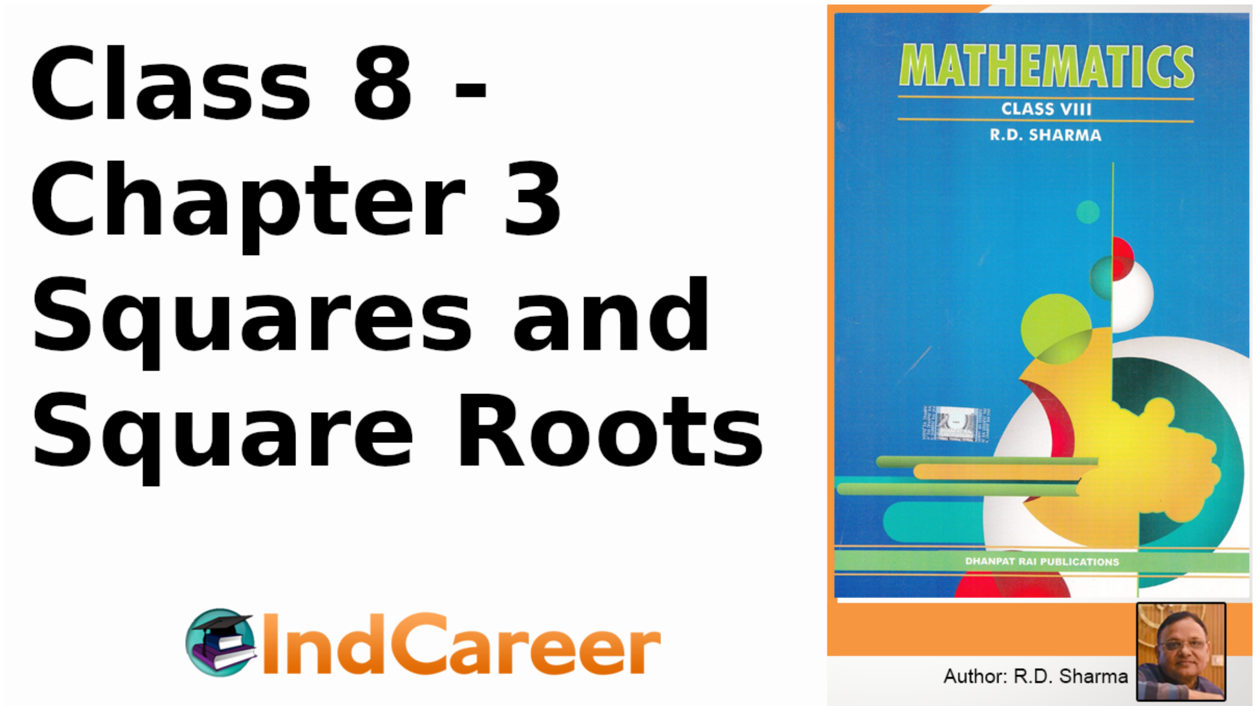


RD Sharma Solutions for Class 8 Maths Chapter 3–Squares and Square Roots

Class 8: Maths Chapter 3 solutions. Complete Class 8 Maths Chapter 3 Notes.

RD Sharma Solutions for Class 8 Maths Chapter 3–Squares and Square Roots

RD Sharma 8th Maths Chapter 3, Class 8 Maths Chapter 3 solutions

https://www.indcareer.com/schools/rd-sharma-solutions-for-class-8-maths-chapter-3-squares-and-square-roots/

EXERCISE 3.1 PAGE NO: 3.4

1. Which of the following numbers are perfect squares?

(i) 484

(ii) 625

(iii) 576

(iv) 941

(v) 961

(vi) 2500

Solution:

(i) 484

First find the prime factors for 484

484 = 2×2×11×11

By grouping the prime factors in equal pairs we get,

= (2×2) × (11×11)

By observation, none of the prime factors are left out.

∴ 484 is a perfect square.

(ii) 625

First find the prime factors for 625

625 = 5×5×5×5

By grouping the prime factors in equal pairs we get,

= (5×5) × (5×5)

By observation, none of the prime factors are left out.

∴ 625 is a perfect square.

(iii) 576

First find the prime factors for 576

576 = 2×2×2×2×2×2×3×3

By grouping the prime factors in equal pairs we get,

= (2×2) × (2×2) × (2×2) × (3×3)

By observation, none of the prime factors are left out.

∴ 576 is a perfect square.

(iv) 941

First find the prime factors for 941

941 = 941 × 1

We know that 941 itself is a prime factor.

∴ 941 is not a perfect square.

(v) 961

First find the prime factors for 961

961 = 31×31

By grouping the prime factors in equal pairs we get,

= (31×31)

By observation, none of the prime factors are left out.

∴ 961 is a perfect square.

(vi) 2500

First find the prime factors for 2500

2500 = 2×2×5×5×5×5

By grouping the prime factors in equal pairs we get,

= (2×2) × (5×5) × (5×5)

By observation, none of the prime factors are left out.

∴ 2500 is a perfect square.

2. Show that each of the following numbers is a perfect square. Also find the number whose square is the given number in each case:

(i) 1156

(ii) 2025

(iii) 14641

(iv) 4761

Solution:

(i) 1156

First find the prime factors for 1156

1156 = 2×2×17×17

By grouping the prime factors in equal pairs we get,

= (2×2) × (17×17)

By observation, none of the prime factors are left out.

∴ 1156 is a perfect square.

To find the square of the given number

1156 = (2×17) × (2×17)

= 34 × 34

= $(34)^2$

∴ 1156 is a square of 34.

(ii) 2025

First find the prime factors for 2025

2025 = 3×3×3×3×5×5

By grouping the prime factors in equal pairs we get,

= (3×3) × (3×3) × (5×5)

By observation, none of the prime factors are left out.

∴ 2025 is a perfect square.

To find the square of the given number

2025 = (3×3×5) × (3×3×5)

= 45 × 45

= $(45)^2$

∴ 2025 is a square of 45.

(iii) 14641

First find the prime factors for 14641

14641 = 11×11×11×11

By grouping the prime factors in equal pairs we get,

= (11×11) × (11×11)

By observation, none of the prime factors are left out.

∴ 14641 is a perfect square.

To find the square of the given number

14641 = (11×11) × (11×11)

= 121 × 121

= $(121)^2$

∴ 14641 is a square of 121.

(iv) 4761

First find the prime factors for 4761

4761 = 3×3×23×23

By grouping the prime factors in equal pairs we get,

= (3×3) × (23×23)

By observation, none of the prime factors are left out.

∴ 4761 is a perfect square.

To find the square of the given number

4761 = (3×23) × (3×23)

= 69 × 69

= $(69)^2$

∴ 4761 is a square of 69.

3. Find the smallest number by which the given number must be multiplied so that the product is a perfect square:

(i) 23805

(ii) 12150

(iii) 7688

Solution:

(i) 23805

First find the prime factors for 23805

23805 = 3×3×23×23×5

By grouping the prime factors in equal pairs we get,

= (3×3) × (23×23) × 5

By observation, prime factor 5 is left out.

So, multiply by 5 we get,

23805 × 5 = (3×3) × (23×23) × (5×5)

= (3×5×23) × (3×5×23)

= 345 × 345

= $(345)^2$

∴ Product is the square of 345.

(ii) 12150

First find the prime factors for 12150

12150 = 2×3×3×3×3×3×5×5

By grouping the prime factors in equal pairs we get,

= 2×3 × (3×3) × (3×3) × (5×5)

By observation, prime factor 2 and 3 are left out.

So, multiply by 2×3 = 6 we get,

12150 × 6 = 2×3 × (3×3) × (3×3) × (5×5) × 2 × 3

= (2×3×3×3×5) × (2×3×3×3×5)

= 270 × 270

= $(270)^2$

∴ Product is the square of 270.

(iii) 7688

First find the prime factors for 7688

7688 = 2×2×31×31×2

By grouping the prime factors in equal pairs we get,

= (2×2) × (31×31) × 2

By observation, prime factor 2 is left out.

So, multiply by 2 we get,

7688 × 2 = (2×2) × (31×31)× (2×2)

= (2×31×2) × (2×31×2)

= 124 × 124

= $(124)^2$

∴ Product is the square of 124.

4. Find the smallest number by which the given number must be divided so that the resulting number is a perfect square:

(i) 14283

(ii) 1800

(iii) 2904

Solution:

(i) 14283

First find the prime factors for 14283

14283 = 3×3×3×23×23

By grouping the prime factors in equal pairs we get,

= (3×3) × (23×23) × 3

By observation, prime factor 3 is left out.

So, divide by 3 to eliminate 3 we get,

14283/3 = (3×3) × (23×23)

= (3×23) × (3×23)

= 69 × 69

= $(69)^2$

∴ Resultant is the square of 69.

(ii) 1800

First find the prime factors for 1800

1800 = 2×2×5×5×3×3×2

By grouping the prime factors in equal pairs we get,

= (2×2) × (5×5) × (3×3) × 2

By observation, prime factor 2 is left out.

So, divide by 2 to eliminate 2 we get,

1800/2 = (2×2) × (5×5) × (3×3)

= (2×5×3) × (2×5×3)

= 30 × 30

= $(30)^2$

∴ Resultant is the square of 30.

(iii) 2904

First find the prime factors for 2904

2904 = 2×2×11×11×2×3

By grouping the prime factors in equal pairs we get,

= (2×2) × (11×11) × 2 × 3

By observation, prime factor 2 and 3 are left out.

So, divide by 6 to eliminate 2 and 3 we get,

2904/6 = (2×2) × (11×11)

= (2×11) × (2×11)

= 22 × 22

= $(22)^2$

∴ Resultant is the square of 22.

5. Which of the following numbers are perfect squares?

11, 12, 16, 32, 36, 50, 64, 79, 81, 111, 121

Solution:

11 it is a prime number by itself.

So it is not a perfect square.

12 is not a perfect square.

16= $(4)^2$

16 is a perfect square.

32 is not a perfect square.

36= $(6)^2$

36 is a perfect square.

50 is not a perfect square.

64= $(8)^2$

64 is a perfect square.

79 it is a prime number.

So it is not a perfect square.

81= $(9)^2$

81 is a perfect square.

111 it is a prime number.

So it is not a perfect square.

121= $(11)^2$

121 is a perfect square.

6. Using prime factorization method, find which of the following numbers are perfect squares?

189, 225, 2048, 343, 441, 2961, 11025, 3549

Solution:

189 prime factors are

189 = $3^2 \times 3 \times 7$

Since it does not have equal pair of factors 189 is not a perfect square.

225 prime factors are

225 = (5×5) × (3×3)

Since 225 has equal pair of factors. ∴ It is a perfect square.

2048 prime factors are

2048 = (2×2) × (2×2) × (2×2) × (2×2) × (2×2) × 2

Since it does not have equal pair of factors 2048 is not a perfect square.

343 prime factors are

343 = (7×7) × 7

Since it does not have equal pair of factors 2048 is not a perfect square.

441 prime factors are

441 = (7×7) × (3×3)

Since 441 has equal pair of factors. ∴ It is a perfect square.

2961 prime factors are

2961 = (3×3) × (3×3) × (3×3) × (2×2)

Since 2961 has equal pair of factors. ∴ It is a perfect square.

11025 prime factors are

11025 = (3×3) × (5×5) × (7×7)

Since 11025 has equal pair of factors. ∴ It is a perfect square.

3549 prime factors are

3549 = (13×13) × 3 × 7

Since it does not have equal pair of factors 3549 is not a perfect square.

7. By what number should each of the following numbers by multiplied to get a perfect square in each case? Also find the number whose square is the new number.

(i) 8820

(ii) 3675

(iii) 605

(iv) 2880

(v) 4056

(vi) 3468

(vii) 7776

Solution:

(i) 8820

First find the prime factors for 8820

8820 = 2×2×3×3×7×7×5

By grouping the prime factors in equal pairs we get,

= (2×2) × (3×3) × (7×7) × 5

By observation, prime factor 5 is left out.

So, multiply by 5 we get,

8820 × 5 = (2×2) × (3×3) × (7×7) × (5×5)

= (2×3×7×5) × (2×3×7×5)

= 210 × 210

= $(210)^2$

∴ Product is the square of 210.

(ii) 3675

First find the prime factors for 3675

3675 = 5×5×7×7×3

By grouping the prime factors in equal pairs we get,

= (5×5) × (7×7) × 3

By observation, prime factor 3 is left out.

So, multiply by 3 we get,

3675 × 3 = (5×5) × (7×7) × (3×3)

$= (5×7×3) × (5×7×3)$

$= 105 × 105$

$= (105)^2$

∴ Product is the square of 105.

(iii) 605

First find the prime factors for 605

$605 = 5×11×11$

By grouping the prime factors in equal pairs we get,

$= (11×11) × 5$

By observation, prime factor 5 is left out.

So, multiply by 5 we get,

$605 × 5 = (11×11) × (5×5)$

$= (11×5) × (11×5)$

$= 55 × 55$

$= (55)^2$

∴ Product is the square of 55.

(iv) 2880

First find the prime factors for 2880

$2880 = 5×3×3×2×2×2×2×2×2$

By grouping the prime factors in equal pairs we get,

$= (3×3) × (2×2) × (2×2) × (2×2) × 5$

By observation, prime factor 5 is left out.

So, multiply by 5 we get,

$2880 \times 5 = (3\times3) \times (2\times2) \times (2\times2) \times (2\times2) \times (5\times5)$

$= (3\times2\times2\times2\times5) \times (3\times2\times2\times2\times5)$

$= 120 \times 120$

$= (120)^2$

∴ Product is the square of 120.

