1. (a) Objective: Do a matched transform for the log transformation for the California Dataset, such that function $z = a \log_{10} x + b$
From the California data subset, the median is 179140.5.
Step 1: Calculate T′, Given $T(x) = log(x) = log_{10}e * log_e x$
T′ $= log_{10}e * \frac{1}{x} = \frac{0.4343}{x}$
Median $= x_0 =$ 179140.5 (Given)
Step 2: Calculate b
From lecture notes, b=$\frac{1}{T'(x_0)} = \frac{x_0}{0.4343} = \frac{179140.5}{0.4343} = 412481$
Step 3: Calculate a
Also from Lecture Notes, $a = x_0 - b * log_{10} x_0$
$= 179140.5 - 412481 * log_{10} 179140.5$
$\approx$ -1987702
Hence rounding a and b, the matched value transformation is, $z = 412481 * log(x) - 1987702$