00
      | 49
      |_____
  147 | 1120
      | 1029
      |_____
      | 91
```

Square root of 0.602 up to two decimal 0.77

4.(i)

Solution:

$$3\frac{4}{5} = \frac{19}{5} = 3.8$$

```
           1.94
       ┌─────────
    1  │ 3.8000
       │ 1
    ───┼─────────
   29  │ 280
       │ 261
   ────┼─────────
  384  │ 1900
       │ 1536
       ─────────
         364
```

Square root of $3\frac{4}{5} = 1.94$

(ii)

Solution:

$$6\frac{7}{8} = \frac{55}{8} = 6.875$$

```
            2.62
         _____
    2 │ 6.8750
      │ 4
      ├─────────
   46 │ 287
      │ 276
      ├─────────
  522 │ 1150
      │ 1044
      ├─────────
      │  106
```

Square root of $6\dfrac{7}{8}$ up to two decimal $= 2.62$

5.(i)

Solution:

796

```
         28
         _____
    2 │ 796
      │ 4
      ├─────────
   48 │ 396
      │ 384
      ├─────────
      │  12
```

So 12 must be subtracted from 796 so that if will be perfect square.

(ii)

Solution:

1886

43
4 | 1886
    16
      286
83   249
      37

37 must be subtracted from 1886 so that if will be perfect square.

(iii)

Solution:

23497

153
1 | 23497
    1
      134
25   125
      997
303 909
       88

88 must be subtracted from given number to get perfect square number .

6.(i)

Solution:

511

Clearly 511 is greater than 22^2.

On adding the enquired number to 511 we shall be getting 23^2 or $= 529$.

Required number $\begin{aligned}&= 529 - 511 \\&= 18\end{aligned}$

(ii)

Solution:

```
        84
       ────
   8 │ 7172
     │ 64
     │────
     │  772
 164 │  656
     │ ────
     │  116
```

Clearly 7172 is greater than square of 84.

On adding required number we shall get 85^2 or $= 7225$.

Required number $= 7225 - 7172$

$$= 53$$

(iii)

Solution:

```
        234
       ─────
   2 │ 55078
     │ 4
     │─────
     │  150
  43 │  129
     │ ─────
     │  2178
 464 │  1856
     │ ─────
     │   322
```

Cleary 55078 is greater than $(234)^2$

On adding required number we shall get square of $(235)^2$ or

$(235)^2 = 55225$.

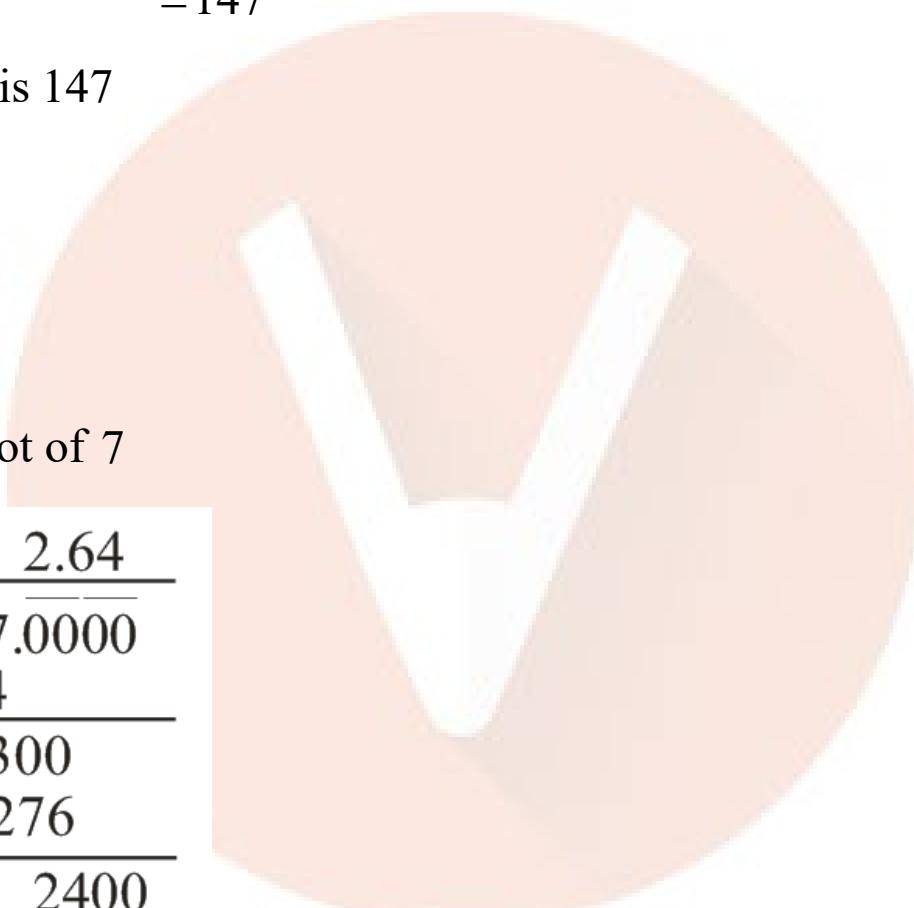Required number $= 55225 - 55078$

$= 147$

Required is 147

7.

Solution:

Square root of 7

