Warm-up

Use your Alg II knowledge and intuition to attempt:

1) Solve $4^{3x-1} = 16$

2) Solve $4^{3x-1} = 32$

3) Solve $3^{2x-1} = 9^{2x+1}$

4) Solve $\frac{5^x}{25^{x+1}} = 125$

Log Functions Day 4:

- (2.13) Exponential Equations
- (2.10/2.13) Inverse of Exponential Functions

Homework:
Exponential Equations

Quiz Next Class!
(On days 1 - 3)

General approach to exponential equations

1. Isolate the exponential part
2. Take the log of both sides
3. Solve for x (distribute, rearrange, factor)

Example A: $4^{2x-3} - 3 = 137$

Example B+C

Example B

$$4e^{7x} + 10 = 22$$

Example C

$$4\left(3^{2x-3}\right) - 3 = 17$$

Example D+E

Example D

$$\frac{119}{e^{6x}+14}=7$$

Example E

$$\left(8^{x+1}\right)\left(2^{x-1}\right)=10$$

Example F+G

Example F

$e^{4x-5} + 10 = 12$

Example G: Find the x-value of the point at which the graph of $f(x) = 9^{x-3}$ intersects the graph of $g(x) = 3^{x+5}$

Example H

$$2^{2x} - 5(2)^x + 4 = 0$$

Example I

$$9^{2x} + 6(9)^{x} - 27 = 0$$

Example J - Actual Question From 2025 AP Exam FRQ 4

The function m is given by $m(x) = e^{2x} - e^{x} - 12$.
Find all inputs in the domain of m that yield an output value of 0.

Example K - Inverse Functions

Let $f(x) = 3(2)^x + 5$. Find an expression for $f^{-1}(x)$.

Example L+M - Inverse Functions

Let $g(x) = 3^{x+4} - 10$. Find $g^{-1}(x)$.

Let $h(x) = e^{2x-5}$. Find $h^{-1}(x)$.

Example N

Let $f(x) = -5^{3x+4} + 7$

Find an expression for $f^{-1}(x)$

Example O - Calculator/Desmos

Let $f(x) = \frac{20}{e^{kx}+2}$. If $f(-2) = 5$, find k.

Given this value of k, find $f(1)$.

Example P - Calculator/Desmos

Let $g(x) = 100 - 3^{kx+1}$. If $g(2) = -56$, find k.

Given this value of k, find $g(-3)$.