#AskTheGoat

What we are doing here is simple. Ask me about an official question, I'll handwrite a solution, and I'll provide an analysis of the question. There's no set schedule as to when these will appear, nor is there a set schedule for when currently posted analyses will be removed from this site. So stay current. To know when an update has been made, check the bottom right within this intro. For more insights and analyses, head to my Twitter feed @chrisXcho

Last updated: 5/27

#OnlyHardWork #onlygoodthings

The first item up is from the May 2019 exam. It is #12 from the NO Calculator section.

Similar to #10 within this same section, this question would be aided by the knowledge that we can rewrite the notation of a given function as y. This question reveals that idea a bit more directly, but it might still not be an obvious thing to think to actually do.

With that said, let's acknowledge that at the core of this question is the fact that to determine the *x-intercept* of a given function, we can plug in 0 for y. As you can see from the work, doing so leads us to a value of 1 for x. (Take a moment to acknowledge that Mantra #2: *Show Every Step* is on display within my handwritten work.)

Knowing that the x-value must be 1, we can state that (C) is the correct final answer, even if the second half of each answer option seems a bit strange.

Rating: 650+
BBB '18 Cross-Reference: 948 #35
BBB '20 Cross-Reference: 882 #35

The second item up is from the May 2019 exam. It is #20 from the NO Calculator section.

This is a straight factual question, and I would contend that it is NOT the hardest question within the section. This assertion further supports a longstanding theory of mine: Math questions are NOT in order of difficulty. (If you don't know anything about colons by the way, you need to click on the "SAT Knowledge" link at some point.) To a solid extent, it defeats the *true* purpose of the SAT to put Math questions in order....

Ok, so the first raw skill you would need to possess here is knowing how to re-write a radical into a fractional exponent. This is something that could be memorized as *power over root*. So, for instance, with the bottom radical, the "power" is the 4 and the "root" is the 3, which is why the fractional exponent becomes 4/3. With the top radical, you would also need to remember that there is an implied radical value of 2 when there is nothing written within the radical.

Having re-written the radicals, you would now need to remember that dividing two different items (that are the same base) with exponents really means to subtract. And this leads us to the second raw skill you would need to possess here: manually subtracting fractions.

Rating: 700+
BBB '18 Cross-Reference: 559 #3, 564 #17
BBB '20 Cross-Reference: 1115 #3, 1120 #17

The third item up is from the May 2019 exam. It is #21 from the Calculator section. (S/o superstar Alyssa for asking about it!)

When a question is tied to lines and equations involving *y* and *x* are involved, a key move at some point of the question will almost definitely be re-writing any given equations so that *y* is isolated. Doing so allows us to determine the SLOPE of a given line and its Y-INTERCEPT (where the line intersects the y-axis).

Questions like this also tend to be great examples of the importance of Mantra #2: *Show Every Step*. Doing anything in your head for a question like this tends to lead to a minor mistake that the test writers *know* many students will allow themselves to make.

Once *y* is isolated, what is in FRONT of *x* is the SLOPE of the line. The value that is *by itself* is the *y-intercept*. And so, a line with the equation of

$$y = {}^{3}/_{2}x - {}^{5}/_{2}$$

is a line that would have a positive slope($3/2$) and would cross the y-axis at a negative point($-5/2$).

With a question like this one, it would make sense to simply start with option (A) and work your way down. When (A) gives us what we are looking for, it would make sense to move on. If you really are *showing every step*, there is no reason to second-guess your work, and there is no reason to work through other options.

Within my handwritten solution, under a drawn line, you will see that I did work out (B). This was for the sake of ensuring that you firmly understood why (A) is the correct final answer, as you should see a clear difference between what you end up with (B) and what you end up with (A). On the day of a real exam, knowing that, of course, I *show every step*, as I push my students to, I would have confidently selected (A) after doing the work that is shown above the drawn line.

(A rating of 600+ simply means that a student trying to score *at least* a 600 needs to be comfortable with the question.)

Rating: 600+
BBB '18 Cross-Reference: 671 #8, 802 #11
BBB '20 Cross-Reference: 335 #9, 1002 #11

The fourth item up is from the May 2019 exam. It is #6 from the NO Calculator section.

This is what we refer to as a Rearrangement Question (RQ). Many RQs are very straightforward. This is a challenging version of this question, hence the rating below of 700+. (A 700+ rating means that students trying to score 700 or higher need to be comfortable with the question.)

Despite the high rating of this question, if you feel comfortable with it, that is great. But if you do not, then at least be sure to get the cross-referenced questions.

An RQ should be rather straightforward to spot; if you are having an issue determining whether a given question is an RQ, hmu.

Rating: 700+
BBB '18 Cross-Reference: 925 #7, 1180 #3
BBB '20 Cross-Reference: 592 #3, 859 #7

The fifth item is from the May 2019 exam. It is #8 from the NO Calculator section.

Seeing the 2 in front of the x^2 could have been an immediate clue that it was exceptionally likely that the *quadratic formula* was going to be necessary to use.