(v) 4056

First find the prime factors for 4056

$4056 = 2\times2\times13\times13\times2\times3$

By grouping the prime factors in equal pairs we get,

$= (2\times2) \times (13\times13) \times 2 \times 3$

By observation, prime factors 2 and 3 are left out.

So, multiply by 6 we get,

$4056 \times 6 = (2\times2) \times (13\times13) \times (2\times2) \times (3\times3)$

$= (2\times13\times2\times3) \times (2\times13\times2\times3)$

$= 156 \times 156$

$= (156)^2$

∴ Product is the square of 156.

(vi) 3468

First find the prime factors for 3468

$3468 = 2\times2\times17\times17\times3$

By grouping the prime factors in equal pairs we get,

= (2×2) × (17×17) × 3

By observation, prime factor 3 is left out.

So, multiply by 3 we get,

3468 × 3 = (2×2) × (17×17) × (3×3)

= (2×17×3) × (2×17×3)

= 102 × 102

= $(102)^2$

∴ Product is the square of 102.

(vii) 7776

First find the prime factors for 7776

7776 = 2×2×2×2×3×3×3×3×2×3

By grouping the prime factors in equal pairs we get,

= (2×2) × (2×2) × (3×3) × (3×3) × 2 × 3

By observation, prime factors 2 and 3 are left out.

So, multiply by 6 we get,

7776 × 6 = (2×2) × (2×2) × (3×3) × (3×3) × (2×2) × (3×3)

= (2×2×3×3×2×3) × (2×2×3×3×2×3)

= 216 × 216

= $(216)^2$

∴ Product is the square of 216.

8. By What numbers should each of the following be divided to get a perfect square in each case? Also, find the number whose square is the new number.

(i) 16562

(ii) 3698

(iii) 5103

(iv) 3174

(v) 1575

Solution:

(i) 16562

First find the prime factors for 16562

16562 = 7×7×13×13×2

By grouping the prime factors in equal pairs we get,

= (7×7) × (13×13) × 2

By observation, prime factor 2 is left out.

So, divide by 2 to eliminate 2 we get,

16562/2 = (7×7) × (13×13)

= (7×13) × (7×13)

= 91 × 91

= $(91)^2$

∴ Resultant is the square of 91.

(ii) 3698

First find the prime factors for 3698

3698 = 2×43×43

By grouping the prime factors in equal pairs we get,

= (43×43) × 2

By observation, prime factor 2 is left out.

So, divide by 2 to eliminate 2 we get,

3698/2 = (43×43)

= $(43)^2$

∴ Resultant is the square of 43.

(iii) 5103

First find the prime factors for 5103

5103 = 3×3×3×3×3×3×7

By grouping the prime factors in equal pairs we get,

= (3×3) × (3×3) × (3×3) × 7

By observation, prime factor 7 is left out.

So, divide by 7 to eliminate 7 we get,

5103/7 = (3×3) × (3×3) × (3×3)

= (3×3×3) × (3×3×3)

= 27 × 27

= $(27)^2$

∴ Resultant is the square of 27.

(iv) 3174

First find the prime factors for 3174

3174 = 2×3×23×23

By grouping the prime factors in equal pairs we get,

= (23×23) × 2 × 3

By observation, prime factor 2 and 3 are left out.

So, divide by 6 to eliminate 2 and 3 we get,

3174/6 = (23×23)

= $(23)^2$

∴ Resultant is the square of 23.

(v) 1575

First find the prime factors for 1575

1575 = 3×3×5×5×7

By grouping the prime factors in equal pairs we get,

= (3×3) × (5×5) × 7

By observation, prime factor 7 is left out.

So, divide by 7 to eliminate 7 we get,

1575/7 = (3×3) × (5×5)

= (3×5) × (3×5)

= 15 × 15

= $(15)^2$

∴ Resultant is the square of 15.

9. Find the greatest number of two digits which is a perfect square.

Solution:

We know that the two digit greatest number is 99

	9
9	99
	81
	18

∴ Greatest two digit perfect square number is 99-18 = 81

10. Find the least number of three digits which is perfect square.

Solution:

We know that the three digit greatest number is 100

To find the square root of 100

	10
1	100
	1
2	0

∴ the least number of three digits which is a perfect square is 100 itself.

11. Find the smallest number by which 4851 must be multiplied so that the product becomes a perfect square.

Solution:

First find the prime factors for 4851

4851 = 3×3×7×7×11

By grouping the prime factors in equal pairs we get,

= (3×3) × (7×7) × 11

∴ The smallest number by which 4851 must be multiplied so that the product becomes a perfect square is 11.

12. Find the smallest number by which 28812 must be divided so that the quotient becomes a perfect square.

Solution:

First find the prime factors for 28812

28812 = 2×2×3×7×7×7×7

By grouping the prime factors in equal pairs we get,

= (2×2) × 3 × (7×7) × (7×7)

∴ The smallest number by which 28812 must be divided so that the quotient becomes a perfect square is 3.

13. Find the smallest number by which 1152 must be divided so that it becomes a perfect square. Also find the number whose square is the resulting number.

Solution:

First find the prime factors for 1152

1152 = 2×2×2×2×2×2×2×3×3

By grouping the prime factors in equal pairs we get,

= (2×2) × (2×2) × (2×2) × (3×3) × 2

∴ The smallest number by which 1152 must be divided so that the quotient becomes a perfect square is 2.

The number after division, 1152/2 = 576

prime factors for 576 = 2×2×2×2×2×2×3×3

By grouping the prime factors in equal pairs we get,

= (2×2) × (2×2) × (2×2) × (3×3)

= $2^6 \times 3^2$

= 24^2

∴ The resulting number is the square of 24.

EXERCISE 3.2 PAGE NO: 3.18

1. The following numbers are not perfect squares. Give reason.

(i) 1547

(ii) 45743

(iii)8948

(iv) 333333

Solution:

The numbers ending with 2, 3, 7 or 8 is not a perfect square.

So, **(i)** 1547

(ii) 45743

(iii) 8948

(iv) 333333

Are not perfect squares.

2. Show that the following numbers are not, perfect squares:

(i) 9327

(ii) 4058

(iii)22453

(iv) 743522

Solution:

The numbers ending with 2, 3, 7 or 8 is not a perfect square.

So, **(i)** 9327

(ii) 4058

(iii) 22453

(iv) 743522

Are not perfect squares.

3. The square of which of the following numbers would be an old number?

(i) 731

(ii) 3456

(iii)5559

(iv) 42008

Solution:

We know that square of an even number is even number.

Square of an odd number is odd number.

(i) 731

Since 731 is an odd number, the square of the given number is also odd.

(ii) 3456

Since 3456 is an even number, the square of the given number is also even.

(iii) 5559

Since 5559 is an odd number, the square of the given number is also odd.

(iv) 42008

Since 42008 is an even number, the square of the given number is also even.

4. What will be the unit's digit of the squares of the following numbers?

(i) 52

(ii) 977

(iii) 4583

(iv) 78367

(v) 52698

(vi) 99880

(vii) 12796

(viii) 55555

(ix) 53924

Solution:

(i) 52

Unit digit of $(52)^2 = (2^2) = 4$

(ii) 977

Unit digit of $(977)^2 = (7^2) = 49 = 9$

(iii) 4583

Unit digit of $(4583)^2 = (3^2) = 9$

(iv) 78367

Unit digit of $(78367)^2 = (7^2) = 49 = 9$

(v) 52698

Unit digit of $(52698)^2 = (8^2) = 64 = 4$

(vi) 99880

Unit digit of $(99880)^2 = (0^2) = 0$

(vii) 12796

Unit digit of $(12796)^2 = (6^2) = 36 = 6$

(viii) 55555

Unit digit of $(55555)^2 = (5^2) = 25 = 5$

(ix) 53924

Unit digit of $(53924)^2 = (4^2) = 16 = 6$

5. Observe the following pattern

$1+3 = 2^2$

$1+3+5 = 3^2$

$1+3+5+7 = 4^2$

And write the value of 1+3+5+7+9+……… up to n terms.

Solution:

We know that the pattern given is the square of the given number on the right hand side is equal to the sum of the given numbers on the left hand side.

∴ The value of 1+3+5+7+9+……… up to n terms = n^2 (as there are only n terms).

6. Observe the following pattern

$2^2 - 1^2 = 2 + 1$

$3^2 – 2^2 = 3 + 2$

$4^2 – 3^2 = 4 + 3$

$5^2 – 4^2 = 5 + 4$

And find the value of

(i) $100^2 - 99^2$

(ii) $111^2 – 109^2$

(iii) $99^2 – 96^2$

Solution:

(i) $100^2 - 99^2$

100 + 99 = 199

(ii) $111^2 – 109^2$

$(111^2 – 110^2) + (110^2 – 109^2)$

(111 + 110) + (100 + 109)

440

(iii) $99^2 – 96^2$

$(99^2 – 98^2) + (98^2 – 97^2) + (97^2 – 96^2)$

(99 + 98) + (98 + 97) + (97 + 96)

585

7. Which of the following triplets are Pythagorean?

(i) (8, 15, 17)

(ii) (18, 80, 82)

(iii) (14, 48, 51)

(iv) (10, 24, 26)

(v) (16, 63, 65)

(vi) (12, 35, 38)

Solution:

(i) (8, 15, 17)

LHS = $8^2 + 15^2$

= 289

RHS = 17^2

= 289

LHS = RHS

∴ The given triplet is a Pythagorean.

(ii) (18, 80, 82)

LHS = $18^2 + 80^2$

= 6724

RHS = 82^2

= 6724

LHS = RHS

∴ The given triplet is a Pythagorean.

(iii) (14, 48, 51)

LHS = $14^2 + 48^2$

= 2500

RHS = 51^2

= 2601

LHS ≠ RHS

∴ The given triplet is not a Pythagorean.

(iv) (10, 24, 26)

LHS = $10^2 + 24^2$

= 676

RHS = 26^2

= 676

LHS = RHS

∴ The given triplet is a Pythagorean.

(v) (16, 63, 65)

LHS = $16^2 + 63^2$

= 4225

RHS = 65^2

= 4225

LHS = RHS

∴ The given triplet is a Pythagorean.

(vi) (12, 35, 38)

LHS = $12^2 + 35^2$

= 1369

RHS = 38^2

= 1444

LHS ≠ RHS

∴ The given triplet is not a Pythagorean.

8. Observe the following pattern

(1×2) + (2×3) = (2×3×4)/3

(1×2) + (2×3) + (3×4) = (3×4×5)/3

(1×2) + (2×3) + (3×4) + (4×5) = (4×5×6)/3

And find the value of

(1×2) + (2×3) + (3×4) + (4×5) + (5×6)

Solution:

(1×2) + (2×3) + (3×4) + (4×5) + (5×6) = (5×6×7)/3 = 70

9. Observe the following pattern

1 = 1/2 (1×(1+1))

1+2 = 1/2 (2×(2+1))

1+2+3 = 1/2 (3×(3+1))

1+2+3+4 = 1/2 (4×(4+1))

And find the values of each of the following:

(i) 1+2+3+4+5+…+50

(ii) 31+32+….+50

Solution:

We know that R.H.S = 1/2 [No. of terms in L.H.S × (No. of terms + 1)] (if only when L.H.S starts with 1)

(i) 1+2+3+4+5+…+50 = 1/2 (5×(5+1))

25 × 51 = 1275

(ii) 31+32+….+50 = (1+2+3+4+5+…+50) – (1+2+3+…+30)

1275 – 1/2 (30×(30+1))

1275 – 465

810

10. Observe the following pattern

1^2 = 1/6 (1×(1+1)×(2×1+1))

1^2+2^2 = 1/6 (2×(2+1)×(2×2+1)))

$1^2+2^2+3^2$ = 1/6 (3×(3+1)×(2×3+1)))

$1^2+2^2+3^2+4^2$ = 1/6 (4×(4+1)×(2×4+1)))

And find the values of each of the following:

(i) $1^2+2^2+3^2+4^2+\ldots+10^2$

(ii) $5^2+6^2+7^2+8^2+9^2+10^2+11^2+12^2$

Solution:

RHS = 1/6 [(No. of terms in L.H.S) × (No. of terms + 1) × (2 × No. of terms + 1)]

(i) $1^2+2^2+3^2+4^2+\ldots+10^2$ = 1/6 (10×(10+1)×(2×10+1))

= 1/6 (2310)

= 385

(ii) $5^2+6^2+7^2+8^2+9^2+10^2+11^2+12^2 = 1^2+2^2+3^2+\ldots+12^2 - (1^2+2^2+3^2+4^2)$

1/6 (12×(12+1)×(2×12+1)) – 1/6 (4×(4+1)×(2×4+1))

650-30

620

11. Which of the following numbers are squares of even numbers?

121, 225, 256, 324, 1296, 6561, 5476, 4489, 373758

Solution:

We know that only even numbers be the squares of even numbers.

So, 256, 324, 1296, 5476, 373758 are even numbers, since 373758 is not a perfect square

∴ 256, 324, 1296, 5476 are squares of even numbers.

12. By just examining the units digits, can you tell which of the following cannot be whole squares?

(i) 1026

(ii) 1028

(iii)1024

(iv) 1022

(v) 1023

(vi) 1027

Solution:

We know that numbers ending with 2, 3, 7, 8 cannot be a perfect square.

∴ 1028, 1022, 1023, and 1027 cannot be whole squares.

13. Which of the numbers for which you cannot decide whether they are squares.

Solution:

We know that the natural numbers such as 0, 1, 4, 5, 6 or 9 cannot be decided surely whether they are squares or not.

