Prime Factorization Method for Finding Square Roots

Examples	
With a Square Root	Without a Square Root
Determine the square root of 196.	Determine the square root of 84.

Notice 196 = (2)(2)(7)(7)

Since there is an even number of prime factors and they can be grouped in identical pairs we know that 196 has a square root that is a whole number.

Taking one number from each pair and multiplying we get;

$$\sqrt{196} = 2 \times 7 = 14$$

Notice 84 = (2)(2)(3)(7)

Although there is an even number of factors they **cannot** be grouped in identical pairs. Because of this we conclude that 84 is not a perfect square and does not have a square root that is a whole number.

Use the Prime Factorization method to decide if these numbers are perfect squares and to find the square roots of those that are perfect squares.

1.   225

2.   400

3.   360

4.   484

5.   396

6.   280