Chapter - 1

Squares and squares roots

Squares of 1st 30 natural numbers

n	n^2	n	n^2
1	1	26	676
2	4	27	729
3	9	28	784
4	16	29	841
5	25	30	900
6	36		
7	49		
8	64		
9	81		
10	100		
11	121		
12	144		
13	169		
14	196		
15	225		
16	256		
17	289		
18	324		
19	361		
20	400		
21	441		
22	484		
23	529		
24	576		
25	625		

★ Square of a number is obtained by multiplying the number itself.

★ Perfect square or Square no.

A number which is square of natural number is called perfect square or square no.

eg: 1, 4, 9, 16, 25, 36 etc

Facts about Perfect Squares

★ (i) A number ending with an odd numbers of zeroes (one zero, three zeroes and so on) is never a perfect square.

eg: 150, 25000, 350 are not perfect square.

(ii) Squares of even numbers are always even.

eg: $8^2 = 64$, $12^2 = 144$, $20^2 = 400$

(iii) Squares of odd numbers are always odd.

eg: $7^2 = 49$, $13^2 = 169$, $21^2 = 441$

(iv) The numbers ending with 2, 3, 7, 8 are not perfect squares.

eg: 32, 243, 37, 368 are not perfect squares.

(v) The ~~number~~ square of a number other than 0 and 1, is either a multiple of 3 or exceeds the multiple of three by 1.

- examples of multiple of 3.

$3^2 = 9$ $\qquad$ $12^2 = 144$

- Examples of multiple of 3 exceeded by 1

$4^2 = 16 (15+1)$ $\qquad$ $13^2 = 169 = (168+1)$.

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(VI) The square of a number other than 0 and 1, is either a multiple of 4 or exceeds a multiple of 4 by 1

- Examples of multiples of 4

$6^2 = 36$ $8^2 = 64$

- Examples of multiples of 4 exceeded by 1

$7^2 = 49 = (48+1)$ $9^2 = 81 (80+1)$

(VII) The difference between the squares of two consecutive natural numbers is equal to their sum.

Let us take two consecutive natural numbers, 3 and 4

$4^2 - 3^2 = 16 - 9 = 7 = 3+4$

(VIII) The square of a natural number n is equal to the sum of the first n, odd natural numbers.

~~(iii)~~ eg: $1^2 = 1$ = Sum of the first one odd natural number.

$2^2 = 1+3$ = Sum of the first two odd natural numbers.

$3^2 = 1+3+5$ = Sum of the first three odd natural numbers.

$4^2 = 1+3+5+7$ = Sum of the first four odd natural numbers.

(IX) Squares of natural numbers Composed of only digit 1, follow a peculiar pattern.

$1^2 = 1$

$11^2 = 121$

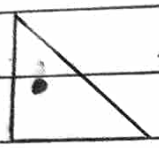
$111^2 = 12321$

$1111^2 = 1234321$

$11111^2 = 123454321$

Triangular Numbers

Numbers whose dot patterns can be arranged as triangles are called triangular numbers

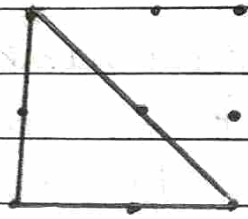


= 1

+ 2

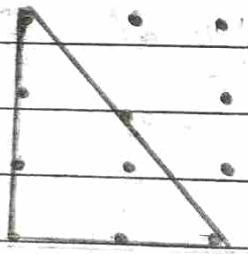
= 3

+ 3



= 6

+ 4



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WS-1

Q1, 2, 3, 4 on Book

Q5: How many non-square numbers lie between the following

(i) 7^2 and 8^2

14

(ii) 10^2 and 11^2

20

(iii) 40^2 and 41^2

80

(IV) 80^2 and 81^2

160

(v) 101^2 and 102^2

202

(vi) 205^2 and 206^2

410

Q6, 7 on book

Q8: Which of the following triplets are pythagorean ?

(i) (3,4,5)

$2m = 4$

$\Rightarrow m = \frac{4}{2} \Rightarrow m = 2$

$(m^2-1, 2m, m^2+1)$

$(2^2-1, 2\times2, 2^2+1)$

$(3,4,5)$

Yes

(ii) (6,7,8)

$2m = 6$

$\Rightarrow m = \frac{6}{2} \Rightarrow m = 3$

$(m^2-1, 2m, m^2+1)$

$(3^2-1, 2\times3, 3^2+1)$

$(8,6,10)$

No

(iii) (10,24,26)

$2m = 10$

$\Rightarrow m = \frac{10}{2} \Rightarrow m = 5$

$(m^2-1, 2m, m^2+1)$

$(5^2-1, 2\times5, 5^2+1)$

$(24,10,26)$

Yes

(IV) (2,3,4)

