Just sit right back and you'll hear a tale,
A tale of a fateful trip
That started from this tropic port,
Aboard this tiny Ship.

The mate was a mighty sailin' man,
The Skipper brave and sure,
Five passengers set sail that day
For a three hour tour.

A three hour tour.

The weather started getting rough,
The tiny ship was tossed.
If not for the courage of the fearless crew,
The Minnow would be lost.

The Minnow would be lost.

The ship's aground on the shore of this
Uncharted desert isle
With Gilligan, the Skipper too,
The Millionaire and his wife,
A movie star, the Professor and Mary Ann,
Here on Gilligan's Isle!

Those of you who are fans of classic TV will recognize this as the beginning of the theme song to the sitcom "Gilligan's Island". This series ran from September 26, 1964 to September 4, 1967. The series revolved around 7 castaways (4 men and 3 women) marooned on an island somewhere near Hawaii.

Over the course of three seasons, the series followed attempts to leave the island, visitors to the island and general incompetence in getting rescued. When the series was cancelled in 1967, the castaways were never rescued.

In 1978, a made for TV movie called “Rescue from Gilligan’s Island” aired in which the castaways were rescued. However, at the end of this movie they decided to go on a reunion cruise and became stranded on the same island again after another freak storm. In 1979, another made for TV movie called “The Castaways on Gilligan’s Island” aired in which they were rescued once again. This time they decide to convert the island to a resort. It was hoped that this premise would generate a new series, but this never happened.

In 1981, a second sequel was created, “The Harlem Globetrotters on Gilligan’s Island” in which nefarious forces plotted to take over the island and the castaways are saved by the Harlem Globetrotter.

Although this series began before I was born, I watched years and years of reruns throughout my childhood. I must have watched each of the 98 episodes several times each. But there was one question that nagged at me. If there were two women on the island of child bearing age (Ginger and Mary Ann), why didn’t the population grow? Why didn’t nature take its course and lead to new castaways?

Let’s find out how many castaways there should have been in 1978, 14 years after they were originally shipwrecked.

To answer this question, let’s assume that the population on the island is an example of continuous exponential growth. This may or may not be a good choice due to the small size of the population. However, with this assumption the population after t years 1964 will be given by the function

$$A(t) = Pe^{rt}$$

In this situation, P is the initial population and r is the continuous growth rate in percent per year.

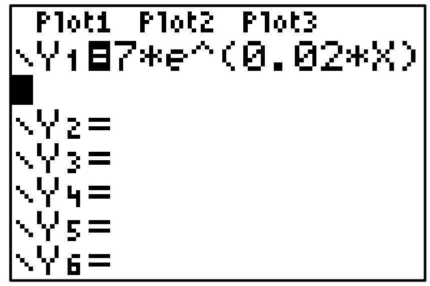
Since the population of Gilligan’s Island was initially 7, we’ll set $P = 7$. For the growth rate r, we’ll use a fairly conservative rate of 2% per year. This is about what the world birth rate is. Around the world brith rates vary from a little less than 1% (China) to around 5% (African countries). With these values, we model the population by

$$A(t) = 7e^{0.02t}$$

To predict the population in 1978, I’ll graph this function on a graphing calculator and trace to x = 14.

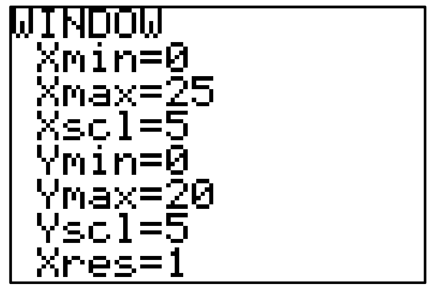
Enter the function

1. To enter the function, press [Y=].
2. In the first line of the equation editor, enter the function $Y_1 = 7e^{0.02X}$ by pressing [7][×][2nd][LN][0][.][0][2][×][X,T,Θ,n][)] The [2nd][LN] key combination creates the exponential function.



