Squares and Square Roots: Exercise 6.1

Q.1 What will be the unit digit of the squares of the following numbers?
(i) 81 (ii) 272 (iii) 799 (iv) 3853 (v) 1234
(vi) 26387 (vii) 52698 (viii) 99880 (ix) 12796 (x) 55555
***Sol.* (i)** 81
Since given number 81 ends with digit '1' and square of 1 is 1.
Thus, the unit digit of square of 81 will be 1.

(ii) 272
Since, given number 272 ends with digit '2' and square of 2 is 4.
Thus, the unit digit of square of 272 will be 4.

(iii) 799
Since, given number 799 ends with digit '9' and square of 9 is 81.
Thus, the unit digit of square of 799 will be 1.

(iv) 3853
Since, given number 3853 ends with digit '3' and square of 3 is 9.
Thus, the unit digit of square of 3583 will be 9.

(v) 1234
Since, given number 1234 ends with digit '4' and square of 4 is 16.
Thus, the unit digit of square of 1234 will be 6.

(vi) 26387
Since, given number 26387 ends with digit '7' and square of 7 is 49.
Thus, the unit digit of square of 26387 will be 9.

(vii) 52698
Since, given number 52698 ends with digit '8' and square of 8 is 64.
Thus, the unit digit of square of 52698 will be 4.

(viii) 99880
Since, given number 99880 ends with digit '0' and square of 0 is 0.
Thus, the unit digit of square of 99880 will be 0.

(ix) 12796
Since, given number 12796 ends with digit '6' and square of 6 is 36.
Thus, the unit digit of square of 12796 will be 6.

(x) 55555
Since, given number 55555 ends with digit '5' and square of 5 is 25.
Thus, the unit digit of square of 55555 will be 5.

Q.2 The following numbers are obviously not perfect squares. Give reason.
(i) 1057 (ii) 23453 (iii) 7928 (iv) 222222
(v) 64000 (vi) 89722 (vii) 222000 (viii) 505050
Sol. Since, if a natural number ends with digit 1, 4, 5, 6, 9 or even number of 0, then number will be perfect square.
(i) 1057
This number is not a perfect square because its unit's digit ends with 7.

(ii) 23453
This number is not a perfect square because its unit's digit ends with 3.

(iii) 7928
This number is not a perfect square because its unit's digit ends with 8

(iv) 222222
This number is not a perfect square because its unit's digit ends with 2.

(v) 64000
This number is not a perfect square because its unit's digit ends with odd number of 0

(vi) 89722
This number is not a perfect square because its unit's digit ends with 2

(vii) 222000
This number is not a perfect square because its unit's digit ends with odd number of 0.

(viii) 505050
This number is not a perfect square because its unit's digit does not end with odd number of 0

Q.3 The squares of which of the following would be odd numbers?
(i) 431 (ii) 2826 (iii) 7779 (iv) 82004
Sol. (i) 431
Since, given number 431 ends with digit '1' and square of 1 is 1.
Thus, the square of 431 will be an odd number.

(ii) 2826
Since, given number 2826 ends with digit '6' and square of 6 is 36.
Thus, the square of 2826 will not be an odd number.

(iii) 7779
Since, given number 7779 ends with digit '9'and square of 9 is 81.
Thus, the square of 7779 will be an odd number.

(iv) 82004
Since, given number 82004 ends with digit '4'and square of 4 is 16.
Thus, the square of 82004 will not be an odd number.

Q.4 Observe the following pattern and find the missing digits.
$11^2 = 121$
$101^2 = 10201$
$1001^2 = 1002001$
$100001^2 = 1 \ldots\ldots\ldots 2 \ldots\ldots\ldots 1$
$10000001^2 = \ldots\ldots\ldots\ldots\ldots\ldots$
Sol. The missing digits:
$100001^2 = 10000200001$
$10000001^2 = 100000020000001$

Q.5 Observe the following pattern and supply the missing numbers.
$11^2 = 1\ 2\ 1$
$101^2 = 1\ 0\ 2\ 0\ 1$
$10101^2 = 102030201$
$1010101^2 =$ .....
..... $^2 = 10203040504030201$
Sol. The missing numbers:
$1010101^2 = 1020304030201$
$101010101^2 = 10203040504030201$

Q.6 Using the given pattern, find the missing numbers.
$1^2 + 2^2 + 2^2 = 3^2$
$2^2 + 3^2 + 6^2 = 7^2$
$3^2 + 4^2 + 12^2 = 13^2$
$4^2 + 5^2 + \_^2 = 21^2$
$5^2 + \_^2 + 30^2 = 31^2$
$6^2 + 7^2 + \_^2 = \_\_^2$
Sol. The missing numbers:
$4^2 + 5^2 + \mathbf{\underline{20}}^2 = 21^2$
$5^2 + \mathbf{\underline{6}}^2 + 30^2 = 31^2$
$6^2 + 7^2 + \mathbf{\underline{42}}^2 = \mathbf{\underline{43}}^2$

Q.7 Without adding, find the sum.
(i) 1 + 3 + 5 + 7 + 9
(ii) 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 +19
(iii) 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 + 21 + 23
Sol. Since, sum of first n odd natural numbers is n^2.

(i) 1 + 3 + 5 + 7 + 9
Given: number of odd numbers =5
So, $1 + 3 + 5 + 7 + 9 = 5^2 = 25$.

(ii) 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 +19
Given: number of odd numbers =10
So, $1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 +19 = 10^2 = 100$

(iii) 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 + 21 + 23
Given: number of odd numbers = 12
So, $1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 + 21 + 23 = 12^2 = 144$

Q.8 (i) Express 49 as the sum of 7 odd numbers.
(ii) Express 121 as the sum of 11 odd numbers.
Sol. Since, sum of first n odd natural numbers is n^2.
(i) Given number = 49 which is square of number 7.
So, it will be the sum of 7 odd numbers.
Thus, $49 = 1 + 3 + 5 + 7 + 9 + 11 + 13$

(ii) Given number = 121 which is square of 11.
So, it will be the sum of 11 odd numbers.
Thus, $121 = 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 + 21$

Q.9 How many numbers lie between squares of the following numbers?
(i) 12 and 13 (ii) 25 and 26 (iii) 99 and 100

Sol. Since, there will be $2n$ non-perfect numbers in between the numbers n^2 and $(n+1)^2$.

(i) Given numbers: 12 and 13
The value of $n = 12$. So, there will be $2n = 2 \times 12 = 24$ non-perfect square numbers between the 12^2 and 13^2.

(ii) Given numbers: 25 and 26
The value of $n = 25$. So, there will be $2n = 2 \times 25 = 50$ non-perfect square numbers between the 25^2 and 26^2.

(iii) Given numbers: 99 and 100
The value of $n = 99$. So, there will be $2n = 2 \times 99 = 198$ non-perfect square numbers between the 99^2 and 100^2.