```
            2.64
        ┌─────────
    2   │ 7.0000
        │ 4
        ├─────────
        │ 300
   46   │ 276
        ├─────────
        │ 2400
  524   │ 2096
        ├─────────
        │  304
```

Square root of 7 up to two decimal $= 2.67$

Now,

$$\sqrt{\frac{4+\sqrt{7}}{4-\sqrt{7}}}$$

Rationalization $= \sqrt{\frac{\left(4+\sqrt{7}\right)}{\left(4-\sqrt{7}\right)} \times \frac{\left(4+\sqrt{7}\right)}{\left(4+\sqrt{7}\right)}}$

$$= \sqrt{\frac{\left(4+\sqrt{7}\right)^2}{16-7}}$$

$$= \frac{4+\sqrt{7}}{3}$$

Now,

Value of $\dfrac{4+\sqrt{7}}{3}$

$$= \frac{4+2.67}{3}\left\{\sqrt{7}=2.62\right.$$

$$= 2.223$$

8.

Solution:

$\sqrt{5}$

```
            2.23
    2  | 5.0000
       | 4
   ----+------
   42  | 100
       | 84
   ----+------
  443  | 1600
       | 1329
       +------
            271
```

Square root of 5 up to two decimal = 2.23

Now,

$$\frac{3-\sqrt{5}}{3+\sqrt{5}} = \frac{\left(3-\sqrt{5}\right)}{\left(3+\sqrt{5}\right)} \times \frac{\left(3-\sqrt{5}\right)}{\left(3-\sqrt{5}\right)}$$

$$= \frac{\left(3-\sqrt{5}\right)^{2}}{9-5}$$

$$= \frac{9+\left(\sqrt{5}\right)^{2}-2\times3\sqrt{5}}{4}$$

$$= \frac{14-6\sqrt{5}}{4}$$

Now, put the value of $\sqrt{5} = 2.23$

$$= \frac{14 - 6 \times 2.23}{4}$$

$$= \frac{0.62}{4}$$

$$= 0.155$$

9.(i)

Solution:

$$\frac{1764}{2809}$$

Square root of $\dfrac{1764}{2809}$

$$\sqrt{\frac{1764}{2809}} = \frac{\sqrt{1764}}{\sqrt{2809}}$$

Find square root of numerator and denominator and divide then square root of 1764.