$2m = 2$

$\Rightarrow m = \frac{2}{2} \Rightarrow m = 1$

$(m^2-1, 2m, m^2+1)$

$(1^2-1, 2\times1, 1^2+1)$

$(1-1, 2, 2)$

$(0,2,2)$

No

W.S-2

Q1: Find the square root of the following

(i) 16

16-1 = 15
15-3 = 12
12-5 = 7
7-7 = 0
So $\sqrt{16} = 4$

(ii) 49

49-1 = 48
48-3 = 45
45-5 = 40
40-7 = 33
33-9 = 24
24-11 = 13
13-13 = 0
So $\sqrt{49} = 7$

(iii) 64

64-1 = 63
63-3 = 60
60-5 = 55
55-7 = 48
48-9 = 39
39-11 = 28
28-13 = 15
15-15 = 0
So $\sqrt{64} = 8$

(iv) 100

100-1 = 99
99-3 = 96
96-5 = 91
91-7 = 84
84-9 = 75
75-11 = 64
64-13 = 51
51-15 = 36
36-17 = 19
19-19 = 0
So $\sqrt{100} = 10$

(v) 169

169-1 = 168
168-3 = 165
165-5 = 160
160-7 = 153
153-9 = 144
144-11 = 133
133-13 = 120
120-15 = 105
105-17 = 88
88-19 = 69
69-21 = 48
48-23 = 25
25-25 = 0
So $\sqrt{169} = 13$

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(VI) 81

81 - 1 = 80
80 - 3 = 77
77 - 5 = 72
72 - 7 = 65
65 - 9 = 56
56 - 11 = 45
45 - 13 = 32
32 - 15 = 17
17 - 17 = 0
so $\sqrt{81} = 9$

(VII) 256

256 - 1 = 255
255 - 3 = 252
252 - 5 = 247
247 - 7 = 240
240 - 9 = 231
231 - 11 = 220
220 - 13 = 207
207 - 15 = 192
192 - 17 = 175
175 - 19 = 156
156 - 21 = 135
135 - 23 = 112
112 - 25 = 87
87 - 27 = 60
60 - 29 = 31
31 - 31 = 0
so $\sqrt{256} = 16$

(VIII) 144

144 - 1 = 143
143 - 3 = 140
140 - 5 = 135
135 - 7 = 128
128 - 9 = 119
119 - 11 = 108
108 - 13 = 95
95 - 15 = 80
80 - 17 = 63
63 - 19 = 44
44 - 21 = 23
23 - 23 = 0
so $\sqrt{144} = 12$

WS-3

Q1: Find Square root by prime factorisation

(i) 225

3	225
3	75
5	25
5	5
	1

$225 = 3 \times 3 \times 5 \times 5$

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

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

$\sqrt{225} = 15$

(ii) 444

3	444
3	147
7	49
7	7
	1

$441 = 3 \times 3 \times 7 \times 7$

$\sqrt{441} = \sqrt{3 \times 3 \times 7 \times 7}$

$\sqrt{441} = 3 \times 7$

$\sqrt{441} = 21$

(iii) 529

23	529
23	23
	1

$529 = 23 \times 23$

$\sqrt{529} = \sqrt{23 \times 23}$

$\sqrt{529} = 23$

$\sqrt{529} = 23$

(iv) 40000

2	40000
2	20000
2	10000
2	5000
2	2500
2	1250
5	625
5	125
5	25
5	5
	1

(v) 7744

2	7744
2	3872
2	1936
2	968
2	484
2	242
11	121
11	11
	1

$7744 = 2\times2\times2\times2\times2\times2\times11\times11$

$\sqrt{7744} = \sqrt{2\times2\times2\times2\times2\times2\times11\times11}$

$\sqrt{7744} = 2\times2\times2\times11$

$\sqrt{7744} = 88$

(vi) 8281

7	8281
7	1183
13	169
13	13
	1

$8281 = 7\times7\times13\times13$

$\sqrt{8281} = \sqrt{7\times7\times13\times13}$

$\sqrt{8281} = 7\times13$

$\sqrt{8281} = 91$

(vii) 4096

2	4096
2	2048
2	1024
2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

$4096 = 2\times2\times2\times2\times2\times2\times2\times2\times2\times2\times2\times2$

$\sqrt{4096} = 2\times2\times2\times2\times2\times2\times2\times2\times2\times2\times2\times2$

$\sqrt{4096} = \sqrt{2\times2\times2\times2\times2\times2\times2\times2\times2\times2\times2\times2}$

