

One of Veritas Prep's most-beloved employees is Scott Shrum, co-author of the book *Your MBA Game Plan* and our resident "scientist" (given that designation because of his BS from MIT; he doesn't wear a labcoat but when you ask him a science question he pretty much always nails it even after the disclaimer "You know that not everyone who went to MIT is actually a scientist"). Scott is a natural to test out hard GMAT problems — he scored 770 on the GMAT and was admitted to Kellogg and HBS — and one of our favorite internal barometers for determining question difficulty is when we find what we call a "Shrumbuster" — a question that Scott Shrum gets wrong.

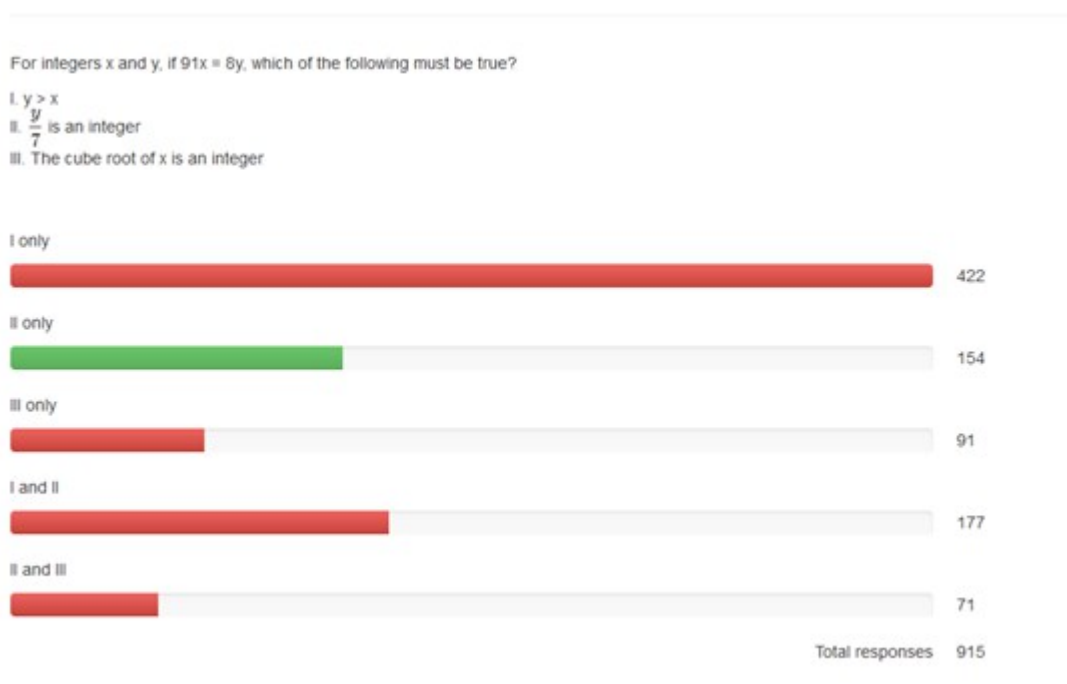
Scott will be the first to tell you that a high percentage of Shrumbusters contain the same trap. So consider this question and see if you can avoid becoming, ahem, Shrumbusted:

For integers x and y , if $91x = 8y$, which of the following must be true?

- I. $y > x$
 - II. $y/7$ is an integer
 - III. The cube root of x is an integer
- (A) I only
(B) II only
(C) III only
(D) I and II
(E) II and III

And before we discuss the answers, let's take a look at some of the overall statistics. On this question, the correct answer was only the third most popular answer choice, and only about 1/6 of test-takers answered correctly. Because random guess would mean that approximately 1 out of every 5 would guess correctly, this difficulty rating means that the traps on this question are so well-crafted that test-takers do worse on this question than they would simply by picking a letter at random and moving on!

So it pays to be aware of these traps, as these questions offer you a great opportunity to separate yourself from the majority of test-takers. So let's take a look at the stats and correct/incorrect answers:



Clearly, many believe that y must be greater than x here. But why isn't that the case? What if both x and y were 0. Then

91(0) would equal 8(0), but y and x would be equal. Or x and y could both be negative numbers. Consider:
 $91(-8) = 8(-91)$

Here, x would be greater than y. So the first statement does not need to be true. But here's where the Shrumbuster element lies – as Mr. MBA Game Plan himself would tell you, his Achilles' heel en route to a 770 was that he'd often forget to consider negative numbers. Even those at the upper end of the curve tend to fall victim to the same simple mistakes – they just do so when their intellect has been "satisfied" by items like statement II here.

Statement II must be true. In order for that given equation $91x = 8y$ to balance, y needs to account for the 91 on the left and x needs to account for that 8 on the right. And since 91 and 8 share no prime factors in common, but x and y must be integers, then in order to satisfy the divisibility of either side x must be a multiple of 8 and y must be a multiple of 91. And since 91 is a multiple of 7, y must then be a multiple of 7.

Now, that requires some thought and some knowledge of factors and multiples. Which is why choice D is such a satisfying choice for many. At Veritas Prep we're big fans of the phrase "Think Like The Testmaker," meaning that you should think about why you fell for the traps that you did so that you can see how the authors of the test can trick you. And here's the blueprint for choice D:

1. Get test-takers to only consider positive values for x and y in statement I.
2. Satisfy the "elite" test-takers' intellect by making statement II challenging to prove.

That second part is really the Shrumbuster element. Those scoring above 600 tend to feel that they've graduated from the basic traps (don't assume integer; don't assume positive; etc.) and so you can't trick them simply by offering those traps. But you *can* trick them with those traps if you have the element of "misdirection" in your arsenal – if you convince them that the question is about something else, and in doing so get them to focus their energy on one part of the question while casually blowing through another. So recognize this misdirection – don't let yourself become too complacent for getting part of the question right; know that the hardest questions can differentiate between "better" and "best" by preying on the fact that many test-takers will lose focus once they feel as though they've identified what makes the question difficult. Stay focused until you've finished the entire problem!

A word on statement III here – it offers another trap, in that many who understood the second statement will see similar logic with the third: x needs to balance out the 8 on the other side of the equation, so many will say that " $x = 8$ ". But that's not necessarily true, as the equation holds if $x = 16$ (accounting for the 8 plus another factor of 2) and $y = 182$ (the 91 from the other side plus another factor of 2 to balance that, too). III doesn't need to be true, but it certainly could. And those who feel as though they've expertly cracked statement II and avoided statement I are often fooled into quickly selecting choice E by incorporating statement III, too.

So what can you take from this question? Two major takeaways stand out from the statistics:

1. As basic as it sounds, you simply cannot forget to consider negative numbers and 0 when you're asked whether something "must be true" in a problem solving question (or in any data sufficiency question).
2. Adding to that, beware the "Shrumbuster" theme – what makes above-average difficulty questions really-really difficult isn't always "harder math." It's quite often that the above average math satisfies the intellect of above-average test-takers, and they fall for what they'd agree in retrospect is an "easy" trap. Don't get caught celebrating before you've crossed the finish line!

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