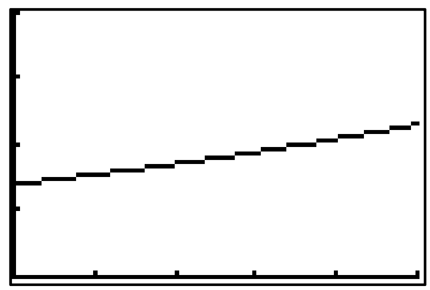
Set the window

3. Press the [WINDOW] button.
4. Set the window so that it looks like the one to the right.



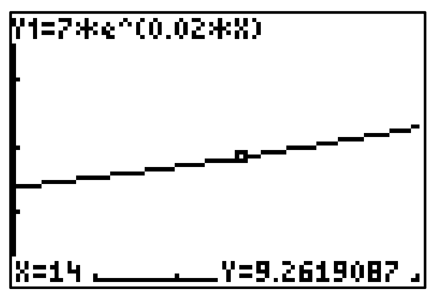
Graph the function

5. Press [GRAPH] to see the function.



Find the value of the function at x = 14.

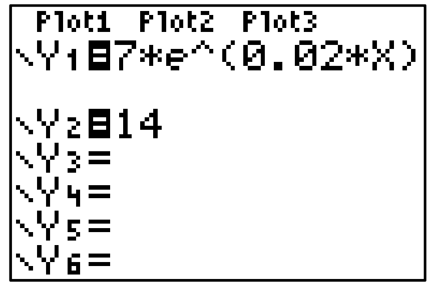
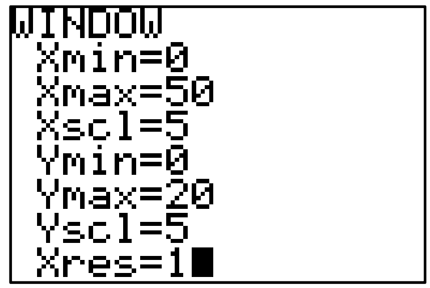
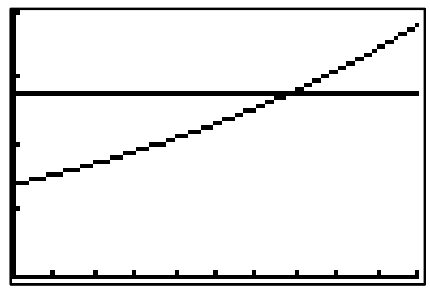
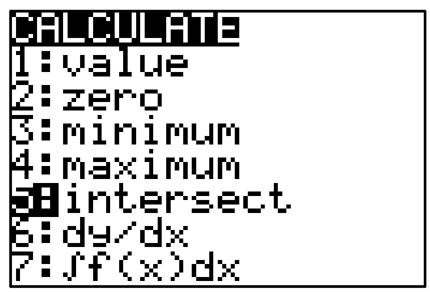
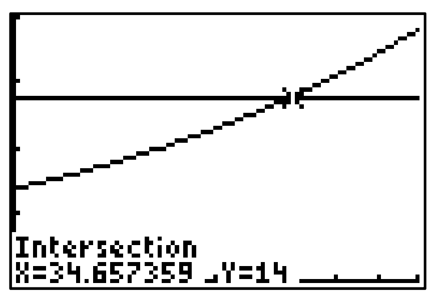
6. Press [TRACE].
7. Press [1][4][ENTER] to calculate the functions value. This means that in 1978 there should have been about 9 people on the island.



Populations are often described by their doubling times. The doubling time is the amount of time it takes a population to double. Since Gilligan's Island started out with a population of 7, we can find the doubling time by finding when the population should reach 14. By solving the equation

$$14 = 7e^{0.02t}$$

graphically, we can find the value of t. We'll do this by utilizing the Method of Intersection.

Enter the new function 8. To enter the function, press [Y=]. 9. In the second line of the equation editor, enter the function $Y_2 = 14$ by pressing [1][4].	
Set the window 10. Press the [WINDOW] button. 11. Since the doubling time is greater than 25 years, we need to increase Xmax to 50.	
Graph the functions 12. Press [GRAPH] to see the functions.	
Find the point of intersection 13. Press [2nd][TRACE] to access the CALC menu. 14. Press [5] or use the arrow keys to highlight 5: intersect and press [ENTER].	
15. To select the first curve, press [ENTER]. 16. To select the second curve press [ENTER]. 17. Use the arrow keys [◄][►] to move the cursor to a point near the point of intersection and press [ENTER]. The point of intersection is approximately (34.66, 14).	

Based on the graph, the population of Gilligan's Island would double every 34.66 years since the doubling time is 34.66 years.