$\sqrt{4096} = 2\times2\times2\times2\times2\times2$

$\sqrt{4096} = 64$

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OR

(VIII) 28900

17	28900
17	1700
5	100
5	20
2	4
2	2
	1

$28900 = 17 \times 17 \times 5 \times 5 \times 2 \times 2$

$\sqrt{28900} = \sqrt{17 \times 17 \times 5 \times 5 \times 2 \times 2}$

$\sqrt{28900} = 17 \times 5 \times 2$

$\sqrt{28900} = 170$

OR

2	28900
2	14450
5	7225
5	1445
17	289
17	17
	1

$28900 = 2 \times 2 \times 5 \times 5 \times 17 \times 17$

$\sqrt{28900} = \sqrt{2 \times 2 \times 5 \times 5 \times 17 \times 17}$

$\sqrt{28900} = 2 \times 5 \times 17$

$\sqrt{28900} = 170$

Q2: Given no. = 1100

2	1100
2	550
5	275
5	55
11	11
	1

$1100 = 2 \times 2 \times 5 \times 5 \times 11$

Since, Prime factor 11 is left unpaired so 11 must be multiplied by 11 to get a perfect square

$1100 \times 11 = 12100$

$\sqrt{12100} = \sqrt{2 \times 2 \times 5 \times 5 \times 11 \times 11}$

$\sqrt{12100} = 2 \times 5 \times 11$

$= 110$

So $\sqrt{12100} = 110$

Q3: Given no. = 180

2	180
2	90
3	45
3	15
5	5
	1

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

Since prime factor 5 is left unpaired so 180 must be multiplied by 5 to get perfect square

$180 \times 5 = 900$

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

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

$\sqrt{900} = 30$

Q4 Given no. = 3645

3	3645
3	1215
3	405
3	135
3	45
3	15
5	5
	1

$3645 = 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 5$

Since prime factor left unpaired so 3645 must be divided by 5 to get a perfect square

~~3645~~ 729

5 1

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$\sqrt{729} = \sqrt{3\times3\times3\times3\times3\times3}$

$\sqrt{729} = 3\times3\times3$

$\sqrt{729} = 27$

Total trees = 1521

Q5: Let there x rows and x trees in each row.

ATQ

$x \times x = 1521$

$x^2 = 1521$

$x = \sqrt{1521}$

3	1521
3	507
13	169
13	13
	1

$x = \sqrt{3\times3\times13\times13}$

$x = 3\times13$

$x = 39$

No. of rows are 39

Q6: No. of cadets = 202500

Since cadets to be arrange in a square

Let the no. of cadets in each row be x

$x \times x = 202500$

$x^2 = 202500$

$x = \sqrt{202500}$

2	202500
2	101250
3	50625
3	16875
3	5625
3	1875
5	625
5	125
5	25
5	5
	1

$\sqrt{202500} = \sqrt{2\times2\times3\times3\times3\times3\times5\times5\times5\times5}$

$\sqrt{202500} = 2\times3\times3\times5\times5$

$\sqrt{202500} = 450$

So there are 450 candets ineach row

7. Area of square feild = $5184\ m^2$

Side × side = $5184\ m^2$

$Side^2 = 5184$

$Side = \sqrt{5184}$

$\sqrt{5184} = \sqrt{2\times2\times2\times2\times2\times2\times3\times3\times3\times3}$

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

2	5184
2	2592
2	1296
2	648
2	324
2	162
3	81
3	27
3	9
3	3
	1

Side of square = 72 m

Perimeter of square = 4 × Side

$= 4\times72$

$= 288\ m$

Let breadth of rectangle be x m

So length be 2x m

Perimeter of rect. = Perimeter of square

$2(x+2x) = 288$

$3x = \frac{288}{x1}\ \frac{144}{}$

$x = \frac{144}{x1}\ \frac{48}{}$

Breadth of rectangle = 48 m

length $2\times48 = 96\ m$

Area of rectangle = $l \times b$

48×96

$= 4608\ m^2$

Q8: Find $\sqrt{47089} + \sqrt{24336}$

7	47089
7	6727
31	961
31	31
	1

$\sqrt{47089} = \sqrt{7\times7\times31\times31}$

$= 7\times31$

$= 217$

2	24336
2	12168
2	6084
2	3042
3	1521
3	507
13	169
13	13
	1

$\sqrt{24336} = \sqrt{2\times2\times2\times2\times3\times3\times13\times13}$

$= 2\times2\times3\times13$

$= 156$

So $\sqrt{47089} + \sqrt{24336} = 373$

Good

Answer 28/3/22

W.S-4

Find square root of following

(i) 9801

	99
9	9801
	81 ↓
189	1701
	1701
	X

$189 \times 9 = 1701$

$\sqrt{9801} = 99$

(iii) 390625

```
      625
   ---------
6 | 390625
    36↓
   ----
122  306
     244↓
    -----
1245  6225
      6225
      ----
        X
```

$\sqrt{390625} = 625$

(v) 363609

```
      603
   ---------
6 | 363609
    36↓
   ----
120  36
     00↓
    -----
1203  3609
      3609
      ----
        X
```

$\sqrt{363609} = 603$

(vii) 1471369

```
      1213
   ---------
1 | 1471369
    1↓
   ----
22  x 47
      44↓
    -----
241   x313
      241↓
     ------
2423  x7269
      7269
      ----
        X
```

