

# AP Precalculus - M3Y & M3Z

## Exponentials and Logarithms - Homework 1

1. Solve the following equations:

(i)  $\log_3(4x - 7) = 2$

(ii)  $\ln(3x - 12 + e^2) = 2$

(iii)  $\log_2(x^2 - 4) = 4$

(iv)  $\log(x + 3) - \log(2x + 8) = 0$

(v)  $\log_{\frac{1}{5}}(x^2 - 6x) = \log_{\frac{1}{5}}(18 - 3x)$

(vi)  $\ln(2^x - 8) = \ln(2^{x-2} + 4)$

(vii)  $\log_{16} x + \log_4 x + \log_2 x = 7$

(viii)  $3 \cdot 2^x + 4 = 36 - 13 \cdot 2^x$

(ix)  $e^{x^2-7x} = \frac{1}{e^{10}}$

(x)  $5^{x-1} = 3^x$

2. Solve the following inequalities:

(i)  $5^x - 15 \leq 10 - 4 \cdot 5^x$

(ii)  $\frac{e^x - 1}{e^x + 1} < \frac{1}{2}$

(iii)  $\log_3(x - 12) < 3$

(iv)  $\log(x + 1) > \log x + \log 5$

(v)  $\log_{\frac{1}{3}}(x - 2) \geq -1$

(vi)  $2 \log 5 + x \log 3 \leq \log 9 + x \log 5$

3. Find the domain and the inverse of the following functions:

(i)  $f(x) = \log(2x - 6)$

(ii)  $g(x) = 6^{5x-3}$

(iii)  $h(x) = \log_{\frac{1}{2}}(2^{2x-5} - 8)$