```
            42
        ┌────────
    4   │ 1764
        │ 16
        ├────────
   82   │  164
        │  164
        ├────────
        │   ×
```

$$\sqrt{1764} = 42$$

(ii)

Solution:

$$\sqrt{2809}$$

```
          53
      ┌────────
   5  │ 2890
      │ 25
   ───┼────────
  103 │ 309
      │ 309
   ───┼────────
      │   ×
```

$$\sqrt{2809} = 53$$

$$\sqrt{\frac{1764}{2809}} = \frac{42}{53}$$

$$= 0.792$$

(iii)

Solution:

$$\frac{507}{4107}$$

$$\sqrt{507} =$$

$$\begin{array}{r|l} & 22.5 \\ \hline 2 & \overline{507}.\overline{00} \\ & 4 \\ \hline 42 & 107 \\ & 84 \\ \hline 445 & 2300 \\ & 2225 \\ \hline & 75 \end{array}$$

$\sqrt{507} = 22.5$

Similarly finding square root of 4107

$$\begin{array}{r|l} & 64.08 \\ \hline 6 & \overline{4107}.\overline{00} \\ & 36 \\ \hline 124 & 507 \\ & 496 \\ \hline 12808 & 110000 \\ & 102464 \\ \hline & 7536 \end{array}$$

$\sqrt{4107} = 22.08$

Now $\sqrt{\dfrac{507}{4107}} = \dfrac{22.5}{64.08}$

$= 0.3511$

(iv)

Solution:

$\sqrt{108 \times 2028}$

$\sqrt{219024}$

$$
\begin{array}{r|l}
 & 468 \\
\hline
4 & 219024.00 \\
 & 16 \\
\hline
86 & 590 \\
 & 516 \\
\hline
928 & 7424 \\
 & 7424 \\
\hline
\end{array}
$$

$\sqrt{108 \times 2028} = 468$

(v)

Solution:

Square root of $0.01 + \sqrt{0.0064}$

$= \sqrt{0.01 + \sqrt{0.0064}}$

First find square root of $\sqrt{0.0064}$

$$\begin{array}{r|l} & 0.08 \\ \hline 8 & 0.\overline{00}\overline{64} \\ \hline 16 & 64 \\ \hline & \times \end{array}$$

$\sqrt{0.0064} = 0.08$

$$\sqrt{0.01} + \sqrt{0.0064} = \sqrt{0.01} + 0.08$$
$$= \sqrt{0.09}$$

Now again find square root of 0.009

$$\begin{array}{r|l} & 0.3 \\ \hline 3 & 0.\overline{09} \\ & 9 \\ \hline & \times \end{array}$$

$= 0.3$

10. (i)

Solution:

7.832

We have to find square root up to two decimal place.

```
        2.79
   ┌─────────
 2 │ 7.8320
   │ 4
   ├─────────
47 │ 383
   │ 329
   ├─────────
549│ 5420
   │ 4941
   ├─────────
   │ 479
```

Required value of square root of 7.832 up to 2 decimal = 2.79

(ii)

Solution:

7.832

We have find root two significant digits