$\sqrt{1471369} = 1213$

(VIII) 57121

	239
2	57121
	4
43	171
	129
469	4221
	4221
	X

$\sqrt{57121} = 239$

(ii) 6561

	81
8	6561
	64
161	161
	161
	X

$\sqrt{6561} = 81$

(IV) 108241

	329
3	108241
	9
62	182
	124
649	5841
	5841
	X

$\sqrt{108241} = 329$

(VI) 120409

```
      347
   ---------
3 | 120409
    9 ↓
   ---------
64 | 304
     256 ↓
   ---------
687 | 4809
      4809
   ---------
        X
```

$\sqrt{120409} = 347$

Q2: Given no - 6203

```
      78
   ---------
7 | 6203
    -49 ↓
   ---------
148 | 1303
     -1184
   ---------
      119
   ---------
```

So, 119 should be subtracted from 6203 to get a perfect square.

Perfect square = 6203 - 119

= 6084

$\sqrt{6084} = 78$

Q3: Greatest six digit no. 999999

```
      999
   ---------
9 | 999999
    81 ↓
   ---------
189 | 1899
      1701 ↓
   ---------
1989 | 19899
       17901
   ---------
       1998
```

999999 − 1998 = 998001

So required no. is 998001

$\sqrt{998001} = 999$

Q4. given no. = 6203

```
          79
     7 | 6203
       | -49 ↓
   149 | 1303
       | -1341
       |   38
```

So 38 should be added to 6203 to get a perfect square

6203 + 38 = 6241

$\sqrt{6241} = 79$

Q5: least no. of 6 digit = 100000

```
          317
     3 | 100000
       |  9 ↓
    61 | 100
       |  61 ↓
   627 | 3900
       | 4389
       |  489
```

So required no. = 100000 + 489

= 100489

$\sqrt{100489} = 317$

Q6 $\sqrt{64432729} - \sqrt{9653449}$

	8027
8	64432729
	-64 ↓
160	x 43
	00 ↓
1602	4327
	3204 ↓
	112329
	112329
	x

	3107
3	9653449
	-9 ↓
61	x 65
	-61 ↓
620	434
	-000 ↓
6207	43449
	-43449
	x

$\therefore \sqrt{64432729} = 8027$

$\therefore \sqrt{9653449} = 3107$

$8027 - 3107$

$= 4920$

W.S-5

Q1: Find the square root of the following

(i) $\sqrt{\frac{324}{361}}$

$= \sqrt{\frac{18^2}{19^2}}$

$= \sqrt{\left(\frac{18}{19}\right)^2} = \frac{18}{19}$

(ii) $\sqrt{\frac{441}{961}}$

$= \sqrt{\frac{21^2}{31^2}}$

$= \sqrt{\left(\frac{21}{31}\right)^2}$

$= \sqrt{\left(\frac{21}{31}\right)^2}$

$= \frac{21}{31}$

(iv) $\sqrt{21\frac{51}{169}}$

$= \sqrt{\frac{3600}{169}}$

$= \sqrt{\frac{60^2}{13^2}}$

$= \sqrt{\left(\frac{60}{13}\right)^2}$

$= \frac{60}{13} = 4\frac{8}{13}$

169 × 21

169

338 ×

3549

+ 51

3600

(v) $\sqrt{\frac{5625}{441}}$

$\sqrt{\frac{75^2}{21^2}}$

```
   75
 7 | 5625
   | 49 ↓
---|------
145| 725
   | 725
---|------
```

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$$= \sqrt{\left(\frac{75}{21}\right)^2}$$

$$= \frac{75}{21} = 3\frac{12}{21}$$

(VIII)

$$\sqrt{35\frac{85}{1444}}$$

$$\sqrt{\frac{50625}{1444}}$$

$$= \sqrt{\frac{225^2}{38^2}}$$

$$\sqrt{\left(\frac{225}{38}\right)^2}$$

$$= \frac{225}{38}$$

$$= 5\frac{35}{38}$$

1444		225
× 35	2	50625
7220		4 ↓
4332 ×	42	106
50540		84 ↓
+ 85	445	2225
50625		2225
		×

Q2: Find value of

(i) $\sqrt{0.0009}$

$$= \sqrt{\frac{9}{10000}}$$

$$= \sqrt{\frac{3^2}{100^2}}$$

$\sqrt{\left(\frac{3}{100}\right)^2}$

$= \frac{3}{100}$

$= 0.03$

(ii) $\sqrt{0.0081}$

$= \sqrt{\frac{81}{10000}}$

$= \sqrt{\frac{9^2}{100^2}}$

$= \sqrt{\left(\frac{9}{100}\right)^2}$

$= \frac{9}{100}$

$= 0.09$

(iii) $\sqrt{0.012321}$

$\sqrt{\frac{12321}{1000000}} = \sqrt{\frac{111^2}{1000^2}}$

$\sqrt{\left(\frac{111}{1000}\right)^2} = \frac{111}{1000} = 0.111$

~~WS-5~~

(iv) $\sqrt{7.29}$

$\sqrt{\frac{729}{100}} = \sqrt{\frac{27^2}{10^2}}$

$\sqrt{\left(\frac{27}{10}\right)^2}$

$\frac{27}{10} = 2.7$

WS-5 (HW)

