Worksheet -2 Subject: - Mathematics Class: - VIII Teacher: - Ms. Neeru

Name: _____ Class & Sec: _____ Roll No. _____ Date: 28.07.2020

Ex 6.3

Question 5:

For each of the following numbers, find the smallest whole number by which it should be multiplied so as to get a perfect square number. Also, find the square root of the square number so obtained:

(i) 252 (ii) 180

(iii) 1008 (iv) 2028

(v) 1458 (vi) 768

Answer 5:

(i) $252 = 2 \times 2 \times 3 \times 3 \times 7$

Here, prime factor 7 has no pair. Therefore 252 must be multiplied by 7 to make it a perfect square.

$\therefore \quad 252 \times 7 = 1764$

And $\sqrt{1764} = 2 \times 3 \times 7 = 42$

2	**252**
2	126
3	63
3	21
7	7
	1

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

Here, prime factor 5 has no pair. Therefore 180 must be multiplied by 5 to make it a perfect square.

$\therefore \quad 180 \times 5 = 900$

And $\sqrt{900} = 2 \times 3 \times 5 = 30$

2	**180**
2	90
3	45
3	15
5	5
	1

(iii) $1008 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 7$

Here, prime factor 7 has no pair. Therefore 1008 must be multiplied by 7 to make it a perfect square.

$\therefore \quad 1008 \times 7 = 7056$

And $\sqrt{7056} = 2 \times 2 \times 3 \times 7 = 84$

2	**1008**
2	504
2	252
2	126
3	63
3	21
7	7
	1

(iv) $2028 = 2 \times 2 \times 3 \times 13 \times 13$

Here, prime factor 3 has no pair. Therefore 2028 must be multiplied by 3 to make it a perfect square.

$\therefore \quad 2028 \times 3 = 6084$

And $\sqrt{6084} = 2 \times 2 \times 3 \times 3 \times 13 \times 13 = 78$

2	
2	1014
3	507
13	169
13	13
	1

(v) $1458 = 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$

Here, prime factor 2 has no pair. Therefore 1458 must be multiplied by 2 to make it a perfect square.

$\therefore \quad 1458 \times 2 = 2916$

And $\sqrt{2916} = 2 \times 3 \times 3 \times 3 = 54$

2	1458
3	729
3	243
3	81
3	27
3	9
3	3
	1

(vi) $768 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3$

Here, prime factor 3 has no pair. Therefore 768 must be multiplied by 3 to make it a perfect square.

$\therefore \quad 768 \times 3 = 2304$

And $\sqrt{2304} = 2 \times 2 \times 2 \times 2 \times 3 = 48$

2	768
2	384
2	192
2	96
2	48
2	24
2	12
2	6
3	3
	1

Question 6:

For each of the following numbers, find the smallest whole number by which it should be divided so as to get a perfect square. Also, find the square root of the square number so obtained:

(i) 252 (ii) 2925

(iii) 396 (iv) 2645

(v) 2800 (vi) 1620

Answer 6:

(i) $252 = 2 \times 2 \times 3 \times 3 \times 7$

Here, prime factor 7 has no pair. Therefore 252 must be divided by 7 to make it a perfect square.

$\therefore \quad 252 \div 7 = 36$

And $\sqrt{36} = 2 \times 3 = 6$

2	252
2	126
3	63
3	21
7	7
	1

(ii) $2925 = 3 \times 3 \times 5 \times 5 \times 13$

Here, prime factor 13 has no pair. Therefore 2925 must be divided by 13 to make it a perfect square.

$\therefore \quad 2925 \div 13 = 225$

And $\sqrt{225} = 3 \times 5 = 15$

3	2925
3	975
5	325
5	65
13	13
	1

(iii) $396 = 2 \times 2 \times 3 \times 3 \times 11$

Here, prime factor 11 has no pair. Therefore 396 must be divided by 11 to make it a perfect square.

$\therefore \quad 396 \div 11 = 36$

And $\sqrt{36} = 2 \times 3 = 6$

2	
2	198
3	99
3	33
11	11
	1

(iv) $2645 = 5 \times 23 \times 23$

Here, prime factor 5 has no pair. Therefore 2645 must be divided by 5 to make it a perfect square.

$\therefore \quad 2645 \div 5 = 529$

And $\sqrt{529} = 23 \times 23 = 23$

5	2645
23	529
23	23
	1

(v) $2800 = 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 7$

Here, prime factor 7 has no pair. Therefore 2800 must be divided by 7 to make it a perfect square.

$\therefore \quad 2800 \div 7 = 400$

And $\sqrt{400} = 2 \times 2 \times 5 = 20$

2	2800
2	1400
2	700
2	350
5	175
5	35
7	7
	1

(vi) $1620 = 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 5$

Here, prime factor 5 has no pair. Therefore 1620 must be divided by 5 to make it a perfect square.

$\therefore \quad 1620 \div 5 = 324$

And $\sqrt{324} = 2 \times 3 \times 3 = 18$

2	1620
2	810
3	405
3	135
3	45
3	15
5	5
	1

Find the smallest additional factor so that the expressions below generate perfect squares.

a) $2 \times 3 \times 3 \times \ldots$

b) $5 \times 5 \times 5 \times 3 \times 3 \times \ldots$

c) $13^5 \times \ldots$

d) $3^3 \times 7^5 \times \ldots$

e) $p^2 \times q \times \ldots$

f) $p^{2n+1} \times \ldots$

(where n is an integer)

a) $2 \times 3 \times 3 \times 2$

b) $5 \times 5 \times 5 \times 3 \times 3 \times 5$

c) $13^5 \times 13$

d) $3^3 \times 7^5 \times 3 \times 7 = 3^3 \times 7^5 \times 21$

e) $p^2 \times q \times q$

f) $p^{2n+1} \times p$

Example 6: Is 2352 a perfect square? If not, find the smallest multiple of 2352 which is a perfect square. Find the square root of the new number.

2	2352
2	1176
2	588
2	294
3	147
7	49
	7

Solution: We have $2352 = \underline{2 \times 2} \times \underline{2 \times 2} \times 3 \times \underline{7 \times 7}$

As the prime factor 3 has no pair, 2352 is not a perfect square.

If 3 gets a pair then the number will become perfect square. So, we multiply 2352 by 3 to get,

$$2352 \times 3 = \underline{2 \times 2} \times \underline{2 \times 2} \times \underline{3 \times 3} \times \underline{7 \times 7}$$

Now each prime factor is in a pair. Therefore, $2352 \times 3 = 7056$ is a perfect square.

Thus the required smallest multiple of 2352 is 7056 which is a perfect square.

And, $\sqrt{7056} = 2 \times 2 \times 3 \times 7 = 84$

Example 7: Find the smallest number by which 9408 must be divided so that the quotient is a perfect square. Find the square root of the quotient.

Solution: We have, $9408 = \underline{2 \times 2} \times \underline{2 \times 2} \times \underline{2 \times 2} \times 3 \times \underline{7 \times 7}$

If we divide 9408 by the factor 3, then

$9408 \div 3 = 3136 = \underline{2 \times 2} \times \underline{2 \times 2} \times \underline{2 \times 2} \times \underline{7 \times 7}$ which is a perfect square. (Why?)

Therefore, the required smallest number is 3.

And, $\sqrt{3136} = 2 \times 2 \times 2 \times 7 = 56.$