

## Homework Handout for Class 28, Due with Homework 11

Name:

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Consider the equation  $x^m - A = 0$ . Show that Newton's method can be used to produce a Generalized Babylonian algorithm which produces an approximation to  $\sqrt[m]{A} = A^{1/m}$ .

The Generalized Babylonian Algorithm is  $x_{n+1} = \frac{1}{m} \left( (m-1)x_n + \frac{A}{x_n^{m-1}} \right)$ . (Confirm that  $m = 2$  corresponds to the standard Babylonian Algorithm.)

2. Use a computing device and the Generalized Babylonian Algorithm to estimate  $7^{1/5}$  to 9 decimal places. (Show all your steps.)

3. Use a computing device and the Generalized Babylonian Algorithm to estimate  $2^{5/3}$  to 9 decimal places. (Show all your steps.)