Q1:(iii) $\sqrt{5\frac{19}{25}}$ $\quad 25 \times 5 = 125 + 19 = 144$

$\sqrt{\frac{144}{25}}$

$\sqrt{\frac{12^2}{5^2}} = \sqrt{\left(\frac{12}{5}\right)^2}$

$= \frac{12}{5} = 2\frac{2}{5}$

(vi) $\sqrt{7\frac{18}{49}}$ $\quad 49 \times 7 = 343 + 18 = 361$

$\sqrt{\frac{361}{49}}$

$$\sqrt{\frac{19^2}{7^2}} = \sqrt{\left(\frac{19}{7}\right)^2}$$

$$= \frac{19}{7} = 2\frac{5}{7}$$

(VII) $\sqrt{23\frac{394}{729}} = \frac{167}{}$

$$\sqrt{\frac{17161}{729}}$$

729
× 23
16767
+ 394
17161

$$\sqrt{\frac{131^2}{27^2}} = \sqrt{\left(\frac{131}{27}\right)^2}$$

$$\frac{131}{27} = 4\frac{23}{27}$$

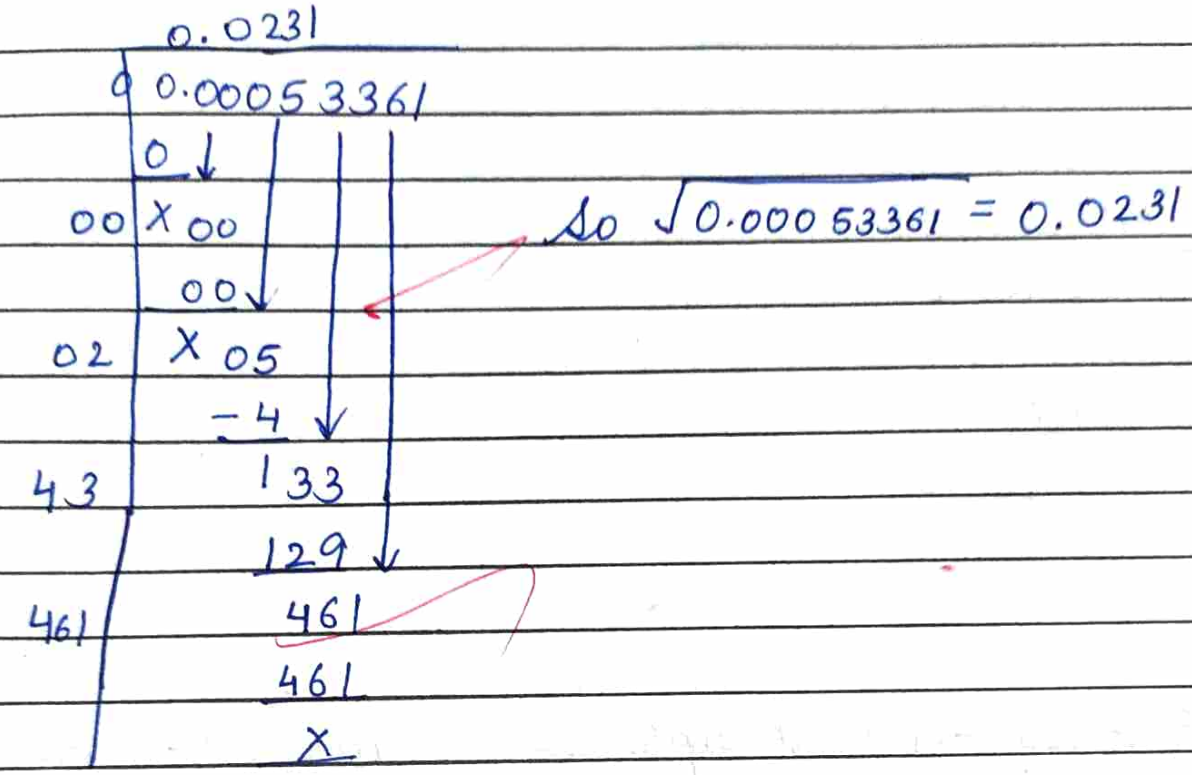
Q3(i) Find square root of

(i) 0.053361

	0.231
0	0.053361
	0 ↓
02	× 05
	− 4 ↓
43	133
	− 129 ↓
461	461
	− 461
	×

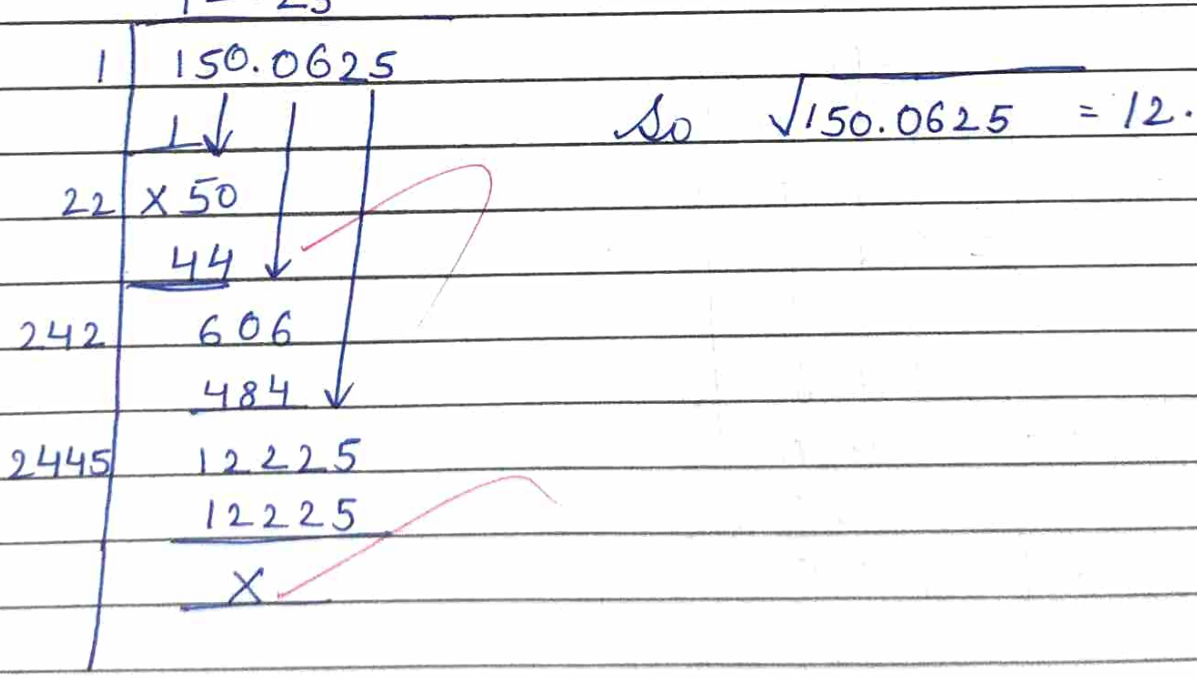
So $\sqrt{0.053361} = 0.231$

(ii) 0.00053361



So $\sqrt{0.00053361} = 0.0231$

(iii) 150.0625



So $\sqrt{150.0625} = 12.25$

(v) 610.09

```
      24.7
    ------
2 | 610.09
    4
    ---
44  210
    176
    ---
48  3409
    3409
    ----
      X
```

Q4: Find square root upto correct upto 3 decimal places.

(i) $\sqrt{7}$

```
        2.6457
      ---------
2   | 7.00000000
      4
      ---
46    300
      276
      ---
524     2400
        2096
        ----
5285    30400
        26425
        -----
52907   397500
