Squares and Square Roots Ex 3.1 Q7

Answer :

Factorising each number.

(i) 8820 = 2 x 2 x 3 x 3 x 5 x 7 x 7

2	8820
2	4410
3	2205
3	735
5	245
7	49
7	7
	1

Grouping them into pairs of equal factors:

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

The factor, 5 is not paired. For a number to be a perfect square, each prime factor has to be paired.

Hence, 8820 must be multiplied by 5 for it to be a perfect square.

The new number would be (2 x 2) x (3 x 3) x (7 x 7) x (5 x 5).

Furthermore, we have:

(2 x 2) x (3 x 3) x (7 x 7) x (5 x 5) = (2 x 3 x 5 x 7) x (2 x 3 x 5 x 7)

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

2 x 3 x 5 x 7 = 210

(ii) 3675 = 3 x 5 x 5 x 7 x 7

3	3675
5	1225
5	245
7	49
7	7
	1

Grouping them into pairs of equal factors:

3675 = (5 x 5) x (7 x 7) x 3

The factor, 3 is not paired. For a number to be a perfect square, each prime factor has to be paired.

Hence, 3675 must be multiplied by 3 for it to be a perfect square.

The new number would be (5 x 5) x (7 x 7) x (3 x 3).

Furthermore, we have:

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

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

3 x 5 x 7 = 105

(iii) 605 = 5 x 11 x 11

5	605
11	121
11	11
	1

Grouping them into pairs of equal factors:

605 = 5 x (11 x 11)

The factor, 5 is not paired. For a number to be a perfect square, each prime factor has to be paired.

Hence, 605 must be multiplied by 5 for it to be a perfect square.

The new number would be (5 x 5) x (11 x 11).

Furthermore, we have:

(5 x 5) x (11 x 11) = (5 x 11) x (5 x 11)

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

5 x 11 = 55

(iv) 2880 = 2 x 2 x 2 x 2 x 2 x 2 x 3 x 3 x 5

2	2880
2	1440
2	720
2	360
2	180
2	90
3	45
3	15
5	5
	1

Grouping them into pairs of equal factors:

2880 = (2 x 2) x (2 x 2) x (2 x 2) x (3 x 3) x 5

There is a 5 as the leftover. For a number to be a perfect square, each prime factor has to be paired.

Hence, 2880 must be multiplied by 5 to be a perfect square.

The new number would be (2 x 2) x (2 x 2) x (2 x 2) x (3 x 3) x (5 x 5).

Furthermore, we have:

(2 x 2) x (2 x 2) x (2 x 2) x (3 x 3) x (5 x 5) = (2 x 2 x 2 x 3 x 5) x (2 x 2 x 2 x 3 x 5)

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

2 x 2 x 2 x 3 x 5 = 120

(v) 4056 = 2 x 2 x 2 x 3 x 13 x 13

2	4056
2	2028
2	1014
3	507
13	169
13	13
	1

Grouping them into pairs of equal factors:

4056 = (2 x 2) x (13 x 13) x 2 x 3

The factors at the end, 2 and 3 are not paired. For a number to be a perfect square, each prime factor has to be paired. Hence, 4056 must be multiplied by 6 (2 x 3) for it to be a perfect square.

The new number would be (2 x 2) x (2 x 2) x (3 x 3) x (13 x 13).

Furthermore, we have:

(2 x 2) x (2 x 2) x (3 x 3) x (13 x 13) = (2 x 2 x 3 x 13) x (2 x 2 x 3 x 13)

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

2 x 2 x 3 x 13 = 156

(vi) 3468 = 2 x 2 x 3 x 17 x 17

2	3468
2	1734
3	864
17	289
17	17
	1

Grouping them into pairs of equal factors:

3468 = (2 x 2) x (17 x 17) x 3

The factor 3 is not paired. For a number to be a perfect square, each prime factor has to be paired.

Hence, 3468 must be multiplied by 3 for it to be a perfect square.

The new number would be (2 x 2) x (17 x 17) x (3 x 3).

Furthermore, we have:

(2 x 2) x (17 x 17) x (3 x 3) = (2 x 3 x 17) x (2 x 3 x 17)

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

2 x 3 x 17 = 102

(vii) 7776 = 2 x 2 x 2 x 2 x 2 x 3 x 3 x 3 x 3 x 3

2	7776
2	3888
2	1944
2	972
2	486
3	243
3	81
3	27
3	9
3	3
	1

Grouping them into pairs of equal factors:

7776 = (2 x 2) x (2 x 2) x (3 x 3) x (3 x 3) x 2 x 3

The factors, 2 and 3 at the end are not paired. For a number to be a perfect square, each prime factor has to be paired. Hence, 7776 must be multiplied by 6 (2 x 3) for it to be a perfect square.

The new number would be (2 x 2) x (2 x 2) x (2 x 2) x (3 x 3) x (3 x 3) x (3 x 3).

Furthermore, we have:

(2 x 2) x (2 x 2) x (2 x 2) x (3 x 3) x (3 x 3) x (3 x 3) = (2 x 2 x 2 x 3 x 3 x 3) x (2 x 2 x 2 x 3 x 3 x 3)

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

2 x 2 x 2 x 3 x 3 x 3 = 216

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