Squares and Square Roots

Exercise-24

Solution 1:

1. 5
   Square of 5
   = 5 × 5
   = 25
2. 10
   Square of 10
   = 10 × 10
   = 100
3. 16
   Square of 16
   = 16 × 16
   = 256
4. 25
   Square of 25
   = 25 × 25
   = 625
5. 110
   Square of 110
   = 110 × 110
   = 12,100

Exercise-25

Solution 1:

1. 6^2
   Square of six
   = 6 × 6
   = 36
2. 11^2
   Square of eleven
   = 11 × 11
   = 121
3. 14^2
   Square of fourteen
   = 14 × 14
   =196
4. 65^2
   Square of sixty-five

= 65 × 65
= 4225

5. 552
   Square of fifty-five
   = 55 × 55
   = 3025
6. 18^2
   Square of eighteen
   = 18 × 18
   = 324
7. 67^2
   Square of sixty-seven
   = 67 × 67
   = 4489
8. 109^2
   Square of one hundred and nine
   = 109 × 109
   =11,881
9. 121^2
   Square of one hundred and twenty-one
   = 121 × 121
   =14,641
10. 112^2
    Square of one hundred and twelve
    = 112 × 112
    =12,544
11. 91^2
    Square of ninety-one
    = 91 × 91
    = 8,281
12. 200^2
    Square of two hundred
    = 200 × 200
    = 40,000

Exercise-26

Solution 1:

1. 85
   The number formed by the digits in the number, other than 5 in the units place = 8
   The number following this number = 9
   The product of these two numbers = 8 × 9 = 72
   The number obtained by writing 25 in front of this number = 7225
   ∴ 85^2 = 7,225

2. 55
   The number formed by the digits in the number, other than 5 in the units place = 5
   The number following this number = 6
   The product of these two numbers = 5 × 6 = 30
   The number obtained by writing 25 in front of this number = 3025
   ∴ 55^2 = 3,025
3. 75
   The number formed by the digits in the number, other than 5 in the units place = 7
   The number following this number = 8
   The product of these two numbers = 7 × 8 = 56
   The number obtained by writing 25 in front of this number = 5625
   ∴ 75^2 = 5,625
4. 95
   The number formed by the digits in the number, other than 5 in the units place = 9
   The number following this number =10
   The product of these two numbers = 9 × 10 = 90
   The number obtained by writing 25 in front of this number = 9025
   ∴ 95^2 = 9,025
5. 115
   The number formed by the digits in the number,
   ther than 5 in the units place = 11
   The number following this number = 12
   The product of these two numbers = 11 × 12 = 132
   The number obtained by writing 25 in front of this number = 13225
   ∴ 115^2 = 13,225
6. 205
   The number formed by the digits in the number, other than 5 in the units place = 20
   The number following this number = 21
   The product of these two numbers = 20 × 21 = 420
   The number obtained by writing 25 in front of this number = 42025
   ∴ 205^2 = 42,025
7. 185
   The number formed by the digits in the number, other than 5 in the units place = 18
   The number following this number = 19
   The product of these two numbers = 18 ×1 9 = 342
   The number obtained by writing 25 in front of this number = 34225
   ∴ 185^2 = 34,225
8. 105
   The number formed by the digits in the number, other than 5 in the units place = 10
   The number following this number = 11
   The product of these two numbers = 10 × 11 = 110
   The number obtained by writing 25 in front of this number = 11025
   ∴ 105^2 = 11,025

Exercise-27

Solution 1(1):

$441 = 9 \times 49$ (441 is divisible by 9)

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

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

$= (3 \times 7)^2$

$= 21$

$\therefore 441 = 21^2$

Hence, $\sqrt{441} = 21$

Solution 1(2):

$576 = 4 \times 144$ (576 is divisible by 4)

$= 4 \times 9 \times 16$ (144 is divisible by 9)

$= 2 \times 2 \times 3 \times 3 \times 4 \times 4$

$= (2 \times 3 \times 4) \times (2 \times 3 \times 4)$

$= (2 \times 3 \times 4)^2$

$= (24)^2$

$\therefore 576 = (24)^2$

Hence, $\sqrt{576} = 24$

Solution 1(3):