      - 370349
        ------
        27151
```

So $\sqrt{7} = 2.6457$

$\sqrt{7} = 2.646$ (approx)

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(ii) 2.5

```
         1.5811
      1 | 2.50 00 00 00
        | 1
     25 | 150
        | 125
    308 | 2500
        | 2464
   3161 | 3600
        | - 3161
  31621 | 43900
        | 31621
        | 12279
```

(iii) $\sqrt{2\frac{1}{12}} = \sqrt{\frac{25}{12}}$ =

```
        2.08333
   12 ) 25
        24
        10
       - 00
        100
         96
         40
       - 36
         40
```

```
          1.4433
      1 | 2.08 33 33 33
        | 1
     24 | 108
        | - 96
    284 | 1233
        | 1136
   2883 | 9733
        | 8649
  28863 | 108433
        | 86589
        | 21844
```

$\sqrt{2\frac{1}{12}}$ = 1.4433 or 1.443

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Q5 Estimate

(i) $\sqrt{90}$

$81 < 90 < 100$

$9^2 < 90 < 10^2$

$9.5 \times 9.5 = 90.25$

Since $90.25 > 90$

$9.4 \times 9.4 = 88.36$

Since 90.25 is more closer to 90 than 88.36

$\therefore \sqrt{90} = 9.5$

(ii) $\sqrt{150}$

$144 < 150 < 169$

$12^2 < 150 < 13^2$

$12.5 \times 12.5 = 156.25$

Since $156.25 > 150$

$12.3 \times 12.3 = 151.29$

Since $151.29 > 150$

$12.2 \times 12.2 = 148.84$

Since 148.84 is more closer to 150 than 151.29

$\sqrt{150} = 12.2$ (approx)