14. Write five numbers which you cannot decide whether they are square just by looking at the unit's digit.

Solution:

We know that any natural number ending with 0, 1, 4, 5, 6 or 9 can be or cannot be a square number.

Here are the five examples which you cannot decide whether they are square or not just by looking at the units place:

(i) 2061

The unit digit is 1. So, it may or may not be a square number

(ii) 1069

The unit digit is 9. So, it may or may not be a square number

(iii) 1234

The unit digit is 4. So, it may or may not be a square number

(iv) 56790

The unit digit is 0. So, it may or may not be a square number

(v) 76555

The unit digit is 5. So, it may or may not be a square number

15. Write true (T) or false (F) for the following statements.

(i) The number of digits in a square number is even.

(ii) The square of a prime number is prime.

(iii) The sum of two square numbers is a square number.

(iv) The difference of two square numbers is a square number.

(v) The product of two square numbers is a square number.

(vi) No square number is negative.

(vii) There is no square number between 50 and 60.

(viii) There are fourteen square number up to 200.

Solution:

(i) False, because 169 is a square number with odd digit.

(ii) False, because square of 3(which is prime) is 9(which is not prime).

(iii) False, because sum of 2^2 and 3^2 is 13 which is not square number.

(iv) False, because difference of 3^2 and 2^2 is 5, which is not square number.

(v) True, because the square of 2^2 and 3^2 is 36 which is square of 6

(vi) True, because $(-2)^2$ is 4, which is not negative.

(vii) True, because as there is no square number between them.

(viii) True, because the fourteen numbers up to 200 are: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196.

EXERCISE 3.3 PAGE NO: 3.32

1. Find the squares of the following numbers using column method. Verify the result by finding the square using the usual multiplication:

(i) 25

(ii) 37

(iii) 54

(iv) 71

(v) 96

Solution:

(i) 25

So here, a = 2 and b = 5

Column I	Column II	Column III
$a^2$4+26	2ab20+222	$b^2$25
6	2	5

∴ $25^2 = 625$

Where, it can be expressed as

$25^2 = 25\times 25 = 625$

(ii) 37

So here, a = 3 and b = 7

Column I	Column II	Column III
$a^2$9+413	2ab42+446	$b^2$49

13	6	9

∴ $37^2 = 1369$

Where, it can be expressed as

$25^2 = 37\times 37 = 1369$

(iii) 54

So here, a = 5 and b = 4

Column I	Column II	Column III
$a^2$25+429	2ab40+141	$b^2$16
29	1	6

∴ $54^2 = 2916$

Where, it can be expressed as

$54^2 = 54 \times 54 = 2916$

(iv) 71

So here, a = 7 and b = 1

Column I	Column II	Column III
$a^2$49+150	2ab14+014	$b^2$01
50	4	1

∴ $71^2 = 5041$

Where, it can be expressed as

$71^2 = 71 \times 71 = 5041$

(v) 96

So here, a = 9 and b = 6

Column I	Column II	Column III
$a^2$81+1192	2ab108+3111	$b^2$36
92	1	6

∴ $96^2 = 9216$

Where, it can be expressed as

$96^2 = 96 \times 96 = 9216$

2. Find the squares of the following numbers using diagonal method:

(i) 98

(ii) 273

(iii) 348

(iv) 295

(v) 171

Solution:

(i) 98

Step 1: Obtain the number and count the number of digits in it. Let there be n digits in the number to be squared.

Step 2: Draw square and divide it into n^2 sub-squares of the same size by drawing (n – 1) horizontal and (n – 1) vertical lines.

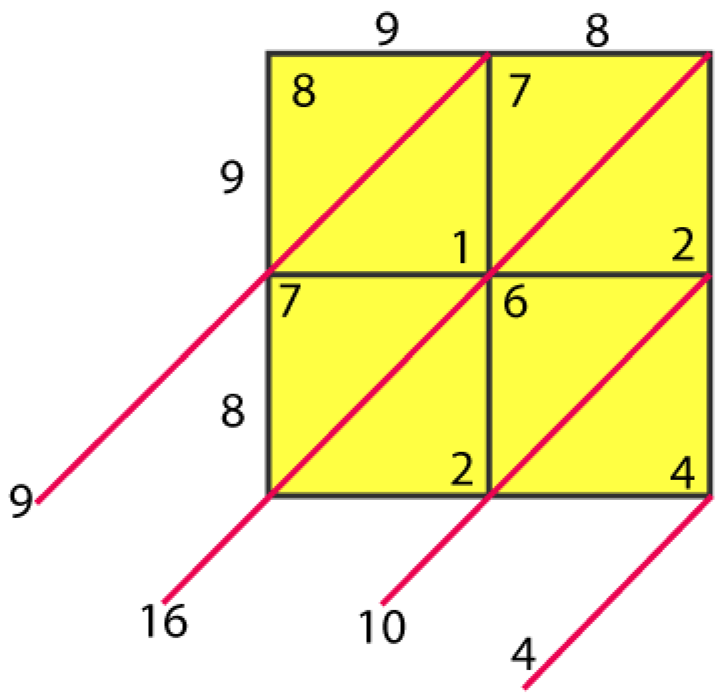
Step 3: Draw the diagonals of each sub-square.

Step 4: Write the digits of the number to be squared along left vertical side sand top horizontal side of the squares.

Step 5: Multiply each digit on the left of the square with each digit on top of the column one-by-one. Write the units digit of the product below the diagonal and tens digit above the diagonal of the corresponding sub-square.

Step 6: Starting below the lowest diagonal sum the digits along the diagonals so obtained. Write the units digit of the sum and take carry, the tens digit (if any) to the diagonal above.

Step 7: Obtain the required square by writing the digits from the left-most side.



∴ $98^2 = 9604$

(ii) 273

Step 1: Obtain the number and count the number of digits in it. Let there be n digits in the number to be squared.

Step 2: Draw square and divide it into n^2 sub-squares of the same size by drawing (n – 1) horizontal and (n – 1) vertical lines.

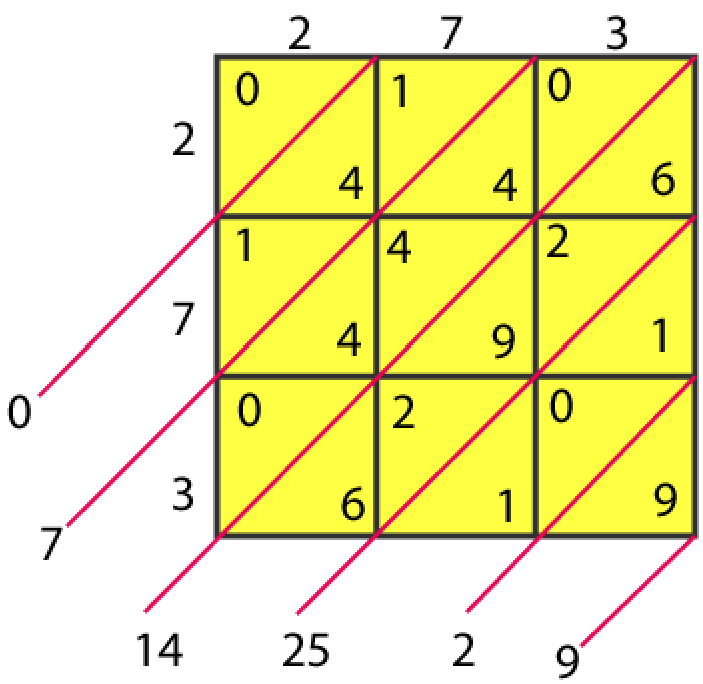
Step 3: Draw the diagonals of each sub-square.

Step 4: Write the digits of the number to be squared along left vertical side sand top horizontal side of the squares.

Step 5: Multiply each digit on the left of the square with each digit on top of the column one-by-one. Write the units digit of the product below the diagonal and tens digit above the diagonal of the corresponding sub-square.

Step 6: Starting below the lowest diagonal sum the digits along the diagonals so obtained. Write the units digit of the sum and take carry, the tens digit (if any) to the diagonal above.

Step 7: Obtain the required square by writing the digits from the left-most side.



∴ $273^2 = 74529$

(iii) 348

Step 1: Obtain the number and count the number of digits in it. Let there be n digits in the number to be squared.

Step 2: Draw square and divide it into n^2 sub-squares of the same size by drawing (n – 1) horizontal and (n – 1) vertical lines.

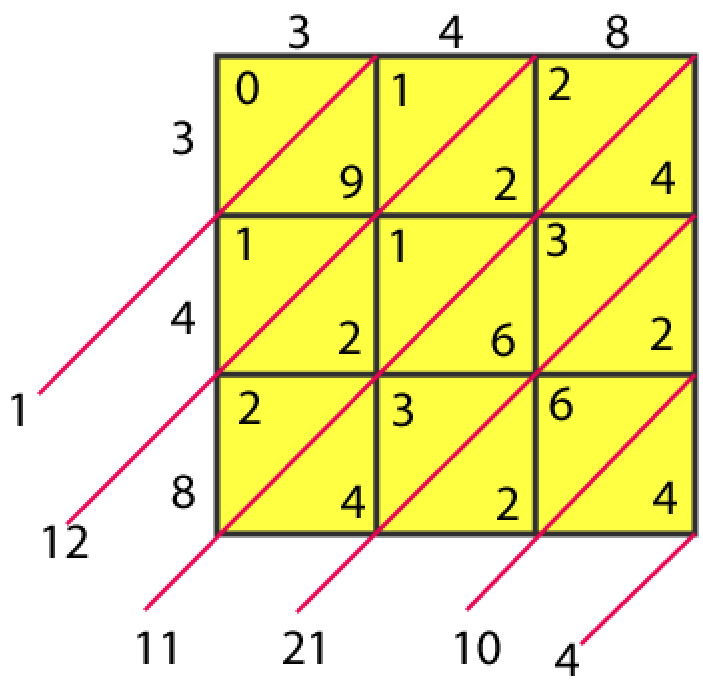
Step 3: Draw the diagonals of each sub-square.

Step 4: Write the digits of the number to be squared along left vertical side sand top horizontal side of the squares.

Step 5: Multiply each digit on the left of the square with each digit on top of the column one-by-one. Write the units digit of the product below the diagonal and tens digit above the diagonal of the corresponding sub-square.

Step 6: Starting below the lowest diagonal sum the digits along the diagonals so obtained. Write the units digit of the sum and take carry, the tens digit (if any) to the diagonal above.

Step 7: Obtain the required square by writing the digits from the left-most side.



$\therefore$ $348^2 = 121104$

(iv) 295

Step 1: Obtain the number and count the number of digits in it. Let there be n digits in the number to be squared.

Step 2: Draw square and divide it into n^2 sub-squares of the same size by drawing (n – 1) horizontal and (n – 1) vertical lines.

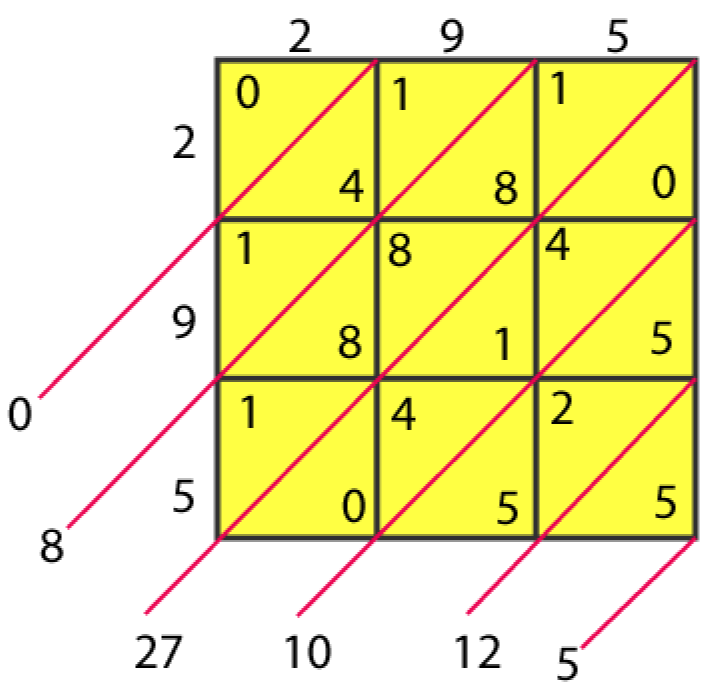
Step 3: Draw the diagonals of each sub-square.

Step 4: Write the digits of the number to be squared along left vertical side sand top horizontal side of the squares.

Step 5: Multiply each digit on the left of the square with each digit on top of the column one-by-one. Write the units digit of the product below the diagonal and tens digit above the diagonal of the corresponding sub-square.

Step 6: Starting below the lowest diagonal sum the digits along the diagonals so obtained. Write the units digit of the sum and take carry, the tens digit (if any) to the diagonal above.

Step 7: Obtain the required square by writing the digits from the left-most side.



∴ $295^2 = 87025$

(v) 171

Step 1: Obtain the number and count the number of digits in it. Let there be n digits in the number to be squared.

Step 2: Draw square and divide it into n^2 sub-squares of the same size by drawing (n – 1) horizontal and (n – 1) vertical lines.