$3025 = 5 \times 605$ (3025 is divisible by 5)

$= 5 \times 5 \times 121$ (605 is divisible by 5)

$= 5 \times 5 \times 11 \times 11$

$= (5 \times 11) \times (5 \times 11)$

$= (5 \times 11)^2$

$= (55)^2$

$\therefore 3025 = (55)^2$

Hence, $\sqrt{3025} = 55$

Solution 1(4):

$7744 = 4 \times 1936$ (7744 is divisible by 4)
$= 4 \times 4 \times 484$ (1936 is divisible by 4)
$= 4 \times 4 \times 4 \times 121$
$= 4 \times 4 \times 2 \times 2 \times 11 \times 11$
$= (4 \times 2 \times 11) \times (4 \times 2 \times 11)$
$= (4 \times 2 \times 11)^2$
$= (88)^2$

$\therefore 7744 = (88)^2$

Hence, $\sqrt{7744} = 88$

Solution 1(5):

$10404 = 4 \times 2601$ (10404 is divisible by 4)
$= 4 \times 9 \times 289$ (2601 is divisible by 9)
$= 2 \times 2 \times 3 \times 3 \times 17 \times 17$
$= (2 \times 3 \times 17) \times (2 \times 3 \times 17)$
$= (2 \times 3 \times 17)^2$
$= (102)^2$

$\therefore 10404 = (102)^2$

Hence, $\sqrt{10404} = 102$

Solution 1(6):

$11664 = 4 \times 2916$ (11664 is divisible by 4)
$= 4 \times 4 \times 729$ (2916 is divisible by 4)
$= 4 \times 4 \times 9 \times 81$ (729 is divisible by 9)
$= 4 \times 4 \times 9 \times 9 \times 9$
$= 4 \times 4 \times 9 \times 9 \times 3 \times 3$
$= (4 \times 9 \times 3) \times (4 \times 9 \times 3)$
$= (4 \times 9 \times 3)^2$
$= (108)^2$

$\therefore 11664 = (108)^2$

Hence, $\sqrt{11664} = 108$

Solution 1(7):

$15625 = 5 \times 3125$ (15625 is divisible by 5)

$= 5 \times 5 \times 625$ (3125 is divisible by 5)

$= 5 \times 5 \times 5 \times 125$ (625 is divisible by 5)

$= 5 \times 5 \times 5 \times 5 \times 25$

$= 5 \times 5 \times 5 \times 5 \times 5 \times 5$

$= (5 \times 5 \times 5) \times (5 \times 5 \times 5)$

$= (5 \times 5 \times 5)^2$

$= (125)^2$

$\therefore \quad 15625 = (125)^2$

Hence, $\sqrt{15625} = 125$

Solution 1(8):

$11025 = 5 \times 2205$ (11025 is divisible by 5)

$= 5 \times 5 \times 441$ (2205 is divisible by 5)

$= 5 \times 5 \times 9 \times 49$ (441 is divisible by 9)

$= 5 \times 5 \times 3 \times 3 \times 7 \times 7$ (49 is divisible by 7)

$= (5 \times 3 \times 7) \times (5 \times 3 \times 7)$

$= (5 \times 3 \times 7)^2$

$= (105)^2$

$\therefore \quad 11025 = (105)^2$

Hence, $\sqrt{11025} = 105$

Solution 1(9):

$14641 = 11 \times 1331$ (14641 is divisible by 11)

$= 11 \times 11 \times 121$ (1331 is divisible by 11)

$= 11 \times 11 \times 11 \times 11$

$= (11 \times 11) \times (11 \times 11)$

$= (11 \times 11)^2$

$= (121)^2$

$\therefore \quad 14641 = (121)^2$

Hence, $\sqrt{14641} = 121$

Solution 1(10):

$9801 = 9 \times 1089$ (9801 is divisible by 9)

$= 9 \times 9 \times 121$ (1089 is divisible by 9)

$= 9 \times 9 \times 11 \times 11$

$= (9 \times 11) \times (9 \times 11)$

$= (9 \times 11)^2$

$= (99)^2$

$\therefore \quad 9801 = (99)^2$

Hence, $\sqrt{9801} = 99$