

Math 170 Week 9

Problem of the week

Solve for x.

$$(\log_7 x)^2 - \log_7 x^{\textcircled{3}} = 10$$

-10 -10

$$(\log_7 x)^2 - 3(\log_7 x) - 10 = 0$$

$$\text{let } w = \log_7 x$$

$$w^2 - 3w - 10 = 0$$

$$(w - 5)(w + 2) = 0$$

$$\left. \begin{array}{l} w - 5 = 0 \\ \quad +5 \quad -5 \\ \hline w = 5 \end{array} \right\} \begin{array}{l} w + 2 = 0 \\ \quad -2 \quad -2 \\ \hline w = -2 \end{array}$$

ln substitute

$$\log_7 x = 5$$

$$7^5 = x$$

$$x = 16807$$

$$\log_7 x = -2$$

$$7^{-2} = x$$

$$x = \frac{1}{49}$$