Do It Again!
Using iteration and Sequences to Solve Equations

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Example 1

$$x^2 - x - 3 = 0$$

Example 2

$$x^3 + 3x - 1 = 0$$

Example 3

$$x^5 - 2x + 4 = 0$$

Example 4

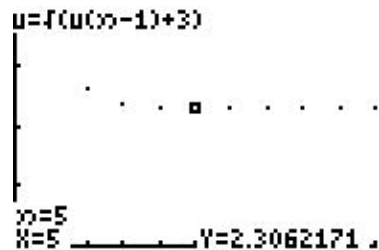$$x = \log(x + 4)$$

Example 5

$$2\sin x - x = 0$$

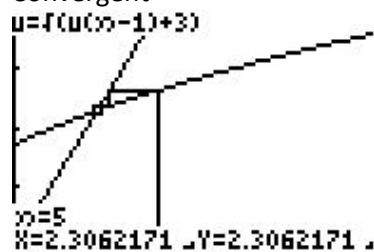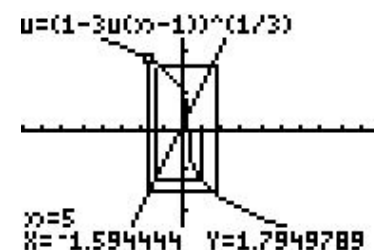Sequence Mode

$$x^2 - x - 3 = 0$$
$$x = \sqrt{x + 3}$$

Cobweb Diagrams

Convergent

Divergent

Applications in SEQ Mode

1. Lee takes 400 mg of medication every 24 hours. At the end of that time period, Lee's kidneys remove 60% of the medication from Lee's bloodstream. If Lee begins this regimen on July 1,
   a. How much medication is in Lee's system on July 4 (after taking the meds in the morning)?
   b. How much is in Lee's system on July 10?
   c. If Lee continues on this regimen, how much will be in Lee's system in the long run (to what value does the medication converge)?

2. Merrill wants to buy a car for $20,000. The car company will finance $12,000 at 0.5% monthly. If Merrill makes the $8000 down payment and then pays $350/month,
   a. What is Merrill's balance after 1 year?
   b. Two years?
   c. Three years?
   d. How much interest has Merrill paid after 3 years?

3. You are stocking a fish pond in your back yard (which must be a lot bigger than mine). You start by putting in 200 fish, who increase their numbers by 3% per month, and you add in another 50 fish per month.
   a. How many fish do you have at the end of the first month (beginning of the second month)?
   b. How many fish do you have at the end of the first year (beginning of the 13th month)?

4. Chris and Alex are taking out a mortgage of $200,000 on a new home. The bank is lending them this tidy sum at 6% compounded monthly. They are planning to pay $1000/month on their mortgage.
   a. What is the balance on their loan after the first month?
   b. After the second month?
   c. What suggestion do you have for these young and mathematically impractical people?