

Quadratic Perfect Square Problem

Math 130 *Kovitz*

Knowing that $61504 = 248^2$, solve for q . Try to accomplish this without using a calculator.

$$q^2 - 496q + 61504 = 121$$

This problem will be very difficult to factor. Try another method.

The quadratic formula will give the answer if the right side is set to 0, but errors tend to show up in the substitutions. Also, it is to be desired to avoid the use of a calculator whenever possible as some calculus courses are taught without the use of calculators.

It might be helpful to rewrite the left side as a perfect square.

Then the form of the equation is $a^2 = b^2$.

What is the next step to get rid of the squares? Be careful.

Hint: if $a^2 = b^2$, can we conclude that $a = b$ or are there other possibilities? Think about it.

Example: It is true that $(-2/5)^2 = 0.4^2$. But does that imply that $-2/5 = 0.4$? If not explain. Then use this idea in our original problem to lead to the solution for q .

Answers: $q = 237$ or $q = 259$.