Approximating Cube Roots:

A. Since cube roots give a smaller number than square roots, we have to be a little more accurate in determining approximations to cube roots than to square roots. See *Approximating Square Roots*.

B. This method is very similar to finding the exact value of cube roots, and thus should be reviewed. Also, this method involves a lot with cube numbers.

C. Like approximating square roots, approximating cube roots involves educated guessing.

1. Starting from the right, chop off 3 digits at a time until you are left with 3, 4, or 5 numbers.
2. Find 2 cubes, within a range of 1, that the number from step 1 is between.
3. Make an educated guess as to where the number might fall between the cubes.
4. Multiply by $10^{n/3}$, where n is the number of digits mentally taken off from step 1.

Ex [1] $\sqrt[3]{1411938}$ = __________.

a. Chop off 3 numbers to leave 1411.
b. We know that $11^3 = 1331$ and $12^3 = 1728$.
c. 1411 is close to 1331 than to 1728 so we might use 11.2.
d. Multiplying by 10 (since we took off 3 digits) we get 112.
e. The answer can be between 107 and 117.

Ex [2] $\sqrt[3]{10000000}$ = __________.

a. Chop off 3 digits to leave 10000.
b. We know that $21^3 = 9261$ and $22^3 = 10648$.
c. 10000 is a little closer to 10648 than to 9261 so we might use 21.6.
d. Multiplying by 10 we get 216.
e. The answer can be between 205 and 226.

Ex [3] $\sqrt[3]{698147326}$ = ___________

a. Chop off 6 digits to leave 698.

b. We know that $8^3 = 512$ and $9^3 = 729$.

c. 698 is very close to 729 so we might use 8.9.

d. Multiply by 100 (since we chopped off 6 digits) we get 890.

e. The answer can be between 843 and 931.

D. Even though we are dealing with smaller numbers, guessing still isn't that important and you should not spend much time trying to decide what to use as you should already be close.