Given that the test writers do not compel us to use the quadratic regularly, this question also gets a rating of 700+. That said, if you're already comfortable with the quadratic formula, no matter what you are trying to score, then it would be great for you to be comfortable with the solution to this question.

And now, with that said, it is important for me to forewarn students about not trying to put too much into their minds heading into an upcoming exam. If you have a score around 550, re-memorizing the quadratic formula is NOT your top priority. Review more fundamentally important questions that you can find on my Twitter feed (@chrisXcho) would be a better use of your time.

Rating: 700+
BBB '18 Cross-Reference: 562 #14
BBB '20 Cross-Reference: 1118 #14

The sixth item is from the April 2019 exam. It is #17 from the NO Calculator section.

#17 Let's acknowledge that the word "constant" can be IGNORED when it appears within any question.

Now let's acknowledge that distributing/opening up parentheses is a rather classic SAT-Math move.

Toward the end of the solution, the idea is that there are matching terms on both sides. Realizing this, we can set the '2a' term equal to 4.

Questions like this appear regularly, hence the MUST rating below.

Rating: MUST
BBB '18 Cross-Reference: 1058 #20, 1185 #17
BBB '20 Cross-Reference: 597 #17, 732 #20

If you took the March, April or May exam, you can pay $18 for the Question and Answer Service (QAS) and gain online access to the questions.

If you did not take any of these exams, scrolling down to see my solutions should give you insight into the questions we are analyzing here, even without seeing the original question. And, you can certainly work on the BBB Cross-Reference questions from whichever version of the official book you currently own. And again, if you are not already doing so, you should consider heading to my Twitter feed for the analysis that posts there daily.

May 2019

No Calc

#12

$$g(x) = 2^x - 2$$

$$y = 2^x - 2$$

$$\downarrow$$

$$0 = 2^x - 2$$

$$\begin{array}{rcl} +2 & & +2 \\ \hline 2 & = & 2^x \end{array}$$

$$x = 1$$

$$\boxed{C}$$

May 2019

NO Calc

#20

$$\frac{\sqrt{x^5}}{\sqrt[3]{x^4}} = x^{\frac{a}{b}}$$

$$\downarrow$$

$$\frac{x^{\frac{5}{2}}}{x^{\frac{4}{3}}} = x^{\frac{a}{b}}$$

$$\frac{(3)\,5}{(3)\,2} - \frac{4\,(2)}{3\,(2)}$$

$$\downarrow$$

$$\frac{15}{6} - \frac{8}{6} = \boxed{\frac{7}{6}}$$

May 2019

Calculator

#21

A) $-3x + 2y = -5$

$\quad +3x \qquad\qquad +3x$

$$\frac{2y}{2} = \frac{3x - 5}{2}$$

$$y = \frac{3}{2}x - \frac{5}{2}$$ ✓

$\boxed{A}$

B) $-3x + 2y = 5$

$\quad +3x \qquad\qquad +3x$

$$\frac{2y}{2} = \frac{3x + 5}{2}$$

$$y = \frac{3}{2}x + \frac{5}{2}$$

May 2019

No Call

#6

$$(1-H)V_B = \frac{V_P}{1-H}\cdot(1-H)$$

$$\downarrow$$

$$(1-H)V_B = V_P$$

$$V_B - HV_B = V_P$$

$$-V_B \qquad\qquad -V_B$$

$$\frac{-HV_B}{-V_B} = \frac{V_P - V_B}{-V_B}$$

$$H = \frac{V_P}{-V_B} - \frac{V_B}{-V_B}$$

$$H = -\frac{V_P}{V_B} + 1$$

$$\boxed{A}$$

May 2019

No Calc

#8

$$2x^2 - 2 = 2x + 3$$
$$-2x \qquad -2x$$

$$2x^2 - 2x - 2 = 3$$
$$-3 \qquad -3$$

$$2x^2 - 2x - 5 = 0$$

$a = 2$

$b = -2$

$c = -5$

$$\frac{-(-2) \pm \sqrt{(-2)^2 - 4(2)(-5)}}{2(2)}$$

$$\frac{2 \pm \sqrt{4 - 8(-5)}}{4}$$

$$\frac{2 \pm \sqrt{4+40}}{4}$$

$$\frac{2 \pm \sqrt{44}}{4}$$

$\sqrt{44}$

$\sqrt{4} \quad \sqrt{11}$

$2\sqrt{11}$

$$\frac{2 \pm 2\sqrt{11}}{4} = \frac{1 \pm \sqrt{11}}{2}$$

$\boxed{D}$

APR 2019

NO CALC

#17

$$5(x+a)+3(x^2-a)=3x^2+5x+4$$

$$\downarrow$$

$$5x+5a+3x^2-3a=3x^2+5x+4$$

$$\downarrow$$

$$3x^2+5x+2a=3x^2+5x+4$$

$$\frac{2a}{2}=\frac{4}{2}$$

$$a=2$$

$$\boxed{2}$$