Name: ____________________________________ Date: ___________________

THE METHOD OF COMMON BASES
COMMON CORE ALGEBRA II HOMEWORK

FLUENCY

1. Solve each of the following exponential equations using the Method of Common Bases. Each equation will result in a linear equation with one solution. Check your answers.

(a) $3^{2x-5}=9$ (b) $2^{3x+7}=16$ (c) $5^{4x-5}=\frac{1}{125}$

(d) $8^{x}=4^{2x+1}$ (e) $216^{x-2}=\left(\frac{1}{1296}\right)^{3x-2}$ (f) $\left(\frac{1}{25}\right)^{x+15}=3125^{\frac{3}{5}x-1}$

2. *Algebraically* determine the intersection point of the two exponential functions shown below. Recall that most systems of equations are solved by substitution.

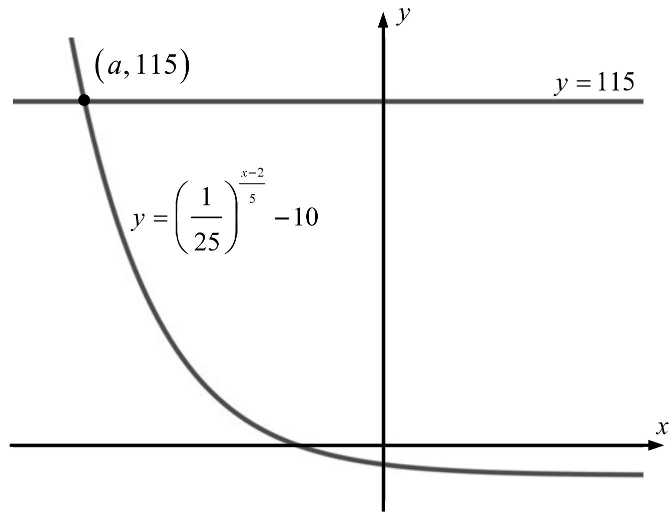
$$y=8^{x-1} \text{ and } y=4^{2x-3}$$

3. *Algebraically* determine the **zeroes** of the exponential function $f(x)=2^{2x-9}-32$. Recall that the reason it is known as a zero is because the **output is zero**.

APPLICATIONS

4. One hundred must be raised to what power in order to be equal to a million cubed? Solve this problem using the Method of Common Bases. Show the algebra you do to find your solution.

5. The exponential function $y=\left(\frac{1}{25}\right)^{\frac{x-2}{5}}-10$ is shown graphed along with the horizontal line $y=115$. Their intersection point is $(a,115)$. Use the Method of Common Bases to find the value of a. Show your work.



REASONING

6 The Method of Common Bases works because exponential functions are one-to-one, i.e. if the outputs are the same, then the inputs must also be the same. This is what allows us to say that if $2^x=2^3$, then x must be equal to 3. But it doesn't always work out so easily.

If $x^2=5^2$, can we say that x must be 5? Could it be anything else? Why does this not work out as easily as the exponential case?