



The Almighty Sanity Check

A **sanity check** is a final check whenever you solve a problem. It's an informal test to see whether your answer makes sense in the context of the problem. It won't prove that an answer is perfectly correct, but many errors produce answers that cannot possibly be right. There are a few different ways in which a sanity check can be used.

SIGN OF AN ANSWER

Some measurements, like time and distance, don't usually make any sense if they're negative. If a question asks how long it takes for some process to happen, and you get a negative answer, that answer can't be right.

There are situations when a distance can be negative. In physics, when we deal with measurements like forces that have direction, we can have a negative answer; it simply means that the distance is in the opposite direction to the one we've decided to call positive, but this is a rare case. No math problems work like this.

SCALE OF AN ANSWER

Most of the word problems you are given will be like real-world problems. This means you can generally tell whether the scale of an answer matches what your problem is asking for. If your physics problem asks, what is the mass of the earth based on a gravitational observation, and your answer is 2000 kg or so, this is not a sensible answer to the question. That's a clue that you should check your work, because the correct answer to the question is most likely an accurate value (or at least a close approximation).

Another way to check the scale of an answer, especially if you are converting from one unit to another, is to check whether the answer you get is larger or smaller than the number you started from.

Consider a metric conversion. A question asks for 200 g in kilograms, and we multiply by 1000 to get 200,000 kg. Is this reasonable? When you convert 200 grams to kilograms, should the answer be larger or smaller than 200? If you're not sure, ask yourself what you know about these units. An object that weighs 200 g is very light, but 200,000 kg is very heavy! The 200 grams isn't an entire kilogram, so our answer should get smaller. Our conversion did the opposite; we got an answer much higher than 200. That means we multiplied when we should have divided.

ANSWERING THE QUESTION THAT WAS ASKED

By now you know that many word problems are actually algebra problems. You set up an equation and solve for an unknown variable. Sometimes, it is simpler to set up a problem so that the variable isn't the thing we've been asked for, however.