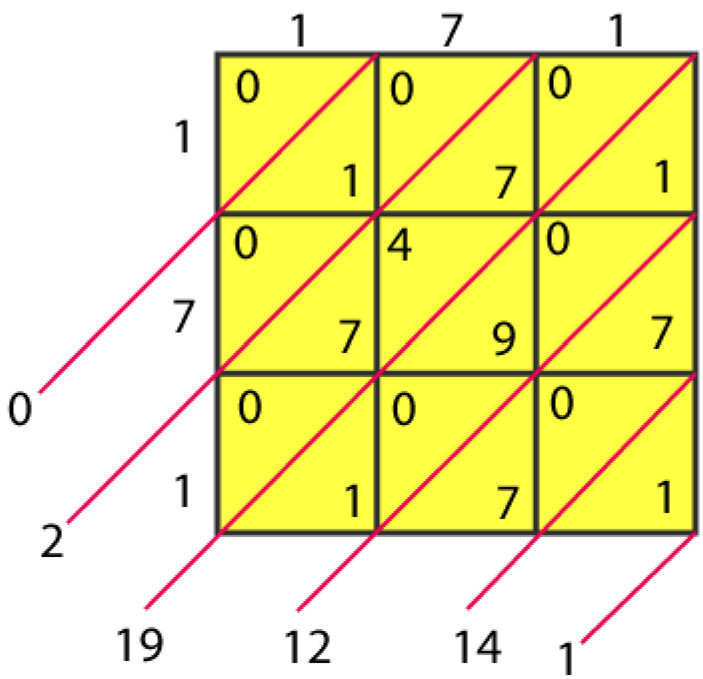
Step 3: Draw the diagonals of each sub-square.

Step 4: Write the digits of the number to be squared along left vertical side sand top horizontal side of the squares.

Step 5: Multiply each digit on the left of the square with each digit on top of the column one-by-one. Write the units digit of the product below the diagonal and tens digit above the diagonal of the corresponding sub-square.

Step 6: Starting below the lowest diagonal sum the digits along the diagonals so obtained. Write the units digit of the sum and take carry, the tens digit (if any) to the diagonal above.

Step 7: Obtain the required square by writing the digits from the left-most side.



∴ $171^2 = 29241$

3. Find the squares of the following numbers:

(i) 127

(ii) 503

(iii) 450

(iv) 862

(v) 265

Solution:

(i) 127

$127^2 = 127 \times 127 = 16129$

(ii) 503

$503^2 = 503 \times 503 = 253009$

(iii) 450

$450^2 = 450 \times 450 = 203401$

(iv) 862

$862^2 = 862 \times 862 = 743044$

(v) 265

$265^2 = 265 \times 265 = 70225$

4. Find the squares of the following numbers:

(i) 425

(ii) 575

(iii)405

(iv) 205

(v) 95

(vi) 745

(vii) 512

(viii) 995

Solution:

(i)425

$425^2 = 425 \times 425 = 180625$

(ii) 575

$575^2 = 575 \times 575 = 330625$

(iii)405

$405^2 = 405 \times 405 = 164025$

(iv) 205

$205^2 = 205 \times 205 = 42025$

(v) 95

$95^2 = 95 \times 95 = 9025$

(vi) 745

$745^2 = 745 \times 745 = 555025$

(vii) 512

$512^2 = 512 \times 512 = 262144$

(viii) 995

$995^2 = 995 \times 995 = 990025$

5. Find the squares of the following numbers using the identity $(a+b)^2 = a^2+2ab+b^2$:

(i) 405

(ii) 510

(iii) 1001

(iv) 209

(v) 605

Solution:

(i) 405

We know, $(a+b)^2 = a^2+2ab+b^2$

$405 = (400+5)^2$

$= (400)^2 + 5^2 + 2\ (400)\ (5)$

$= 160000 + 25 + 4000$

$= 164025$

(ii) 510

We know, $(a+b)^2 = a^2+2ab+b^2$

$510 = (500+10)^2$

$= (500)^2 + 10^2 + 2\ (500)\ (10)$

$= 250000 + 100 + 10000$

= 260100

(iii) 1001

We know, $(a+b)^2 = a^2+2ab+b^2$

$1001 = (1000+1)^2$

$= (1000)^2 + 1^2 + 2\ (1000)\ (1)$

= 1000000 + 1 + 2000

= 1002001

(iv) 209

We know, $(a+b)^2 = a^2+2ab+b^2$

$209 = (200+9)^2$

$= (200)^2 + 9^2 + 2\ (200)\ (9)$

= 40000 + 81 + 3600

= 43681

(v) 605

We know, $(a+b)^2 = a^2+2ab+b^2$

$605 = (600+5)^2$

$= (600)^2 + 5^2 + 2\ (600)\ (5)$

= 360000 + 25 + 6000

= 366025

6. Find the squares of the following numbers using the identity $(a-b)^2 = a^2-2ab+b^2$

(i) 395

(ii) 995

(iii)495

(iv) 498

(v) 99

(vi) 999

(vii)599

Solution:

(i) 395

We know, $(a-b)^2 = a^2-2ab+b^2$

$395 = (400-5)^2$

$= (400)^2 + 5^2 - 2 (400) (5)$

$= 160000 + 25 - 4000$

$= 156025$

(ii) 995

We know, $(a-b)^2 = a^2-2ab+b^2$

$995 = (1000-5)^2$

$= (1000)^2 + 5^2 - 2 (1000) (5)$

$= 1000000 + 25 - 10000$

$= 990025$

(iii) 495

We know, $(a-b)^2 = a^2 - 2ab + b^2$

$495 = (500-5)^2$

$= (500)^2 + 5^2 - 2\ (500)\ (5)$

$= 250000 + 25 - 5000$

$= 245025$

(iv) 498

We know, $(a-b)^2 = a^2 - 2ab + b^2$

$498 = (500-2)^2$

$= (500)^2 + 2^2 - 2\ (500)\ (2)$

$= 250000 + 4 - 2000$

$= 248004$

(v) 99

We know, $(a-b)^2 = a^2 - 2ab + b^2$

$99 = (100-1)^2$

$= (100)^2 + 1^2 - 2\ (100)\ (1)$

$= 10000 + 1 - 200$

$= 9801$

(vi) 999

We know, $(a-b)^2 = a^2 - 2ab + b^2$

$999 = (1000-1)^2$

$= (1000)^2 + 1^2 – 2 (1000) (1)$

= 1000000 + 1 – 2000

= 998001

(vii) 599

We know, $(a-b)^2 = a^2-2ab+b^2$

$599 = (600-1)^2$

$= (600)^2 + 1^2 – 2 (600) (1)$

= 360000 + 1 – 1200

= 358801

7. Find the squares of the following numbers by visual method:

(i) 52

(ii) 95

(iii) 505

(iv) 702

(v) 99

Solution:

(i) 52

We know, $(a+b)^2 = a^2+2ab+b^2$

$52 = (50+2)^2$

$= (50)^2 + 2^2 + 2 (50) (2)$

= 2500 + 4 + 200

= 2704

(ii) 95

We know, $(a-b)^2 = a^2 - 2ab + b^2$

$95 = (100-5)^2$

$= (100)^2 + 5^2 – 2 (100) (5)$

= 10000 + 25 – 1000

= 9025

(iii) 505

We know, $(a+b)^2 = a^2 + 2ab + b^2$

$505 = (500+5)^2$

$= (500)^2 + 5^2 + 2 (500) (5)$

= 250000 + 25 + 5000

= 255025

(iv) 702

We know, $(a+b)^2 = a^2 + 2ab + b^2$

$702 = (700+2)^2$

$= (700)^2 + 2^2 + 2 (700) (2)$

= 490000 + 4 + 2800

= 492804

(v) 99

We know, $(a-b)^2 = a^2-2ab+b^2$

$99 = (100-1)^2$

$= (100)^2 + 1^2 – 2 (100) (1)$

$= 10000 + 1 – 200$

$= 9801$

EXERCISE 3.4 PAGE NO: 3.38

1.Write the possible unit's digits of the square root of the following numbers. Which of these numbers are odd square roots?

(i) 9801

(ii) 99856

(iii) 998001

(iv) 657666025

Solution:

(i) 9801

We know that unit digit of 9801 is 1

Unit digit of square root = 1 or 9

Since the number is odd, square root is also odd

(ii) 99856

We know that unit digit of 99856 = 6

Unit digit of square root = 4 or 6

Since the number is even, square root is also even

(iii) 998001

We know that unit digit of 998001 = 1

Unit digit of square root = 1 or 9

Since the number is odd, square root is also odd

(iv) 657666025

We know that unit digit of 657666025 = 5

Unit digit of square root = 5

Since the number is odd, square root is also odd

2. Find the square root of each of the following by prime factorization.

(i) 441 (ii) 196

(iii) 529 (iv) 1764

(v) 1156 (vi) 4096

(vii) 7056 (viii) 8281

(ix) 11664 (x) 47089

(xi) 24336 (xii) 190969

(xiii) 586756 (xiv) 27225

(xv) 3013696

Solution:

(i) 441

Firstly let's find the prime factors for

441 = 3×3×7×7

$= 3^2 \times 7^2$

√441 = 3×7

$= 21$

(ii) 196

Firstly let's find the prime factors for

$196 = 2\times2\times7\times7$

$= 2^2\times7^2$

$\sqrt{196} = 2\times7$

$= 14$

(iii) 529

Firstly let's find the prime factors for

$529 = 23\times23$

$= 23^2$

$\sqrt{529} = 23$

(iv) 1764

Firstly let's find the prime factors for

$1764 = 2\times2\times3\times3\times7\times7$

$= 2^2\times3^2\times7^2$

$\sqrt{1764} = 2\times3\times7$

$= 42$

(v) 1156

Firstly let's find the prime factors for

1156 = 2×2×17×17

= $2^2 \times 17^2$

√1156 = 2×17

= 34

(vi) 4096

Firstly let's find the prime factors for

4096 = 2×2×2×2×2×2×2×2×2×2×2×2

= 2^{12}

√4096 = 2^6

= 64

(vii) 7056

Firstly let's find the prime factors for

7056 = 2×2×2×2×21×21

= $2^2 \times 2^2 \times 21^2$

√7056 = 2×2×21

= 84

(viii) 8281

Firstly let's find the prime factors for

8281 = 91×91

= 91^2

√8281 = 91

(ix) 11664

Firstly let's find the prime factors for

$11664 = 2\times2\times2\times2\times3\times3\times3\times3\times3\times3$

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

$\sqrt{11664} = 2\times2\times3\times3\times3$

$= 108$

(x) 47089

Firstly let's find the prime factors for

$47089 = 217\times217$

$= 217^2$

$\sqrt{47089} = 217$

(xi) 24336

Firstly let's find the prime factors for

$24336 = 2\times2\times2\times2\times3\times3\times13\times13$

$= 2^2\times2^2\times3^2\times13^2$

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

$= 156$

(xii) 190969

Firstly let's find the prime factors for

$190969 = 23\times23\times19\times19$

$= 23^2\times19^2$

$\sqrt{190969} = 23\times19$

$= 437$

(xiii) 586756

Firstly let's find the prime factors for

$586756 = 2\times2\times383\times383$

$= 2^2\times383^2$

$\sqrt{586756} = 2\times383$

$= 766$

(xiv) 27225

Firstly let's find the prime factors for

$27225 = 5\times5\times3\times3\times11\times11$

$= 5^2\times3^2\times11^2$

$\sqrt{27225} = 5\times3\times11$

$= 165$

(xv) 3013696

Firstly let's find the prime factors for

$3013696 = 2\times2\times2\times2\times2\times2\times217\times217$

$= 2^6\times217^2$

$\sqrt{3013696} = 2^3\times217$

$= 1736$

3.Find the smallest number by which 180 must be multiplied so that it becomes a perfect square. Also, find the square root of the perfect square so obtained.

Solution:

Firstly let's find the prime factors for

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

$= 2^2 \times 3^2 \times 5$

To make the unpaired 5 into paired, multiply the number with 5

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

$\therefore$ Square root of $\sqrt{(180 \times 5)} = 2 \times 3 \times 5$

$= 30$

4. Find the smallest number by which 147 must be multiplied so that it becomes a perfect square. Also, find the square root of the number so obtained.

Solution:

Firstly let's find the prime factors for

$147 = (7 \times 7) \times 3$

$= 7^2 \times 3$

To make the unpaired 3 into paired, multiply the number with 3

$147 \times 3 = 7^2 \times 3^2$

$\therefore$ Square root of $\sqrt{(147 \times 3)} = 7 \times 3$

$= 21$

5. Find the smallest number by which 3645 must be divided so that it becomes a perfect square. Also, find the square root of the resulting number.

Solution:

Firstly let's find the prime factors for

$3645 = (3 \times 3) \times (3 \times 3) \times (3 \times 3) \times 5$

$= 3^2 \times 3^2 \times 3^2 \times 5$

To make the unpaired 5 into paired, the number 3645 has to be divided by 5

$3645 \div 5 = 3^2 \times 3^2 \times 3^2$

∴ Square root of $\sqrt{(3645 \div 5)} = 3 \times 3 \times 3$

$= 27$

6. Find the smallest number by which 1152 must be divided so that it becomes a square. Also, find the square root of the number so obtained.

Solution:

Firstly let's find the prime factors for

$1152 = (2 \times 2) \times (2 \times 2) \times (2 \times 2) \times 2 \times (3 \times 3)$

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

To make the unpaired 2 into paired, the number 1152 has to be divided by 2

$1152 \div 2 = 2^2 \times 2^2 \times 2^2 \times 3^2$

∴ Square root of $\sqrt{(1152 \div 2)} = 2 \times 2 \times 2 \times 3$

$= 24$

7. The product of two numbers is 1296. If one number is 16 times the other, find the numbers.

Solution:

Let us consider two numbers a and b

So we know that one of the number, a =16b

$a \times b = 1296$

$16b \times b = 1296$

$16b^2 = 1296$

$b^2 = 1296/16 = 81$

b = 9

a = 16b

= 16(9)

= 144

∴ a =144 and b =9

8. A welfare association collected Rs 202500 as donation from the residents. If each paid as many rupees as there were residents, find the number of residents.

