SAT Scores *The College Board now reports SAT scores with a new scale, which has the new scale score y defined as a function of the old scale score x by the equation $y = 0.97x + 128.3829$. Suppose a college requires a new scale score greater than or equal to 1000 to admit a student. To determine what old score values would be equivalent to the new scores that would result in admission to this college, do the following:*[1]

a. *Write an inequality to represent the problem, and solve it algebraically.*

The problem tells us how to translate old scores, x, into new scores that are represented by y.

To be admitted to this college we need a new score that is greater than or equal to 1000. Algebraically, we write $y \geq 1000$.

Since we're looking for old scores, substitute the equation into y and solve for x.

$$\begin{aligned} y &\geq 1000 \\ 0.97x + 128.3829 &\geq 1000 \\ 0.97x &\geq 871.6171 \\ x &\geq 898.57 \end{aligned}$$

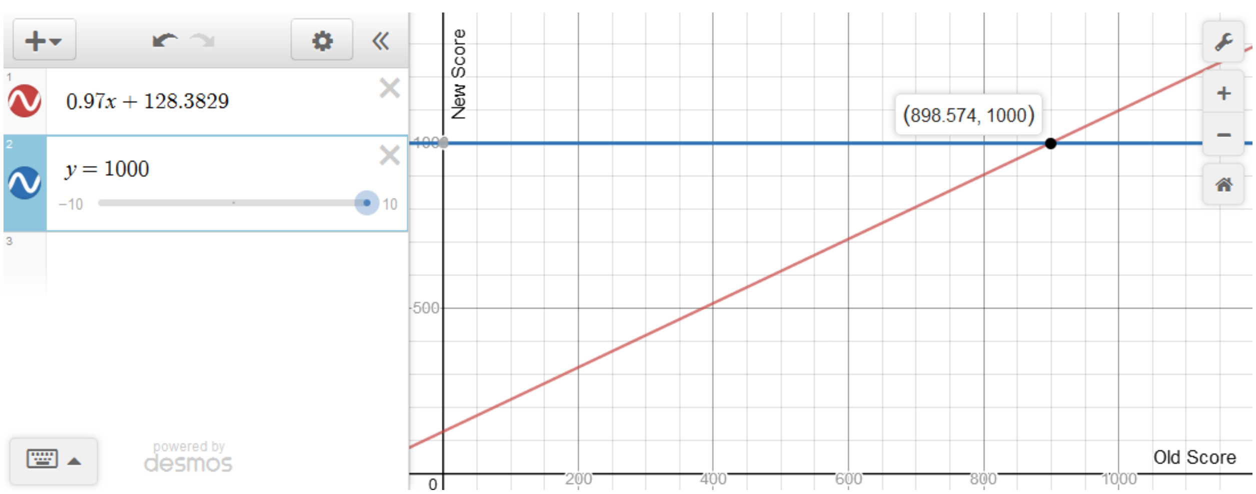
Rounding to a non-fractional score gives us $x \geq 899$.

The old score values that would result in admission to this college are scores of 899 or higher.

b. *Solve the inequality from part (a) graphically to verify your result.*

The question becomes, "For what values of x (the old scores) are the y-values (the new scores) greater than or equal to 1000?"

Here are two lines. One is given by the equation $y = 0.97x + 128.3829$ and the other, the horixontal line, represents a new score of 1000.



The two lines intersect at the point $(898.574, 1000)$ and it is at this point where, as x increases, the y-values generated by the equation $y = 0.97x + 128.3829$ change from being less than 1000 to greater than 1000.

So, we have verified that any x-values greater than or equal to 898.574 will result in a y-value that is greater than or equal to 1000. And again, the old score values that would result in admission to this college are scores of 899 or higher.

[1] Harshbarger/Yocco, *College Algebra In Context*, 5e, p. 149, #38.