(iii) $\sqrt{1000}$

$961 < 1000 < 1024$

$31^2 < 1000 < 32^2$

$31.5 \times 31.5 = 992.25$

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$992.25 < 1000$

$31.7 \times 31.7 = 1004.89$

$1004.89 > 1000$

$31.6 \times 31.6 = 998.56$

Since 998.56 is more closer to 1000 than 1004.89

$\sqrt{1000} = 31.6$ (approx)

Q6: Area of square cloth $= 9m^2$

Since it is divided into 16 square pieces

So area of each small square $= \frac{9}{16} m^2$

Side x Side

$Side^2 = \frac{9}{16}$

$Side = \sqrt{\frac{9}{16}}$

$= \frac{3}{4} m$

So side of scarf is $\frac{3}{4} m$

Q7: Area of square plot $= 800 m^2$

Side x Side $= 800$

$Side^2 = 800$

$Side = \sqrt{800}$

$784 < 800 < 841$

$28^2 < 800 < 29^2$

$28.5 \times 28.5 = 812.25$

$812.25 > 800$

$28.2 \times 28.2 = 795.24$

$795 < 800$

$28.3 \times 28.3 = 800.89$

Since 800.89 is more closer to 800 than 795.24

So $\sqrt{800} = 28.3m$

WS-5 (HW)

Q3 (iv) 0.374544

$$
\begin{array}{r|l}
 & 0.612 \\
0 & 0.374544 \\
 & -0 \\
6 & 37 \\
 & -36 \\
121 & 145 \\
 & -121 \\
1222 & 2444 \\
 & -2444 \\
 & \times
\end{array}
$$

So $\sqrt{0.374544} = 0.612$

Q4 (iv) $367\frac{2}{7} = \frac{2571}{7}$

$$
\begin{array}{r}
7 \overline{)2571} \quad 367.28571428... \\
-21 \\
47 \\
-42 \\
51 \\
-49 \\
20 \\
-14 \\
60 \\
-56 \\
40 \\
-35
\end{array}
$$

Long division for square root:

	19.164
1	$\overline{3}\,\overline{67}.\overline{28}\,\overline{57}\,\overline{14}$
	-1
29	267
	261
381	628
	-381
3826	24757
	-22956
38324	180114
	-153296
	26818 2

$\sqrt{367\frac{2}{7}} = 19.164$ (approx)

Division: $2571 \div 7 = 367.2857....$

7) 2571
-21
47
-42
51
-49
20
-14
60
-56
40
-35
50
-49
10

Q5: Estimate

(iii) $\sqrt{600}$

$576 < 600 < 625$

$24^2 < 600 < 25^2$

$24.5 \times 24.5 = 600.25$

$24.4 \times 24.4 = 595.36$

Since $24.5 \times 24.5 = 600.25$ is more closer to 600 than 595.36

$\sqrt{600} = 600.25$ (approx)

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Value Based Questions

Q1(a) Side of square sheet = 19.5

Area sheet = Side x Side

19.5×19.5 cm^2

380.25

(b) Respectful, Caring, Thankful

Q2: Total money donated = ₹2304

Let no. of students be x and money donated by each students be x

ATQ

$x \times x = 2304$

$x^2 = 2304$

$x = \sqrt{2304}$

$x = 48$

So there are 48 students in VIII-B

	48
4	2304
	16 ↓
88	704
	704
	x

Brain Teasers

Q1(A) On book

(B) a) 13^2 and 14^2
$= 26$

b) First four triangular numbers
1, 3, 6, 10, 15, 21, 26

c) ~~Are~~ Is 5, 7, 9 pythagorean triplets ?
$9^2 = 81$
$5^2 + 7^2 = 25 + 49 = 74$
$81 \neq 74$
So 5, 7, 9 are not pythagorean triplets.

d) Find $\sqrt{9}$ by repeated subtraction method.
$9 - 1 = 8$
$8 - 3 = 5$
$5 - 5 = 0$
$\sqrt{9} = 3$

e) Area of square handkerchief $= 324\ cm^2$
Side x Side $= 324$
$Side^2 = 324$
Side $\sqrt{324}$
$\sqrt{18^2}$
Side $= 18\ cm$

Q2: Find the square root of 10

```
              3.16227
       3    | 10.00 00 00 00 00 00
            | 9
      61    | 100
            | -61
     626    |  3900
            | -3756
    6322    |   14400
            |  -12644
   63242    |    176500
            |   -126484
  632447    |     4911600
            |    -4427129
            |      484471
```

$\therefore \sqrt{10} = 3.16227$

$= 3.1623$ (approx)

Q3: Find the value of $\sqrt{3.1428}$ and $\sqrt{0.31428}$

```
             1.7727
       1   | 3.14 28 00 00
           | -1
      27   | 214
           | -189
     347   |  2528
           | -2429
    3542   |    9900
           |   -7084
   35447   |   281600
           |  -248129
           |    33471
```

$\sqrt{3.1428} = 1.772$

$= 1.773$ (approx)