Solution:

Let us consider total residents as a

So, each paid Rs. a

Total collection = a (a) = a^2

We know that the total Collection = 202500

a = √ 202500

a = √a(2 × 2 × 3 × 3 × 3 × 3 × 5 × 5 × 5 × 5)

= 2 × 3 × 3 × 5 × 5a

= 450

∴ Total residents = 450

9. A society collected Rs 92.16. Each member collected as many paise as there were members. How many members were there and how much did each contribute?

Solution:

Let us consider there were few members, each attributed a paise a (a), i.e. total cost collected = 9216 paise

$a^2 = 9216$

$a = \sqrt{9216}$

$= 2 \times 2 \times 2 \times 12$

$= 96$

∴ There were 96 members in the society and each contributed 96 paise

10. A society collected Rs 2304 as fees from its students. If each student paid as many paise as there were students in the school, how many students were there in the school?

Solution:

Let us consider number of school students as a

each student contributed a paise

Total money obtained = a^2paise

= 2304 paise

$a = \sqrt{2304}$

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

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

$a = 48$

∴ There were 48 students in the school

11. The area of a square field is 5184 m^2. A rectangular field, whose length is twice its breadth has its perimeter equal to the perimeter of the square field. Find the area of the rectangular field.

Solution:

Let us consider the side of square field as a

$a^2 = 5184\ m^2$

a = √5184m

a = 2 × 2 ×2 × 9

= 72 m

Perimeter of square = 4a

= 4(72)

= 288 m

Perimeter of rectangle = 2 (l + b) = perimeter of the square field

= 288 m

2 (2b + b) = 288

b = 48 and l = 96

Area of rectangle = 96 × 48 m^2

= 4608 m^2

12. Find the least square number, exactly divisible by each one of the numbers: (i) 6, 9, 15 and 20 (ii) 8, 12, 15 and 20

Solution:

(i) 6, 9, 15 and 20

Firstly take L.C.M for 6, 9, 15, 20 which is 180

So the prime factors of 180 = $2^2 \times 3^2 \times 5$

To make it a perfect square, we have to multiply the number with 5

180 × 5 = $2^2 \times 3^2 \times 5^2$

∴ 900 is the least square number divisible by 6, 9, 15 and 20

(ii) 8, 2, 15 and 20

Firstly take L.C.M for 8, 2, 15, 20 which is 360

So the prime factors of 360 = $2^2 \times 3^2 \times 2 \times 5$

To make it a perfect square, we have to multiply the number with 2 × 5 = 10

$360 \times 10 = 2^2 \times 3^2 \times 5^2 \times 2^2$

∴ 3600 is the least square number divisible by 8, 12, 15 and 20

13. Find the square roots of 121 and 169 by the method of repeated subtraction.

Solution:

Let us find the square roots of 121 and 169 by the method of repeated subtraction

121 – 1 = 120

120 – 3 = 117

117 – 5 = 112

112 – 7 = 105

105 – 9 = 96

96 – 11 = 85

85 – 13 = 72

72 – 15 = 57

57 – 17 = 40

40 – 19 = 21

21 – 21 = 0

Clearly, we have performed operation 11 times

∴ $\sqrt{121} = 11$

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

Clearly, we have performed subtraction 13 times

∴ $\sqrt{169} = 13$

14. Write the prime factorization of the following numbers and hence find their square roots.

(i) 7744

(ii) 9604

(iii) 5929

(iv) 7056

Solution:

(i) 7744

Prime factors of 7744 is

$7744 = 2^2 \times 2^2 \times 2^2 \times 11^2$

∴ The square root of 7744 is

$\sqrt{7744} = 2 \times 2 \times 2 \times 11$

= 88

(ii) 9604

Prime factors of 9604 is

$9604 = 2^2 \times 7^2 \times 7^2$

∴ The square root of 9604 is

$\sqrt{9604} = 2 \times 7 \times 7$

= 98

(iii) 5929

Prime factors of 5929 is

$5929 = 11^2 \times 7^2$

∴ The square root of 5929 is

$\sqrt{5929} = 11 \times 7$

= 77

(iv) 7056

Prime factors of 7056 is

$7056 = 2^2 \times 2^2 \times 7^2 \times 3^2$

∴ The square root of 7056 is

$\sqrt{7056} = 2 \times 2 \times 7 \times 3$

= 84

15. The students of class VIII of a school donated Rs 2401 for PM's National Relief Fund. Each student donated as many rupees as the number of students in the class, Find the number of students in the class.

Solution:

Let us consider number of students as a

Each student denoted a rupee

So, total amount collected is a × a rupees = 2401

$a^2 = 2401$

$a = \sqrt{2401}$

a = 49

∴ There are 49 students in the class.

16. A PT teacher wants to arrange maximum possible number of 6000 students in a field such that the number of rows is equal to the number of columns. Find the number of rows if 71 were left out after arrangement.

Solution:

Let us consider number of rows as a

No. of columns = a

Total number of students who sat in the field = a^2

Total students $a^2 + 71 = 6000$

$a^2 = 5929$

$a = \sqrt{5929}$

a = 77

∴ total number of rows are 77.

EXERCISE 3.5 PAGE NO: 3.43

1.Find the square root of each of the following by long division method:

(i) 12544 (ii) 97344

(iii) 286225 (iv) 390625

(v) 363609 (vi) 974169

(vii) 120409 (viii) 1471369

(ix) 291600 (x) 9653449

(xi) 1745041 (xii) 4008004

(xiii) 20657025 (xiv) 152547201

(xv) 20421361 (xvi)62504836

(xvii) 82264900 (xviii) 3226694416

(xix) 6407522209 (xx) 3915380329

Solution:

(i) 12544

By using long division method

	112
1	12544
	1
21	25
	21
222	444
	444
	0

∴ the square root of 12544

√12544 = 112

(ii) 97344

By using long division method

	312
3	97344
	9
61	73
	61
622	1244
	1244
	0

∴ the square root of 97344

√97344 = 312

(iii) 286225

By using long division method

	535
5	286225
	25
103	362
	309
1065	5325
	5325
	0

∴ the square root of 286225

√286225 = 535

(iv) 390625

By using long division method

	625
6	$\overline{39}\,\overline{06}\,\overline{25}$
	36
122	306
	244
1245	6225
	6225
	0

∴ the square root of 390625

√390625 = 625

(v) 363609

By using long division method

	603
6	$\overline{36}\,\overline{36}\,\overline{09}$
	36
1203	3609
	3609
	0

∴ the square root of 363609

√36369 = 603

(vi) 974169

By using long division method

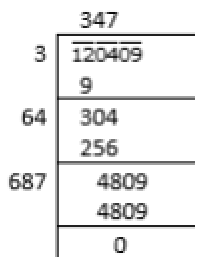
	987
9	$\overline{97}\,\overline{41}\,\overline{69}$
	81
188	1641
	1504
1967	13769
	13769
	0

∴ the square root of 974169

√974169 = 987

(vii) 120409

By using long division method

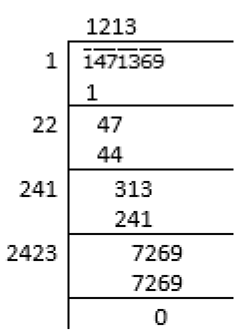


∴ the square root of 120409

√120409 = 347

(viii) 1471369

By using long division method



∴ the square root of 1471369

√1471369 = 1213

(ix) 291600

By using long division method

	540
5	$\overline{29}\,\overline{16}\,\overline{00}$
	25
104	416
	416
1080	00
	00
	0

∴ the square root of 291600

√291600 = 540

(x) 9653449

By using long division method

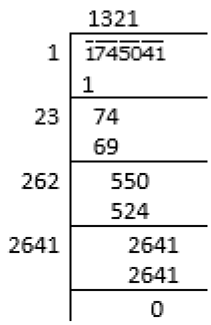
	3107
3	$\overline{9}\,\overline{65}\,\overline{34}\,\overline{49}$
	9
61	65
	61
6107	43449
	43449
	0

∴ the square root of 9653449

√9653449 = 3107

(xi) 1745041

By using long division method

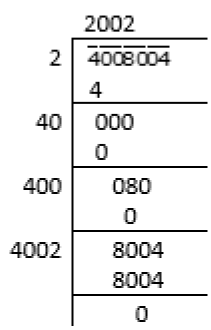


∴ the square root of 1745041

√1745041 = 1321

(xii) 4008004

By using long division method



∴ the square root of 4008004

√4008004 = 2002

(xiii) 20657025

By using long division method

	4545
4	20657025
	16
85	465
	425
904	4070
	3616
9085	45425
	45425
	0

∴ the square root of 20657025

√20657025 = 4545

(xiv) 152547201

By using long division method

	12351
1	152547201
	1
22	52
	44
243	854
	729
2465	12572
	12325
27701	24701
	24701
	0

∴ the square root of 152547201

√152547201 = 12351

(xv) 20421361

By using long division method

	4519
4	20421361
	16
85	442
	425
901	1713
	901
9029	81261
	81261
	0

∴ the square root of 20421361

√20421361 = 4519

(xvi) 62504836

By using long division method

	7906
7	62504836
	49
149	1350
	1341
1580	948
15806	94836
	94836
	0

∴ the square root of 62504836

√62504836 = 7906

(xvii) 82264900

By using long division method

	9070
9	82264900
	81
180	126
1807	12649
	12649
14140	00
	0
	×

∴ the square root of 82264900

√82264900 = 9070

(xviii) 3226694416

By using long division method

	56804
5	3226694416
	25
106	726
	636
1128	9069
	9024
11360	4544
	0
113604	454416
	454416
	×

∴ the square root of 3226694416

√3226694416 = 56804

(xix) 6407522209

By using long division method

	80047
8	$\overline{64}\,\overline{07}\,\overline{52}\,\overline{22}\,\overline{09}$
	64
160	07
	0
1600	752
	00
16004	75222
	64016
160087	1120609
	1120609
	×

∴ the square root of 6407522209

√6407522209 = 80047

(xx) 3915380329

By using long division method

	62573
6	$\overline{39}\,\overline{15}\,\overline{38}\,\overline{03}\,\overline{29}$
	36
122	315
	244
1245	07138
	6225
12507	91303
	87549
125143	0375429
	375429
	×

∴ the square root of 3915380329

√3915380329 = 62573

2. Find the least number which must be subtracted from the following numbers to make them a perfect square:

(i) 2361

(ii) 194491

(iii) 26535

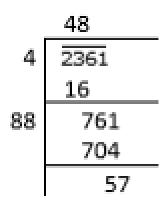
(iv) 161605

(v) 4401624

Solution:

(i) 2361

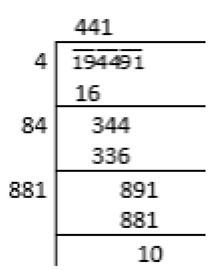
By using long division method



∴ 57 has to be subtracted from 2361 to get a perfect square.

(ii) 194491

By using long division method



∴ 10 has to be subtracted from 194491 to get a perfect square.

(iii) 26535

By using long division method

	162
1	$\overline{2}\,\overline{65}\,\overline{35}$
	1
26	165
	156
322	935
	644
	291

∴ 291 has to be subtracted from 26535 to get a perfect square.

(iv) 161605

By using long division method

	402
9	$\overline{16}\,\overline{16}\,\overline{05}$
	16
802	1605
	1604
	1

∴ 1 has to be subtracted from 161605 to get a perfect square.

(v) 4401624

By using long division method

	2098
2	$\overline{44}\,\overline{01}\,\overline{62}\,\overline{4}$
	4
40	40
	0
409	4016
	3681
4188	33524
	33504
	20

∴ 20 has to be subtracted from 4401624 to get a perfect square.

3. Find the least number which must be added to the following numbers to make them a perfect square:

(i) 5607

(ii)4931

(iii) 4515600

(iv) 37460

(v) 506900

Solution:

(i) 5607

By using long division method

	74
7	$\overline{56}\,\overline{07}$
	49
144	707
	576
	131

The remainder is 131

Since, $(74)^2 < 5607$

https://www.indcareer.com/schools/rd-sharma-solutions-for-class-8-maths-chapter-3-squares-and-square-roots/

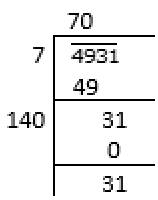
We take, the next perfect square number i.e., $(75)^2$

$(75)^2 = 5625 > 5607$

So, the number to be added = 5625 – 5607 = 18

(ii) 4931

By using long division method



The remainder is 31

Since, $(70)^2 < 4931$

We take, the next perfect square number i.e., $(71)^2$

$(71)^2 = 5041 > 4931$

So, the number to be added = 5041 – 4931 = 110

(iii) 4515600

By using long division method

	2124
2	$\overline{4}\,\overline{51}\,\overline{56}\,\overline{00}$
	4
41	51
	41
422	1056
	844
4244	21200
	16976
	4224

The remainder is 4224

Since, $(2124)^2 < 4515600$

We take, the next perfect square number i.e., $(2125)^2$

$(2125)^2 = 4515625 > 4515600$

So, the number to be added = 4515625 – 4515600 = 25

(iv) 37460

By using long division method

	193
1	$\overline{3}\,\overline{74}\,\overline{60}$
	1
29	274
	261
383	1360
	1149
	211

The remainder is 211

Since, $(193)^2 < 37460$

We take, the next perfect square number i.e., $(194)^2$

$(194)^2 = 37636 > 37460$

So, the number to be added = 37636 – 37460 = 176

(v) 506900

By using long division method

	711
7	$\overline{50}\,\overline{69}\,\overline{00}$
	49
141	169
	141
1421	2800
	1421
	1379

The remainder is 1379

Since, $(711)^2 < 506900$

We take, the next perfect square number i.e., $(712)^2$

$(712)^2 = 506944 > 506900$

So, the number to be added = 506944 – 506900 = 44

4. Find the greatest number of 5 digits which is a perfect square.

Solution:

We know that the greatest 5 digit number is 99999

By using long division method

	316
3	$\overline{9}\,\overline{99}\,\overline{99}$
	9
61	99
	61
626	3899
	3766
	143

The remainder is 143

So, the greatest 5 digit perfect square number is:

99999 – 143 = 99856

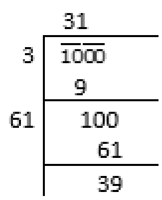
∴ 99856 is the required greatest 5 digit perfect square number.

