Squares and Square Roots Ex 3.1 Q8

Answer :

Factorising each number.

(i) 16562 = 2 x 7 x 7 x 13 x 13

2	16562
7	8281
7	1183
13	169
13	13
	1

Grouping them into pairs of equal factors:

16562 = 2 x (7 x 7) x (13 x 13)

The factor, 2 is not paired. For a number to be a perfect square, each prime factor has to be paired.

Hence, 16562 must be divided by 2 for it to be a perfect square.

The new number would be (7 x 7) x (13 x 13).

Furthermore, we have:

(7 x 7) x (13 x 13) = (7 x 13) x (7 x 13)

Hence, the number whose square is the new number is:

7 x 13 = 91

(ii) 3698 = 2 x 43 x 43

2	3698
43	1849
43	43
	1

Grouping them into pairs of equal factors:

3698 = 2 x (43 x 43)

The factor, 2 is not paired. For a number to be a perfect square, each prime factor has to be paired.

Hence, 3698 must be divided by 2 for it to be a perfect square.

The new number would be (43 x 43).

Hence, the number whose square is the new number is 43.

(iii) 5103 = 3 x 3 x 3 x 3 x 3 x 3 x 7

3	5103
3	1701
3	567
3	189
3	63
3	21
7	7
	1

Grouping them into pairs of equal factors:

5103 = (3 x 3) x (3 x 3) x (3 x 3) x 7

The factor, 7 is not paired. For a number to be a perfect square, each prime factor has to be paired.

Hence, 5103 must be divided by 7 for it to be a perfect square.

The new number would be (3 x 3) x (3 x 3) x (3 x 3).

Furthermore, we have:

(3 x 3) x (3 x 3) x (3 x 3) = (3 x 3 x 3) x (3 x 3 x 3)

Hence, the number whose square is the new number is:

3 x 3 x 3 = 27

(iv) 3174 = 2 x 3 x 23 x 23

2	3174
3	1587
23	529
23	23
	1

Grouping them into pairs of equal factors:

3174 = 2 x 3 x (23 x 23)

The factors, 2 and 3 are not paired. For a number to be a perfect square, each prime factor has to be paired. Hence, 3174 must be divided by 6 (2 x 3) for it to be a perfect square.

The new number would be (23 x 23).

Hence, the number whose square is the new number is 23.

(v) 1575 = 3 x 3 x 5 x 5 x 7

3	1575
3	525
5	175
5	35
7	7
	1

Grouping them into pairs of equal factors:

1575 = (3 x 3) x (5 x 5) x 7

The factor, 7 is not paired. For a number to be a perfect square, each prime factor has to be paired.

Hence, 1575 must be divided by 7 for it to be a perfect square.

The new number would be (3 x 3) x (5 x 5).

Furthermore, we have:

(3 x 3) x (5 x 5) = (3 x 5) x (3 x 5)

Hence, the number whose square is the new number is:

3 x 5 = 15

********** END **********