```
        2.7
   ┌─────────
 2 │ 7.832
   │ 4
   ├─────────
47 │ 383
   │ 329
   ├─────────
   │ 54
```

Required value up to two significant of digit = 2.7

CHAPTER-3-SQUARES AND SQUARE ROOTS

EXERCISE 3(C)

1.

(i)

Solution:

3051

For square of a number unit place digit should be 0, 1, 4, 5, 6 or 9.

So,

This can be square of a number.

(ii)

Solution:

2332

Unit place digit = 2

For square of a number unit place digit should be 0, 1, 4, 5, 6 or 9.

So,

This can't be square of a number.

(iii)

Solution:

568<u>4</u>

Unit place digit = 4

For square of a number unit place digit should be 0, 1, 4, 5, 6 or 9.

So, This can't be a square of a number.

(iv)

Solution:

690<u>8</u>

Unit place digit = 8

For square of a number unit place digit should be 0, 1, 4, 5, 6 or 9.

So, This can't be a square of a number.

(v)

Solution:

5069<u>9</u>

Unit place digit = 9

For square of a number the unit place digit should be 0, 1, 4, 5, 6 or 9.

So, This can't be a square of a number.

2.

(i)

Solution:

5<u>7</u>

Unit place digit = 7

If number has 1 or 9 at its unit place.

Then square of the number will have 1 at unit place.

So,

57 will not have 1 at unit place.

(ii)

Solution:

8<u>1</u>

Unit place digit = 1

A number has 1 or 9 at unit place will have 1 at its unit place of its square.

So,

81's square will have 1 at unit place.

(iii)

Solution:

13**9**

Unit place digit $= 9$

A number with 1 or 9 at unit place will have 1 at its unit place of its square.

So,

Square of 139 will have 1 at unit place.

(iv)

Solution:

7**3**

Unit place digit $= 3$

A number with 1 or 9 at unit place will have 1 at its unit place of its square.

So,

73 will have 1 at its square's unit place.

(v)

Solution:

6**4**

Unit place digit $= 4$

A number with 1 or 9 at unit place will have 1 at its unit place of its

square.

So,

64 will have 1 at unit place of its square.

3.

(i)

Solution:

32^2

Unit place digit of $32 = 2$
Square of $2 = 4$

So, 32^2 will not have 1 at its unit place.

(ii)

Solution:

57^2

Unit place digit of $57 = 7$

Square of $7 = 49$ with 9 at its unit place

So, 57^2 will not have 1 at its unit place.

(iii)

Solution:

69^2

Unit place digit of $69 = 9$

Square of $9 = 81$ have 1 at unit place

So, 69^2 will have 1 at its unit place.

(iv)

Solution:

321^2

Unit place digit of $321 = 1$

Square of $1 = 1$

So, 321^2 will have 1 at its unit place.

(v)

Solution:

265^2

Unit place digit of $265 = 5$

Square of $5 = 2\underline{5}$ with 5 at unit place

So, 265^2 will not have 1 at its unit place.

4.

(i)

Solution:

35

Unit place digit $= 5$

If unit place digit of a number is 4 or 6, then square will always have 6 at its unit's place.

So,

35 <u>will not have</u> 6 at its unit place of its square.

(ii)

Solution:

23

Unit place digit $= 3$

If unit place digit of a number is 4 or 6, then square will always have 6 at its unit's place.

So,

Square 23 <u>will not have</u> 6 at its unit place.

(iii)

Solution:

64

Unit place digit $= 4$

If unit place digit of a number is 4 or 6, then square will always have 6 at its unit's place.

So,

Square of 64 <u>will have</u> 6 at its unit place.

(iv)

Solution:

76

Unit place digit $= 6$

If unit place digit of a number is 4 or 6, then square will always have 6 at its unit's place.

So,

Square of 76 <u>will have</u> 6 at its unit place.

(v)

Solution:

98

Unit place digit $= 8$

If a number have 4 or 6 at its unit's place, then square of the number

will have 6 at its unit's place.

So,

98 <u>will not have</u> 6 at its unit's place of its unit's place of its square.

5.

(i)

Solution:

26^2

Unit of place digit $= 6$

If a number have 4 or 6 at its unit's place, then its square will have 6 at its unit's place.

So,

26^2 <u>will have</u> 6 at its unit's place.

(ii)

Solution:

49^2

Unit of place digit $= 9$

If a number have 4 or 6 at its unit's place then its square will have 6 at its unit's place.

So,

49^2 will not have 6 at its unit's place.