5. Find the least number of 4 digits which is a perfect square.

Solution:

We know that the least 4 digit number is 1000

By using long division method



The remainder is 39

Since, $(31)^2 < 1000$

We take, the next perfect square number i.e., $(32)^2$

$(32)^2 = 1024 > 1000$

∴ 1024 is the required least number 4 digit number which is a perfect square.

6. Find the least number of six digits which is a perfect square.

Solution:

We know that the least 6 digit number is 100000

By using long division method

	316
3	$\overline{10}\,\overline{00}\,\overline{00}$
	9
61	100
	61
626	3900
	3756
	144

The remainder is 144

Since, $(316)^2 < 100000$

We take, the next perfect square number i.e., $(317)^2$

$(317)^2 = 100489 > 100000$

∴ 100489 is the required least number 6 digit number which is a perfect square.

7. Find the greatest number of 4 digits which is a perfect square.

Solution:

We know that the greatest 4 digit number is 9999

By using long division method

	91
9	$\overline{99}\,\overline{99}$
	81
89	1899
	1701
	198

The remainder is 198

So, the greatest 4 digit perfect square number is:

9999 – 198 = 9801

∴ 9801 is the required greatest 4 digit perfect square number.

8. A General arranges his soldiers in rows to form a perfect square. He finds that in doing so, 60 soldiers are left out. If the total number of soldiers be 8160, find the number of soldiers in each row

Solution:

We know that the total number of soldiers = 8160

Number of soldiers left out = 60

Number of soldiers arranged in rows to form a perfect square = 8160 – 60 = 8100

∴ number of soldiers in each row = √8100

= √ (9×9×10×10)

= 9×10

= 90

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

Solution:

We know that the area of square field = 60025 m^2

Speed of cyclist = 18 km/h

= 18 × (1000/60×60)

= 5 m/s^2

Area = 60025 m^2

Side^2 = 60025

Side = √60025

= 245

We know, Total length of boundary = 4 × Side

= 4 × 245

= 980 m

∴ Time taken to return to the starting point = 980/5

= 196 seconds

= 3 minutes 16 seconds

10. The cost of levelling and turning a square lawn at Rs 2.50 per m^2 is Rs13322.50 Find the cost of fencing it at Rs 5 per metre.

Solution:

We know that the cost of levelling and turning a square lawn = 2.50 per m^2

Total cost of levelling and turning = Rs. 13322.50

Total area of square lawn = 13322.50/2.50

= 5329 m^2

$Side^2$ = 5329

Side of square lawn = √5329

= 73 m

So, total length of lawn = 4 × 73

= 292 m

∴ Cost of fencing the lawn at Rs 5 per metre = 292 × 5

= Rs. 1460

11. Find the greatest number of three digits which is a perfect square.

Solution:

We know that the greatest 3 digit number is 999

By using long division method

	31
3	$\overline{9}\,\overline{99}$
	9
61	99
	61
	38

The remainder is 38

So, the greatest 3 digit perfect square number is:

999 – 38 = 961

∴ 961 is the required greatest 3 digit perfect square number.

12. Find the smallest number which must be added to 2300 so that it becomes a perfect square.

Solution:

By using long division method let's find the square root of 2300

	47
4	$\overline{23}\,\overline{00}$
	16
87	700
	700
	91

The remainder is 91

Since, $(47)^2 < 2300$

We take, the next perfect square number i.e., $(48)^2$

$(48)^2 = 2304 > 2300$

∴ The smallest number required to be added to 2300 to get a perfect square is

2304 – 2300 = 4

EXERCISE 3.6 PAGE NO: 3.48

https://www.indcareer.com/schools/rd-sharma-solutions-for-class-8-maths-chapter-3-squares-and-square-roots/

1. Find the square root of:

(i) 441/961

(ii) 324/841

(iii) 4 29/29

(iv) 2 14/25

(v) 2 137/196

(vi) 23 26/121

(vii) 25 544/729

(viii) 75 46/49

(ix) 3 942/2209

(x) 3 334/3025

(xi) 21 2797/3364

(xii) 38 11/25

(xiii) 23 394/729

(xiv) 21 51/169

(xv) 10 151/225

Solution:

(i) 441/961

The square root of

$\sqrt{441/961} = 21/31$

(ii) 324/841

The square root of

√324/841= 18/29

(iii) 4 29/29

The square root of

√(4 29/29) = √(225/49) = 15/7

(iv) 2 14/25

The square root of

√(2 14/25) = √(64/25) = 8/5

(v) 2 137/196

The square root of

√2 137/196 = √ (529/196) = 23/14

(vi) 23 26/121

The square root of

√(23 26/121) = √(2809/121) = 53/11

(vii) 25 544/729

The square root of

√(25 544/729) = √(18769/729) = 137/27

(viii) 75 46/49

The square root of

√(75 46/49) = √(3721/49) = 61/7

(ix) 3 942/2209

The square root of

√(3 942/2209) = √(7569/2209) = 87/47

(x) 3 334/3025

The square root of

$\sqrt{(3\ 334/3025)} = \sqrt{(9409/3025)} = 97/55$

(xi) 21 2797/3364

The square root of

$\sqrt{(21\ 2797/3364)} = \sqrt{(73441/3364)} = 271/58$

(xii) 38 11/25

The square root of

$\sqrt{(38\ 11/25)} = \sqrt{(961/25)} = 31/5$

(xiii) 23 394/729

The square root of

$\sqrt{(23\ 394/729)} = \sqrt{(17161/729)} = 131/27 = 4\ 23/27$

(xiv) 21 51/169

The square root of

$\sqrt{(21\ 51/169)} = \sqrt{(3600/169)} = 60/13 = 4\ 8/13$

(xv) 10 151/225

The square root of

$\sqrt{(10\ 151/225)} = \sqrt{(2401/225)} = 49/15 = 3\ 4/15$

2. Find the value of:

(i) $\sqrt{80}/\sqrt{405}$

(ii) $\sqrt{441}/\sqrt{625}$

(iii) $\sqrt{1587}/\sqrt{1728}$

(iv) $\sqrt{72} \times \sqrt{338}$

(v) $\sqrt{45} \times \sqrt{20}$

Solution:

(i) $\sqrt{80}/\sqrt{405}$

$\sqrt{80}/\sqrt{405} = \sqrt{16}/\sqrt{81} = 4/9$

(ii) $\sqrt{441}/\sqrt{625}$

$\sqrt{441}/\sqrt{625} = 21/25$

(iii) $\sqrt{1587}/\sqrt{1728}$

$\sqrt{1587}/\sqrt{1728} = \sqrt{529}/\sqrt{576} = 23/24$

(iv) $\sqrt{72} \times \sqrt{338}$

$\sqrt{72} \times \sqrt{338} = \sqrt{(2\times2\times2\times3\times3)} \times \sqrt{(2\times13\times13)}$

By using the formula $\sqrt{a} \times \sqrt{b} = \sqrt{(a\times b)}$

$= \sqrt{(2\times2\times2\times3\times3\times2\times13\times13)}$

$= 2^2 \times 3 \times 13$

$= 156$

(v) $\sqrt{45} \times \sqrt{20}$

$\sqrt{45} \times \sqrt{20} = \sqrt{(5\times3\times3)} \times \sqrt{(5\times2\times2)}$

By using the formula $\sqrt{a} \times \sqrt{b} = \sqrt{(a\times b)}$

$= \sqrt{(5\times3\times3\times5\times2\times2)}$

$= 5 \times 3 \times 2$

$= 30$

3. The area of a square field is 80 244/729 square metres. Find the length of each side of the field.

Solution:

We know that the given area = 80 244/729 m^2

= 58564/729 m^2

If L is length of each side

L^2 = 58564/729

L = √ (58564/729) = √58564/√729

= 242/27

= 8 26/27

∴ Length is 8 26/27

4. The area of a square field is 30 1/4m^2. Calculate the length of the side of the square.

Solution:

We know that the given area = 30 1/4 m^2

= 121/4 m^2

If L is length of each side then,

L^2 = 121/4

L = √(121/4) = √121/√4

= 11/2

∴ Length is 11/2

5. Find the length of a side of a square playground whose area is equal to the area of a rectangular field of dimensions 72m and 338 m.

Solution:

By using the formula

Area of rectangular field = l × b

$= 72 \times 338\ m^2$

$= 24336\ m^2$

Area of square, $L^2 = 24336\ m^2$

$L = \sqrt{24336}$

$= 156$ m

∴ Length of side of square playground is 156 m.

EXERCISE 3.7 PAGE NO: 3.52

Find the square root of the following numbers in decimal form:

1. 84.8241

Solution:

By using long division method

	9.21
9	$\overline{84}.\overline{82}\,\overline{41}$
	81
182	382
	364
1841	1841
	1841
	0

∴ the square root of 84.8241

$\sqrt{84.8241} = 9.21$

2. 0.7225

Solution:

By using long division method

https://www.indcareer.com/schools/rd-sharma-solutions-for-class-8-maths-chapter-3-squares-and-square-roots/

	0.85
0	0.$\overline{72}\,\overline{25}$
	0
8	72
	64
165	825
	825
	0

∴ the square root of 0.7225

√0.7225 = 0.85

3. 0.813604

Solution:

By using long division method

	0.902
0	0.$\overline{81}\,\overline{36}\,\overline{04}$
	0
9	81
	81
180	36
	0
1802	3604
	3604
	0

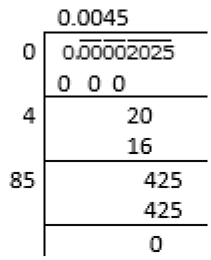
∴ the square root of 0.813604

√0.813604 = 0.902

4. 0.00002025

Solution:

By using long division method



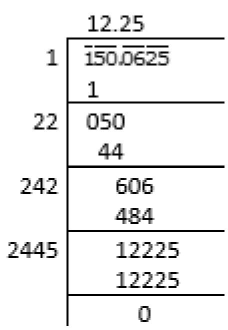
∴ the square root of 0.00002025

√0.00002025 = 0.0045

5. 150.0625

Solution:

By using long division method



∴ the square root of 150.0625

√150.0625 = 12.25

6. 225.6004

Solution:

By using long division method

	15.02
1	$\overline{2}\,\overline{25}.\overline{60}\,\overline{04}$
	1
25	125
	125
300	060
	0
3002	6004
	6004
	0

∴ the square root of 225.6004

√225.6004 = 15.02

7. 3600.720036

Solution:

By using long division method

	60.006
6	$\overline{36}\,\overline{00}.\overline{72}\,\overline{00}\,\overline{36}$
	36
120	000
	0
1200	7200
	0000
12006	720036
	720036
	0

∴ the square root of 3600.720036

√3600.720036 = 60.006

8. 236.144689

Solution:

By using long division method

	15.367
1	236.144689
	1
25	136
	125
303	1114
	909
3066	20546
	18396
30727	215089
	215089
	0

∴ the square root of 236.144689

√236.144689 = 15.367

9. 0.00059049

Solution:

By using long division method

	0.0243
0	0.00059049
	0
0	0
	0
2	05
	4
44	190
	176
483	1449
	1449
	0

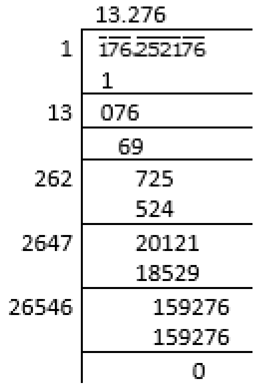
∴ the square root of 0.00059049

√0.00059049 = 0.0243

10. 176.252176

Solution:

By using long division method



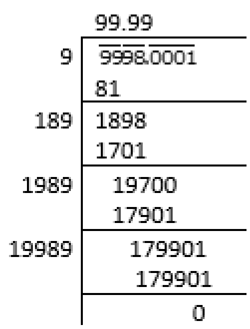
∴ the square root of 176.252176

√176.252176 = 13.276

11. 9998.0001

Solution:

By using long division method



∴ the square root of 9998.0001

√9998.0001 = 99.99

12. 0.00038809

Solution:

By using long division method

	0.0197
0	0.00038809
	0
0	000
	0
1	03
	1
29	288
	261
387	2709
	2709
	0

∴ the square root of 0.00038809

√0.00038809 = 0.0197

13. What is that fraction which when multiplied by itself gives 227.798649?

Solution:

Let us consider a number a

Where, a = √227.798649

= 15.093

By using long division method let us verify

	15.093
1	227.798649
	1
25	127
	125
300	279
	0
3009	27986
	27081
30183	90549
	90549
	0

∴ 15.093 is the fraction which when multiplied by itself gives 227.798649.

