



## Verbs in Math Questions

When you're solving any kind of math problem, it's important to know what you're being asked for. Math teachers and mathematicians use special jargon to specify what kind of work is being asked for, and a lot of the time the verb in the question is the key to knowing what to do.

Some verbs are quite simple — if you're asked to *list*, *graph*, *convert*, *explain*... these instructions should be clear. Other instructions are worth a bit of commentary:

### SOLVE

If the question says to solve, then you've been given one or more equations, and your task is to find the value(s) of the variable(s) that make all the equations true at the same time. All such possible solutions should be given, and if there are many solutions, just giving one, or the first few, isn't enough.

It's worth noting that you cannot solve something that is not an equation. Some students will take something like " $6x^2 + 5x$ " and try to solve it by isolating  $x$ . This expression has no equal sign, so it's not possible to move anything to the other side of the equal sign! This expression is also not any more true for some values than for others; if  $x = 2$ , then the expression is equal to 34, but "34" cannot be true or false. (" $6x^2 + 5x = 34$ " is true when  $x = 2$  and false when  $x = 0$ , but now we're back to describing an equation.)

You may also be given a formula with few or no numbers (e.g.  $PV = nRT$ ). If the question says to solve for a variable, then that variable should be isolated on one side of your final equation, and it should not appear at all on the other side.

### EXPAND & FACTOR

These are two instructions that are opposites of each other.

If the question says factor, then your task is to rewrite the expression given as a multiplication problem, with no additional leftover terms — we call this "factored form". (So if we're asked to factor  $x^2 - 2x - 15$ , " $x(x - 2) - 15$ " is not a valid answer because of the extra " $- 15$ " part of the expression. The correct answer would be " $(x - 5)(x + 3)$ ".)

If the question says expand, then your task is to multiply out the expression to get a series of terms, separated by plus signs and minus signs. In other words, the expression needs to be FOILED out completely. Not surprisingly, this is called "expanded form". (" $x^2 - 2x - 15$ " is an example of expanded form.)

### EVALUATE / CALCULATE

"Evaluate" simply means "find the value of". If the question says to calculate or evaluate, then your task is to provide the numerical answer at the end of a calculation.



## **ESTIMATE**

If the question says to estimate, then you are expected to use the information available and your best judgment to get a close approximation of an answer. Often, when a question tells you to estimate an answer, it's not possible to get the correct answer by any means you've been taught, and even if your answer doesn't match the answer key, it's still right as long as the estimate is reasonable.

## **SIMPLIFY**

If the question says to simplify, then the expression you've been given is not as clear as it could be. Your task is to clean up the expression so that it's easier to understand what it's saying. This may require reducing fractions, collecting like terms, rationalizing denominators, and writing the expression in expanded form, and possibly other things.

This instruction is slightly different from the others in that, even if the question doesn't say to simplify, *you are always expected to do it*, unless the questions tells you not to.

## **EXPRESS**

This instruction often isn't the main instruction of the question. If the question says "express", then your answer should be given in the manner or style specified. "Express your answer without any negative exponents," "express your answer to two decimal places," "express your answer in interval notation," etc. Even if you get a correct answer to this problem, you will lose marks if this instruction is not followed.

## **PROVE / SHOW / DEMONSTRATE**

These three instructions mean more or less the same thing. You've been given a statement, and your task is to provide a reasonable, logical argument which supports the statement.

## **DETERMINE / FIND**

These two instructions can be used a number of ways. Generally, they mean that your task is to explicitly state the number/line/formula that fits a description: "Find the equation of the circle that has...", "Find the x-coordinate of the maximum value of the function...", "Determine the slope of the line whose...", "Determine whether the following relations are functions...", and so on.

## **CONSIDER**

If a question says "consider" then it's establishing the set-up for the problem, similar to a "let" statement. Where we might say, "Let  $x$  represent the number of cars..." to pin down the meaning of a variable specifically, "consider" can work on anything. Outside of a math context, we might say "imagine" instead: "Given a circle, consider a diameter  $AB$ ...", "Consider the real numbers greater than 100...", and so on.