(iii)

Solution:

34^2

Unit of place digit $= 4$

If a number have 4 or 6 at its unit's place then its square will have 6 at its unit's place.

So,

34^2 will have 6 at its unit's place.

(iv)

Solution:

43^2

Unit of place digit $= 3$

If a number have 4 or 6 at its unit's place then its square will have 6 at its unit's place.

So,

43^2 will not have at its unit's place.

(v)

Solution:

244^2

Unit of place digit $= 4$

If a number have 4 or 6 at its unit's place then its square will have 6 at its unit's place.

So,

244^2 <u>will have</u> 6 at its unit's place.

6.

Solution:

If a number ends with 'n' zeroes; its square ends with '$2n$' zeroes.

Here, $n = 3$

So,

Zero in its square $= 2n = 2 \times 3 = 6$

7.

Solution:

If a number ends with 'n' zeroes then its square will have '$2n$' zeroes.

Here, $2n = 10$

So,

$$n = \frac{10}{2} = 5$$

So,

Number have 5 zeroes.

8.

Solution:

If is not possible for the square of a number to end with 5 zeroes, because the number of zeroes in square of a number is even number (i.e. 2*n*), where *n* is number of zeroes in number.

9. (i)

Solution:

2162

Unit place digit $= 2$

A perfect square number have 0, 1, 4, 5, 6 or 9 at its unit's place.

So,

2162 is not a perfect square.

(ii)

Solution:

6843

Unit place digit $= 3$

A perfect square number have 0, 1, 4, 5, 6 or 9 at its unit's place.

So,

6843 is not a perfect square.

(iii)

Solution:

9637

Unit place digit $= 7$

A perfect square number have 0, 1, 4, 5, 6 or 9 at its unit's place.

So,

9137 is not a perfect square.

(iv)

Solution:

6598

Unit place digit $= 8$

A perfect square number have 0, 1, 4, 5, 6 or 9 at its unit's place.

So,

6598 is not a perfect square.

10.   (i)

Solution:

23

23 is an odd number.

Square of an odd number is an odd number and square of an even number is an even number.

So,

Square of 23 is an odd number.

(ii)

Solution:

54

54 is an even number.

Square of an odd number is an odd number and square of an even number is an even number.

So,

Square of 54 is an even number.

(iii)

Solution:

76

76 is an even number.

Square of an odd number is an odd number and square of an even number is an even number.

So,

Square of 76 is an even number.

(iv)

Solution:

75

75 is an odd number.

Square of an odd number is an odd number and square of an even number is an even number.

So,

Square of 75 is an odd number.

11.

Solution:

Number of zeroes in a square of a number is multiple of 2 (i.e. $2n$).

Number of zeroes in $640 = 1$

Number of zeroes in $81000 = 3$

Number of zeroes in $3600000 = 5$

As number of zeroes in each given numbers are not multiple of 2 so these can't be a perfect square.

12. (i)

Solution:

$37^2 - 36^2$

For any natural number n,

$(n+1)^2 - n^2 = (n+1) + n$

Here,

$n = 36$

$n + 1 = 37$

So,

$37^2 - 36^2 = (36+1) + 36$

$= 37 + 36$

$= 73$

(ii)

Solution:

$85^2 - 84^2$

For any natural number n,

$$\left(n+1\right)^2 - n^2 = \left(n+1\right) + n$$

Here,

$n = 84$

$n + 1 = 85$

So,

$$85^2 - 84^2 = 85 + 84 = 169$$

(iii)

Solution:

$101^2 - 100^2$

For any natural number n,

$$\left(n+1\right)^2 - n^2 = \left(n+1\right) + n$$

Here,

$n = 100$

$n + 1 = 101$

So,

$$101^2 - 100^2 = 101 + 100 = 201$$

13. (i)

Solution:

Then sum of first n odd natural numbers $= n^2$

$1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 + 21 + 23$

$n = 12$

$\text{Sum} = n^2 = 12^2 = 144$

(ii)

Solution:

$1 + 3 + 5 + 7 + 9 + \ldots\ldots\ldots\ldots 36 + 41$

The sum of first 20 odd natural numbers

$= (20)^2$

$= 400$

(iii)

Solution:

$1 + 3 + 5 + 7 + 9 + \ldots\ldots\ldots\ldots 51 + 53$

The sum of first 26 odd natural numbers

$= (26)^2$

$= 676$

14.

Solution:

For any three natural numbers *p, q, r*

if $p^2 + q^2 = r^2$

Then *p, q, r* are known as Pythagorean triplets.

Following are three sets of Pythagorean triplets

a) 3, 4, 5

$3^2 + 4^2 = 5^2$

b) 6, 8, 10

$(6)^2 + (8)^2 = 10^2$

c) 5, 12, 13

$(5)^2 + (12)^2 = 13^2$