Name: *Caleb McWhorter — Solutions*
MATH 101
Fall 2021
HW 15: Due 11/16

"I wanted to buy a candle holder, but the store didn't have one. So I got a cake."
–Mitch Hedberg

Problem 1. (10pt) Write the function $f(x) = -5(2^{x-1})$ in the form $y = Ab^x$ for some A and b. Show all your work.

Solution.

$$f(x) = -5(2^{x-1}) = -5(2^{-1} \cdot 2^x) = -5 \cdot \frac{1}{2} \cdot 2^x = -\frac{5}{2}\left(2^x\right)$$

Therefore, $f(x) = -\frac{5}{2}(2^x)$, where here $A = -\frac{5}{2}$ and $b = 2$.

Problem 2. (10pt) Write the function $f(x) = 6(3^{2x+1})$ in the form $y = Ab^x$ for some A and b. Show all your work.

Solution.

$$f(x) = 6(3^{2x+1}) = 6(3^1 \cdot 3^{2x}) = 6 \cdot 3 \cdot 3^{2x} = 18(3^2)^x = 18(9^x)$$

Therefore, $f(x) = 18(9^x)$, where here $A = 18$ and $b = 9$.

Problem 3. (10pt) Solve the equation $4^{x+1} = \dfrac{1}{16}$. Show all your work.

Solution.

$$4^{x+1} = \frac{1}{16}$$

$$4^{x+1} = \frac{1}{4^2}$$

$$4^{x+1} = 4^{-2}$$

Because the bases on both sides are equal, we must have $x + 1 = -2$. But then $x = -3$.

Problem 4. (10pt) Solve the equation $25^{1-x} + 3 = 4$. Show all your work.

Solution.

$$25^{1-x} + 3 = 4$$

$$25^{1-x} = 1$$

$$25^{1-x} = 25^0$$

Because the bases on both sides are equal, we must have $1 - x = 0$. But then $x = 1$.