Compare with Kaplan GMAT

Resource : Kaplan GMAT course book , Page 53

**Question Pool**

23. If $x$ is an integer with $n$ distinct prime factors, is $n$ greater than or equal to 3?

(1) $x$ is divisible by 6.
(2) $x$ is divisible by 10.

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My solution is different.

We need to express the given statement mathematically.

(1) $x = 6 \cdot a = 2 \cdot 3 \cdot a$

(2) $x = 10 \cdot b = 2 \cdot 5 \cdot b$

(1) is not sufficient to answer for the question because we don't know the value a. Same as (2)

If you combine those two condition, we can find at least three prime factors 2,3,5 of x.

So answer is (C)

Compare my solution with following Kaplan one.

Because the question stem tells us that $y$ is positive, that means that $x$ has to be positive. Therefore, this statement is sufficient to answer the question with a no ($x$ cannot be negative in this case), and we can eliminate answers **(B)**, **(C)**, and **(E)**.

Statement (2) tells us that $x - y = 6$. As $y$ is a positive number, according to the question stem, $x$ will have to be an even larger positive number to yield a positive number when subtracting $y$ from it. Therefore, Statement (2) is sufficient to answer the question with a no, and we can eliminate the answer **(A)**.

The correct answer is **(D)**, either statement alone is sufficient to answer the question.

**23. (C)**

**Step 1: Analyze the Question Stem**

This is a Yes/No question, so we don't need to know the exact value of $n$, just whether $n \geq 3$.

There's nothing to simplify, but it's important to note the relationship between the variables: $n$ is the number of distinct prime factors in $x$. (Every non-prime number can be rewritten as a series of prime numbers multiplied together; those are the number's prime factors.)

To answer the question, we'll need to know whether or not $x$ has at least three distinct prime factors.

**Step 2: Evaluate the Statements**

Let's say that you weren't sure how to evaluate the statements abstractly. **Picking Numbers allows you to evaluate a Data Sufficiency statement when you aren't comfortable with a more rules-based approach.**

Statement (1): Let's pick the simplest number that's divisible by 6, namely $x = 6$ itself. We get $6 = 2 \times 3$. Since there are two prime factors, $n = 2$. Now test that number in the question: "Is $2 \geq 3$?" No, it isn't.

But our work on Statement (1) isn't done. We only know that Statement (1) *can* yield the answer "no." We have no idea yet whether the answer is "definitely no," because other permissible numbers might yield different results. **Always test at least two sets of numbers when Picking Numbers in Data Sufficiency** so that you can differentiate between the *definite* answers and the *maybe* answers.

Since we already got a "no" answer, our task is to see whether we can get a "yes," thus proving that Statement (1) does not provide one definite answer. Could we think of a value for $x$ that has three or more prime factors? Since 2 and 3 showed up as prime factors already, we can think of a value for $x$ that has a different prime factor . . . 5, perhaps. So let's pick $x$ to be a multiple of 5 that is also divisible by 6 (otherwise it won't be permissible). $x = 30$ fits the bill: $30 = 2 \times 3 \times 5$. That's three prime factors, so $n = 3$. Put that into the question: "Is $3 \geq 3$?" Yes, it is.

Because we've found both a yes and a no answer, Statement (1) answers the question "maybe yes, maybe no." That's not a definite answer, so Statement (1) is insufficient. Eliminate **(A)** and **(D)**.

Statement (2): Now let's pick the simplest number that's divisible by 10, namely $x = 10$ itself. We get $10 = 2 \times 5$. Since there are two prime factors, $n = 2$. Now test that number in the question: "Is $2 \geq 3$?" No, it isn't. Let's see whether we can pick a number that yields a different answer. We've already seen a number that has three prime factors: 30. And it's divisible by 10, so it's permitted by Statement (2). We get $30 = 2 \times 3 \times 5$. That's three prime factors, so $n = 3$. Put that into the question: "Is $3 \geq 3$?" Yes, it is. As with Statement (1), we've produced a "maybe" answer, so Statement (2) is insufficient. Eliminate **(B)** (and **(D)**, if you worked on Statement (2) first).

**(C)** and **(E)** still remain, so now we have to consider the statements together. We have to pick values for $x$ that are divisible both by 6 and by 10. Happily, we already know one from our earlier work. If $x = 30$, then the answer to our question is yes. Can we find a number that's divisible both by 6 and by 10 but has fewer than three prime factors? Let's try $x = 6 \times 10$, or $x = 60$. We get $60 = 6 \times 10 = 2 \times 3 \times 2 \times 5 = 2^2 \times 3 \times 5$. That's also three distinct prime factors. If you weren't at this point confident that any number that's divisible both by 6 and by 10 would have to have 2, 3, and 5 as prime factors (that's at least three!), quickly testing one or two other possibilities (e.g., $x = 90$, $x = 120$) would confirm it. No matter what permissible numbers are picked, we get the same answer: yes. So together, the answer is "definitely yes." **(C)** is correct.

**24. (B)**

**Step 1: Analyze the Question Stem**

This is a Yes/No question, so we don't need to know the exact value of $x$, just whether $x$ is definitely greater than $x^2$ or definitely *not* greater than $x^2$.

Is it possible to simplify the question? We're told that $x^3 < x$. . . . When would a number be *greater* than its cube? **Picking Numbers can help you understand the question.** If $x = 2$, then $x^3 = 8$; 8 is not less than 2, so $x = 2$ is not a permissible number according to the question stem. Neither is $x = 1$ nor $x = 0$, as in both cases $x^3 = x$. What about other kinds of numbers, like fractions or negatives? If $x = \frac{1}{2}$, then $x^3 = \left(\frac{1}{2}\right)^3 = \frac{1}{8}$. Because $\frac{1}{8}$ is less than $\frac{1}{2}$, $x$ could be a fraction. And if $x = -2$, then $x^3 = -8$; $-8$ is less than $-2$, so $x$ could be a negative number less than $-1$.

How would these different possible values affect the question "Is $x > x^2$"? If $x = \frac{1}{2}$, then $x^2 = \left(\frac{1}{2}\right)^2 = \frac{1}{4}$; $\frac{1}{2}$ is