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$$\begin{array}{r|l} & 0.5606 \\ \hline 0 & 0.31428000 \\ & 0 \downarrow \\ 5 & \times 31 \\ & -25 \downarrow \\ 106 & 642 \\ & -636 \downarrow \\ 1120 & 680 \\ & -000 \downarrow \\ 11206 & 68000 \\ & -67236 \\ & 764 \end{array}$$

$\sqrt{0.31428} = 0.5606$

0.561 (approx)

Q4: Simplify

(i) $\dfrac{\sqrt{0.0441}}{\sqrt{0.000441}}$

$= \sqrt{\dfrac{0.0441}{0.000441}}$

$= \sqrt{\dfrac{441 \times 1000000}{10000 \times 441}}$

$= \sqrt{100} = 10$

(ii) $\sqrt{49} + \sqrt{0.49} + \sqrt{0.0049}$

$= 7 + \sqrt{(0.7)^2} + \sqrt{(0.07)^2}$

$= 7 + 0.7 + 0.07$

$= 7.77$

Q5 Area of square feild = $101\frac{1}{400}$ m^2

$= \frac{40401}{400}$ m^2

Side x Side = $\frac{40401}{400}$ m^2

$Side^2 = \frac{40401}{400}$

$= \frac{201}{20}$

$= 10\frac{1}{20}$

	201
2	40401
	4 ↓
40	x 04
	00 ↓
401	0401
	401
	x

So side is $10\frac{1}{20}$ m

Q6: Let required no. be x

ATQ

$x \times x = 227.798649$

$x^2 = 227.798649$

$x = \sqrt{227.798649}$

$\sqrt{227.798649} = 15.093$

So req. no. = 15.093

	15.093
1	227.798649
	1 ↓
25	127
	-125
300	279
	- 000
3009	27986
	- 27081
30183	90549
	-90549
	x

Q 8: Total no. of men = 64.019
No. of extra men = 10
No. of men arranged in the form of sq.

64019 - 10
64009

Since these are to be arranged in square form
No. of men in front row = $\sqrt{64009}$

```
      253
    ------
2  | 64009
   | -4
   |-----
45 | 240
   | -225
   |------
503| 1509
   | -1509
   |------
   |   x
```

No. of men in first row = 253

HOTS

Q1: Rate of levelling = ₹15/m²
Total cost of levelling = ₹19935
Area of square lawn = $\frac{\text{Total cost}}{\text{Rate}} = \frac{19935}{15}$ 1329

Side x Side = 1329
Side = $\sqrt{1329}$

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Side of sq. = 36.5 m (approx)

Perimeter of sq. = 4 × side = 4 × 36.5 = 146

Cost of fencing 1m = ₹22

Cost of fencing 146m = 22 × 146 = ₹3212

	36.45
3	1329
	-9 ↓
66	429
	-396
724	3300
	-2896
7285	40400
	-36425
	3975

Q2: $\sqrt{2} = 1.414$

$\sqrt{3} = 1.732$

$\sqrt{5} = 2.236$

(i) $\sqrt{72} + \sqrt{48}$

$\sqrt{2\times2\times2\times3\times3} + \sqrt{2\times2\times2\times3\times3}$

$= 2\times2\sqrt{2} + 2\times2\sqrt{3}$

$= 6\sqrt{2} + 4\sqrt{3}$

$= 6\times1.414 + 4\times1.732$

$= 8.484 + 6.928$

$= 15.412$

(ii) $\sqrt{\frac{125}{64}}$

$= \frac{\sqrt{5\times5\times5}}{\sqrt{8^2}}$

$= \frac{5\sqrt{5}}{8}$

$= \frac{5\times2.236}{8} = \frac{11.180}{8} = 1.3975$

Enrichment Questions

Q1: Let one no. be x

Other be $16x$

ATQ

$$x \times 16x = 1296$$

$$x \times x = \frac{1296}{16} = 81$$

$$x^2 = 81$$

$$x = 9$$

one no. $= 9$

other no. $= 16 \times 9 = 144$

Q2: $\sqrt{50625}$

$\sqrt{506.25} + \sqrt{50.625}$

so $\sqrt{50625} = 225$

$\sqrt{506.25} + \sqrt{50.625}$

$= \sqrt{\frac{50625}{100}} + \sqrt{\frac{50625}{10000}}$

$= \frac{\sqrt{50625}}{\sqrt{100}} + \frac{\sqrt{50625}}{\sqrt{10000}}$

$\frac{225}{10} + \frac{225}{100}$

$= 22.5 + 2.25$

24.75

Q3: $2m = 14$

$m = \frac{14}{2}$ 7

$(m^2-1, 2m, m^2+1)$

$(7^2-1, 2\times 7, 7^2+1)$

$(48, 14, 50)$

Brain Teasers (HW)

Q1: Total no. of student = 8649

Let there be x rows and x students in each row.

$x \times x = 8649$

$x^2 = 8649$

$x = \sqrt{8649}$

There are 93 rows and 93 students in each row

	93
9	8649
	-81 ↓
183	549
	-549
	X