14. The area of a square playground is 256.6404 square meter. Find the length of one side of the playground.

Solution:

We know that the given area of a square playground = 256.6404

i.e., $L^2 = 256.6404\ m^2$

$L = \sqrt{256.6404}$

= 16.02m

By using long division method let us verify

	16.02
1	$\overline{2}\,\overline{56}.\overline{64}\,\overline{04}$
	1
26	156
	156
320	064
	0
3202	6404
	6404
	0

∴ length of one side of the playground is 16.02m.

15. What is the fraction which when multiplied by itself gives 0.00053361?

Solution:

Let us consider a number a

Where, $a = \sqrt{0.00053361}$

= 0.0231

By using long division method let us verify

https://www.indcareer.com/schools/rd-sharma-solutions-for-class-8-maths-chapter-3-squares-and-square-roots/

	0.0231
0	$\overline{0.00}\,\overline{05}\,\overline{33}\,\overline{61}$
	0
0	000
	0
2	005
	4
43	133
	129
461	461
	461
	0

∴ 0.0231 is the fraction which when multiplied by itself gives 0.00053361.

16. Simplify:

(i) (√59.29 – √5.29)/ (√59.29 + √5.29)

(ii) (√0.2304 + √0.1764)/ (√0.2304 – √0.1764)

Solution:

(i) (√59.29 – √5.29)/ (√59.29 + √5.29)

Firstly let us find the square root √59.29 and √5.29

√59.29 = √5929/ √100

= 77/10

= 7.7

√5.29 = √5.29/ √100

= 23/10

= 2.3

So, (7.7 – 2.3)/ (7.7 + 2.3)

= 54/10

= 0.54

(ii) (√0.2304 + √0.1764)/ (√0.2304 – √0.1764)

Firstly let us find the square root √0.2304 and √0.1764

√0.2304 = √2304/ √10000

= 48/100

= 0.48

√0.1764 = √1764/ √10000

= 42/100

= 0.42

So, (0.48 + 0.42)/ (0.48 – 0.42)

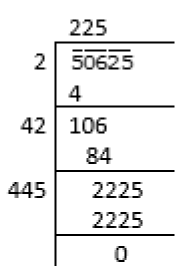
= 0.9/0.06

= 15

17. Evaluate √50625 and hence find the value of √506.25 + √5.0625

Solution:

By using long division method let us find the √50625



So now, √506.25 **=** √50625/ √100

= 225/10

= 22.5

√5.0625 = √50625/ √10000

= 225/100

= 2.25

So equating in the above equation we get,

√506.25 + √5.0625 = 22.5 + 2.25

= 24.75

18. Find the value of √103.0225 and hence find the value of

(i) √10302.25

(ii) √1.030225

Solution:

By using long division method let us find the

√103.0225 = √(1030225/10000) = √1030225/√10000

	1015
1	$\overline{1}\ \overline{03}\ \overline{02}\ \overline{25}$
	1
201	0302
	201
2025	10125
	10125
	0

So now, (i)√10302.25 **=** √(1030225/ 100)

= 1015/ 10

= 101.5

(ii)√1.030225 = √1030225/ √1000000

= 1015/1000

= 1.015

EXERCISE 3.8 PAGE NO: 3.56

1. Find the square root of each of the following correct to three places of decimal.

(i) 5 (ii) 7

(iii) 17 (iv) 20

(v) 66 (vi) 427

(vii) 1.7 (viii) 23.1

(ix) 2.5 (x) 237.615

(xi) 15.3215 (xii) 0.9

(xiii) 0.1 (xiv) 0.016

(xv) 0.00064 (xvi) 0.019

(xvii) 7/8 (xviii) 5/12

(xix) 2 1/2 (xx) 287 5/8

Solution:

(i) 5

By using long division method

	2.2360
2	$\overline{5}.\overline{00}\,\overline{00}\,\overline{00}$
	4
42	100
	84
443	1600
	1329
4466	27100
	26796
44720	30400

https://www.indcareer.com/schools/rd-sharma-solutions-for-class-8-maths-chapter-3-squares-and-square-roots/

∴ the square root of 5 is 2.236

(ii) 7

By using long division method

	2.6457
2	7.000000
	4
46	300
	276
524	2400
	2096
5285	30400
	26425
52927	397500
	370489
	27011

∴ the square root of 7 is 2.646

(iii) 17

By using long division method

	4.123
4	17.000000
	16
81	1.00
	81
822	1900
	1644
8243	25600
	24729
82431	87100
	82431
	4669

∴ the square root of 17 is 4.123

(iv) 20

By using long division method

	4.4721
4	$\overline{20}.\overline{00}\,\overline{00}\,\overline{00}$
	16
84	400
	336
887	6400
	6209
8942	19100
	17884
89441	121600
	89441
	32159

∴ the square root of 20 is 4.472

(v) 66

By using long division method

	8.1240
8	$\overline{66}.\overline{00}\,\overline{00}\,\overline{00}$
	64
161	200
	161
1622	3900
	3244
16244	65600
	64976
162480	62400

∴ the square root of 66 is 8.124

(vi) 427

By using long division method

	20.6639
2	$\overline{4}\,\overline{27}.\overline{00}\,\overline{00}\,\overline{00}$
	4
40	027
	0
406	2700
	2436
4126	26400
	24756
41323	164400
	123969
413269	4043100
	3719421
	323679

∴ the square root of 427 is 20.664

(vii) 1.7

By using long division method

	1.3038
1	$\overline{1}.\overline{70}\,\overline{00}\,\overline{00}$
	1
23	0.70
	69
260	100
	0
2603	10000
	7809
26068	219100
	208544
	10556

∴ the square root of 1.7 is 1.304

(viii) 23.1

By using long division method

	4.8062
4	23100000
	16
88	710
	704
960	600
	0
9606	60000
	57636
96122	236400
	192244
	44156

∴ the square root of 23.1 is 4.806

(ix) 2.5

By using long division method

	1.5811
1	2.500000
	1
25	150
	125
308	2500
	2464
3161	3600
	3161
31621	43900
	31621
	2279

∴ the square root of 2.5 is 1.581

(x) 237.615

By using long division method

	15.4147
1	237.615000
	1
25	137
	125
304	1261
	1216
3081	4550
	3081
30824	146900
	123296
308287	2360400
	2158009
	202391

∴ the square root of 237.615 is 15.415

(xi) 15.3215

By using long division method

	3.9142
3	15.321500
	9
69	632
	621
781	1115
	781
7824	33400
	31296
78282	210400
	156564
	53836

∴ the square root of 15.3215 is 3.914

(xii) 0.9

By using long division method

	0.9486
0	0.900000
	0
9	090
	81
184	900
	736
1888	16400
	15104
18966	129600
	113796
	15804

∴ the square root of 0.9 is 0.949

(xiii) 0.1

By using long division method

	0.3162
0	0.100000
	0
3	10
	9
61	100
	61
626	3900
	3756
6322	14400
	12644
	1756

∴ the square root of 0.1 is 0.316

(xiv) 0.016

By using long division method

	0.1264
0	0.016000
	0
1	001
	1
22	060
	44
246	1600
	1476
2524	12400
	10096
	2304

∴ the square root of 0.016 is 0.126

(xv) 0.00064

By using long division method

	0.0252
0	0.000640
	0
0	0.00
	0
2	006
	4
45	240
	225
502	1500
	1004
	496

∴ the square root of 0.00064 is 0.025

(xvi) 0.019

By using long division method

	0.1378
0	$0.\overline{01}\,\overline{90}\,\overline{00}$
	0
1	01
	1
23	090
	69
267	2100
	1869
2748	23100
	21984
	1116

∴ the square root of 0.019 is 0.138

(xvii) 7/8

By using long division method

	0.9354
0	$0.\overline{87}\,\overline{50}\,\overline{00}$
	0
9	087
	81
183	650
	549
1865	10100
	9325
18704	77500
	74816
	2684

∴ the square root of 7/8 is 0.935

(xviii) 5/12

By using long division method

	0.6454
0	0.416666
	0
6	41
	36
124	566
	496
1285	7066
	6245
12904	64100
	51616
	12484

∴ the square root of 5/12 is 0.645

(xix) 2 1/2

By using long division method

	1.5811
1	2.500000
	1
25	150
	125
308	2500
	2464
3161	3600
	3161
31621	43900
	31621
	12279

∴ the square root of 5/2 is 1.581

(xx) 287 5/8

By using long division method

	16.9593
1	287.62
	1
26	187
	156
329	3162
	2961
3385	20100
	16925
33909	317500
	305181
339183	1231900
	1017549
	214351

∴ the square root of 2301/8 is 16.960

2. Find the square root of 12.0068 correct to four decimal places.

Solution:

By using long division method

	3.46508
3	12.00.68
	9
64	300
	256
686	4468
	4116
6925	35200
	34625
693008	5750000
	5544064
	205936

∴ the square root of 12.0068 is 3.4651

3. Find the square root of 11 correct to five decimal places.

Solution:

By using long division method

	3.316624
3	11.000000
	9
63	200
	189
661	1100
	661
6626	43900
	39756
66326	414400
	398196
663322	1620400
	1327444
6633244	29295600
	26532976
	2762624

∴ the square root of 11 is 3.31662

4. Give that: √2 = 1.414, √3 = 1.732, √5 = 2.236 and √7 = 2.646, evaluate each of the following:

(i) √ **(144/7)**

(ii) √ **(2500/3)**

Solution:

(i) √ (144/7)

Now let us simplify the given equation

√ (144/7) = √ (12×12)/ √7

= 12/ 2.646

= 4.535

(ii) √ (2500/3)

Now let us simplify the given equation

√ (2500/3) = √ (5×5×10×10) /√3

= 5×10/ 1.732

= 50/1.732

= 28.867

5. Given that √2 = 1.414, √3 = 1.732, √5 = 2.236 and √7 = 2.646 find the square roots of the following:

(i) 196/75

(ii) 400/63

(iii) 150/7

(iv) 256/5

(v) 27/50

Solution:

(i) 196/75

Let us find the square root for196/75

√(196/75) = √(196)/ √ (75)

= √(14×14)/ √ (5×5×3)

= 14/ (5√3)

= 14/ (5×1.732)

= 14/8.66

= 1.617

(ii) 400/63

Let us find the square root for400/63

√(400/63) = √(400)/ √ (63)

$= \sqrt{(20\times20)}/ \sqrt{(3\times3\times7)}$

$= 20/ (3\sqrt{7})$

$= 20/ (3\times2.646)$

$= 20/7.938$

$= 2.520$

(iii) 150/7

Let us find the square root for150/7

$\sqrt{(150/7)} = \sqrt{(150)}/ \sqrt{(7)}$

$= \sqrt{(3\times5\times5\times2)}/ \sqrt{(7)}$

$= (5\sqrt{3}\times\sqrt{2})/ (\sqrt{7})$

$= 5\times1.732\times1.414/ (2.646)$

$= 12.245/2.646$

$= 4.628$

(iv) 256/5

Let us find the square root for256/5

$\sqrt{(256/5)} = \sqrt{(256)}/ \sqrt{(5)}$

$= \sqrt{(16\times16)}/ \sqrt{(5)}$

$= 16/ (\sqrt{5})$

$= 16/2.236$

$= 7.155$

(v) 27/50

Let us find the square root for27/50

√(27/50) = √(27)/ √ (50)

= √(3×3×3)/ √ (5×5×2)

= (3√3)/ (5√2)

= (3×1.732)/ (5×1.414)

= 5.196/7.07

= 0.735

EXERCISE 3.9 PAGE NO: 3.61

Square Root Table

Number	**Square Root(√)**	**Number**	**Square Root(√)**	**Number**	**Square Root(√)**	**Number**	**Square Root(√)**	**Number**	**Square Root(√)**
1	1	21	4.583	41	6.403	61	7.81	81	9
2	1.414	22	4.69	42	6.481	62	7.874	82	9.055
3	1.732	23	4.796	43	6.557	63	7.937	83	9.11
4	2	24	4.899	44	6.633	64	8	84	9.165
5	2.236	25	5	45	6.708	65	8.062	85	9.22
6	2.449	26	5.099	46	6.782	66	8.124	86	9.274
7	2.646	27	5.196	47	6.856	67	8.185	87	9.327
8	2.828	28	5.292	48	6.928	68	8.246	88	9.381
9	3	29	5.385	49	7	69	8.307	89	9.434

10	3.162	30	5.477	50	7.071	70	8.367	90	9.487
11	3.317	31	5.568	51	7.141	71	8.426	91	9.539
12	3.464	32	5.657	52	7.211	72	8.485	92	9.592
13	3.606	33	5.745	53	7.28	73	8.544	93	9.644
14	3.742	34	5.831	54	7.348	74	8.602	94	9.695
15	3.873	35	5.916	55	7.416	75	8.66	95	9.747
16	4	36	6	56	7.483	76	8.718	96	9.798
17	4.123	37	6.083	57	7.55	77	8.775	97	9.849
18	4.243	28	6.164	58	7.616	78	8.832	98	9.899
19	4.359	29	6.245	59	7.681	79	8.888	99	9.95
20	4.472	40	6.325	60	7.746	80	8.944	100	10

Using square root table, find the square roots of the following:

1. 7

Solution:

From square root table we know,

Square root of 7 is:

$\sqrt{7} = 2.645$

∴ The square root of 7 is 2.645

2. 15

Solution:

We know that,

15 = 3 x 5

So, $\sqrt{15} = \sqrt{3} \times \sqrt{5}$

From square root table we know,

Square root of 3 and 5 are:

$\sqrt{3} = 1.732$ and $\sqrt{5} = 2.236$

$\Rightarrow \sqrt{15} = 1.732 \times 2.236 = 3.873$

∴ The square root of 15 is 3.873

3. 74

Solution:

We know that,

$74 = 2 \times 37$

So, $\sqrt{74} = \sqrt{2} \times \sqrt{37}$

From square root table we know,

Square root of 2 and 37 are:

$\sqrt{2} = 1.414$ and $\sqrt{37} = 6.083$

$\Rightarrow \sqrt{74} = 1.414 \times 6.083 = 8.602$

∴ The square root of 74 is 8.602

4. 82

Solution:

We know that,

$82 = 2 \times 41$

So, $\sqrt{82} = \sqrt{2} \times \sqrt{41}$

From square root table we know,

Square root of 2 and 41 are:

$\sqrt{2} = 1.414$ and $\sqrt{41} = 6.403$

$\Rightarrow \sqrt{82} = 1.414 \times 6.403 = 9.055$

$\therefore$ The square root of 82 is 9.055

5. 198

Solution:

We know that,

$198 = 2 \times 9 \times 11$

So, $\sqrt{198} = \sqrt{2} \times \sqrt{9} \times \sqrt{11}$

From square root table we know,

Square root of 2, 9 and 11 are:

$\sqrt{2} = 1.414$, $\sqrt{9} = 3$ and $\sqrt{11} = 3.317$

$\Rightarrow \sqrt{198} = 1.414 \times 3 \times 3.317 = 14.071$

$\therefore$ The square root of 198 is 14.071

6. 540

Solution:

We know that,

$540 = 6 \times 9 \times 10$

So, $\sqrt{540} = \sqrt{6} \times \sqrt{9} \times \sqrt{10}$

From square root table we know,

Square root of 6, 9 and 10 are:

$\sqrt{6} = 2.449$, $\sqrt{9} = 3$ and $\sqrt{10} = 3.162$

⇒ √540 = 2.449 x 3 x 3.162 = 23.24

∴ The square root of 540 is 23.24

7. 8700

Solution:

We know that,

8700 = 87 x 100

So, √8700 = √87 x √100

From square root table we know,

Square root of 87 and 100 are:

√8700 = 9.327 and √100 = 10

⇒ √8700 = 9.327 x 10 = 93.27

∴ The square root of 8700 is 93.27

8. 3509

Solution:

We know that,

3509 = 121 x 29

So, √3509 = √121 x √29

From square root table we know,

Square root of 121 and 29 are:

√121 = 11 and √29 = 5.385

⇒ √3509 = 11 x 10 = 5.385

∴ The square root of 3509 is 59.235

9. 6929

Solution:

We know that,

6929 = 169 x 41

So, √6929 = √169 x √41

From square root table we know,

Square root of 169 and 41 are:

√169 = 13 and √41 = 6.403

⇒ √6929 = 13 x 6.403 = 83.239

∴ The square root of 6929 is 83.239

10. 25725

Solution:

We know that,

25725 = 3 x 7 x 25 x 49

So, √25725 = √3 x √7 x √25 x √49

From square root table we know,

Square root of 3, 7, 25 and 49 are:

√3 = 1.732, √7 = 2.646, √25 = 5 and √49 = 7

⇒ √25725 = 1.732 x 2.646 x 5 x 7 = 160.41

∴ The square root of 25725 is 160.41

11. 1312.

Solution:

We know that,

$1312 = 2 \times 16 \times 41$

So, $\sqrt{1312} = \sqrt{2} \times \sqrt{16} \times \sqrt{41}$

From square root table we know,

Square root of 2, 16 and 41 are:

$\sqrt{2} = 1.414$, $\sqrt{16} = 4$ and $\sqrt{41} = 6.403$

$\Rightarrow \sqrt{1312} = 1.414 \times 4 \times 6.403 = 36.22$

$\therefore$ The square root of 1312 is 36.22

12. 4192

Solution:

We know that,

$4192 = 2 \times 16 \times 131$

So, $\sqrt{4192} = \sqrt{2} \times \sqrt{16} \times \sqrt{131}$

From square root table we know,

Square root of 2 and16 are:

$\sqrt{2} = 1.414$ and $\sqrt{16} = 4$

The square root of 131 is not listed in the table

Thus, let's apply long division to find it

	1	1	.4	4	5
1	1	31	.00	00	00
	1				
21		31			
		21			
224		10	00		
		8	96		
2284		1	04	00	
			91	36	
22885			12	64	00
			11	44	25
22890			1	19	75

So, square root of 131 is 11.445

Now,

⇒ √4192 = 1.414 x 4 x 11.445 = 64.75

∴ The square root of 4192 is 64.75

13. 4955

Solution:

We know that,

4955 = 5 x 991

So, √4955 = √5 x √991

From square root table we know,

Square root of 5 is:

√5 = 2.236

The square root of 991 is not listed in the table

Thus, let's apply long division to find it

	3 1 .4 8 0
3	$\overline{9}$ $\overline{91}$.$\overline{00}$ $\overline{00}$ $\overline{00}$
	9
61	91
	61
624	30 00
	24 96
6288	5 04 00
	5 03 04
62960	96 00
	0
62960	96 00

So, square root of 991 is 31.480

Now,

⇒ √4955 = 2.236 x 31.480 = 70.39

∴ The square root of 4955 is 70.39

14. 99/144

Solution:

https://www.indcareer.com/schools/rd-sharma-solutions-for-class-8-maths-chapter-3-squares-and-square-roots/

We know that,

99/144 = (9 x 11) / (12 x 12)

So, √(99/144) = √[(9 x 11) x (12 x 12)]

= 3/12 x √11

From square root table we know,

Square root of 11 is:

√11 = 3.317

⇒ √(99/144) = 3/12 x 3.317 = 3.317/4 = 0.829

∴ The square root of 99/144 is 0.829

15. 57/169

Solution:

We know that,

57/169 = (3 x 19) / (13 x 13)

So, √(57/169) = √[(3 x 19) x (13 x 13)]

= √3 x √19 x 1/13

From square root table we know,

Square root of 3 and 19 is:

√3 = 1.732 and √19 = 4.359

⇒ √(57/169) = 1.732 x 4.359 x 1/13 = 0.581

∴ The square root of 57/169 is 0.581

16. 101/169

Solution:

We know that,

101/169 = 101 / (13 x 13)

So, √(101/169) = √[101 / (13 x 13)]

= √101/13

From square root table we don't have the square root of 101

Thus, we have to manipulate the number such that we get the square root of a number less than 100

√101 = √(1.01 x 100)

= √1.01 x 10

Now, we have to find the square of 1.01

We know that,

√1 = 1 and √2 = 1.414 (From the square root table)

Their difference = 1.414 – 1 = 0.414

Hence, for a difference of 1 (2 – 1), the difference in the value of the square root is 0.414

So,

For the difference of 0.01, the difference in the value of the square roots will be

0.01 x 1.414 = 0.00414

∴√1.01 = 1 + 0.00414 = 1.00414

Then, √101 = 1.00414 x 10 = 10.0414

⇒ √(101/169) = √101/13 = 10.0414/13

∴ The square root of 101/169 is 0.773

17. 13.21

Solution:

We need to find √13.21

From square root table we know,

Square root of 13 and 14 are:

$\sqrt{13} = 3.606$ and $\sqrt{14} = 3.742$

Their difference = 3.742 – 3.606 = 0.136

Hence, for a difference of 1 (14 – 13), the difference in the value of the square root is 0.136

So,

For the difference of 0.21, the difference in the value of the square roots will be

0.136 x 0.21 = 0.0286

⇒ $\sqrt{13.21} = 3.606 + 0.0286 = 3.635$

∴ The square root of 13.21 is 3.635

18. 21.97

Solution:

We need to find √21.97

From square root table we know,

Square root of 21 and 22 are:

$\sqrt{21} = 4.583$ and $\sqrt{22} = 4.690$

Their difference = 4.690 – 4.583 = 0.107

Hence, for a difference of 1 (23 – 22), the difference in the value of the square root is 0.107

So,

For the difference of 0.97, the difference in the value of the square roots will be

0.107 x 0.97 = 0.104

⇒ $\sqrt{21.97} = 4.583 + 0.104 = 4.687$

∴ The square root of 21.97 is 4.687

19. 110

Solution:

We know that,

$110 = 11 \times 10$

So, $\sqrt{110} = \sqrt{11} \times \sqrt{10}$

From square root table we know,

Square root of 11 and 10 are:

$\sqrt{11} = 3.317$ and $\sqrt{10} = 3.162$

⇒ $\sqrt{110} = 3.317 \times 3.162 = 10.488$

∴ The square root of 110 is 10.488

20. 1110

Solution:

We know that,

$1110 = 37 \times 30$

So, $\sqrt{1110} = \sqrt{37} \times \sqrt{30}$

From square root table we know,

Square root of 37 and 30 are:

$\sqrt{37} = 6.083$ and $\sqrt{30} = 5.477$

⇒ $\sqrt{1110} = 6.083 \times 5.477 = 33.317$

∴ The square root of 1110 is 33.317

21. 11.11

Solution:

We need to find $\sqrt{11.11}$

From square root table we know,

Square root of 11 and 12 are:

$\sqrt{11} = 3.317$ and $\sqrt{12} = 3.464$

Their difference = 3.464 – 3.317 = 0.147

Hence, for a difference of 1 (12 – 11), the difference in the value of the square root is 0.147

So,

For the difference of 0.11, the difference in the value of the square roots will be

0.11 x 0.147 = 0.01617

$\Rightarrow \sqrt{11.11} = 3.317 + 0.0162 = 3.333$

∴ The square root of 11.11 is 3.333

22. The area of a square field is 325m^2. Find the approximate length of one side of the field.

Solution:

We know that the given area of the field = 325 m^2

To find the approximate length of the side of the field we will have to calculate the square root of 325

$\sqrt{325} = \sqrt{25} \times \sqrt{13}$

From the square root table, we know

$\sqrt{25} = 5$ and $\sqrt{13} = 3.606$

⇒ $\sqrt{325} = 5 \times 3.606 = 18.030$

∴ The approximate length of one side of the field is 18.030 m

23. Find the length of a side of a square, whose area is equal to the area of a rectangle with sides 240 m and 70 m.

Solution:

We know that from the question,

Area of square = Area of rectangle

$\text{Side}^2 = 240 \times 70$

$\text{Side} = \sqrt{(240 \times 70)}$

$= \sqrt{(10 \times 10 \times 2 \times 2 \times 2 \times 3 \times 7)}$

$= 20\sqrt{42}$

Now, from the square root table, we know $\sqrt{42} = 6.481$

$= 20 \times 6.48$

$= 129.60$ m

∴ The length of side of the square is 129.60 m

Chapterwise RD Sharma Solutions for Class 8 Maths :

- Chapter 1–Rational Numbers
- Chapter 2–Powers
- Chapter 3–Squares and Square Roots
- Chapter 4–Cubes and Cube Roots
- Chapter 5–Playing with Numbers
- Chapter 6–Algebraic Expressions and Identities
- Chapter 7–Factorization
- Chapter 8–Division of Algebraic Expressions
- Chapter 9–Linear Equation in One Variable
- Chapter 10–Direct and Inverse Variations
- Chapter 11–Time and Work
- Chapter 12–Percentage
- Chapter 13–Profit, Loss, Discount and Value Added Tax (VAT)
- Chapter 14–Compound Interest
- Chapter 15–Understanding Shapes- I (Polygons)

- Chapter 16–Understanding Shapes- II (Quadrilaterals)
- Chapter 17–Understanding Shapes- III (Special Types of Quadrilaterals)
- Chapter 18–Practical Geometry (Constructions)
- Chapter 19–Visualising Shapes
- Chapter 20–Mensuration - I (Area of a Trapezium and a Polygon)
- Chapter 21–Mensuration - II (Volumes and Surface Areas of a Cuboid and a cube)
- Chapter 22–Mensuration - III (Surface Area and Volume of a Right Circular Cylinder)
- Chapter 23–Data Handling - I (Classification and Tabulation of Data)
- Chapter 24–Data Handling - II (Graphical Representation of Data as Histogram)
- Chapter 25–Data Handling - III (Pictorial Representation of Data as Pie Charts or Circle Graphs)
- Chapter 26–Data Handling - IV (Probability)
- Chapter 27–Introduction to Graphs

About RD Sharma

RD Sharma i*sn't the kind of author you'd bump into at lit fests. But his bestselling books have helped many* CBSE *students lose their dread of* maths. *Sunday Times profiles the tutor turned internet star*

He dreams of algorithms that would give most people nightmares. And, spends every waking hour thinking of ways to explain concepts like 'series solution of linear differential equations'. Meet Dr Ravi Dutt Sharma — mathematics teacher and author of 25 reference books — whose name evokes as much awe as the subject he teaches. And though students have used his thick tomes for the last 31 years to ace the dreaded maths exam, it's only recently that a spoof video turned the tutor into a YouTube star.

R D Sharma had a good laugh but said he shared little with his on-screen persona except for the love for maths. "I like to spend all my time thinking and writing about maths problems. I find it relaxing," he says. When he is not writing books explaining mathematical concepts for classes 6 to 12 and engineering students, Sharma is busy dispensing his duty as vice-principal and head of department of science and humanities at Delhi government's Guru Nanak Dev Institute of Technology.