

Chapter 4

Exponential and Logarithmic Functions

Figure 4.1.1: graph of
a linear function, illustrating inverses

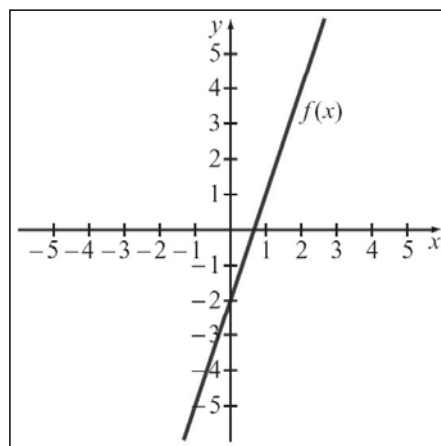
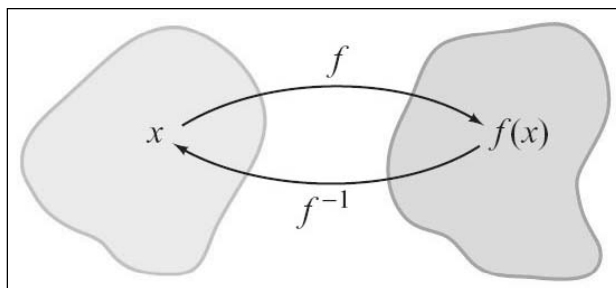


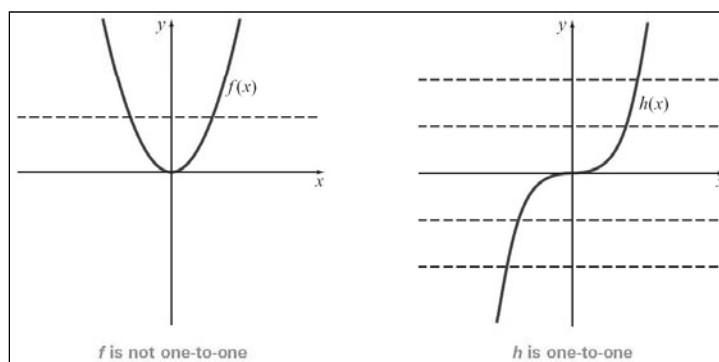
Figure 4.1.2: *Relationship between f and f^{-1}*



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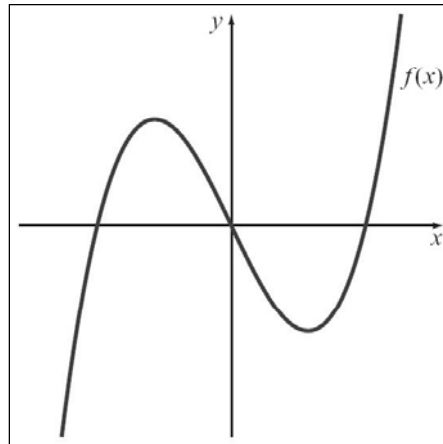
Figure 4.1.3: *Horizontal line test, to determine if a function is one-to-one*



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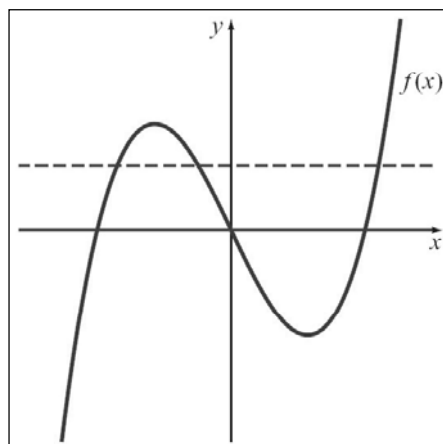
Figure 4.1.4: example of function to apply horizontal line test



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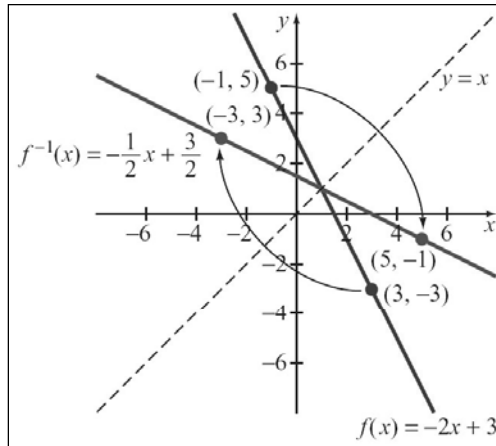
Figure 4.1.5: *Horizontal line test*, applied to function



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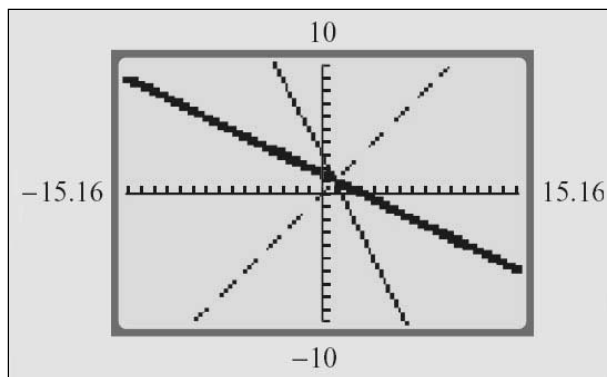
Figure 4.1.6: graph of a linear function and its inverse



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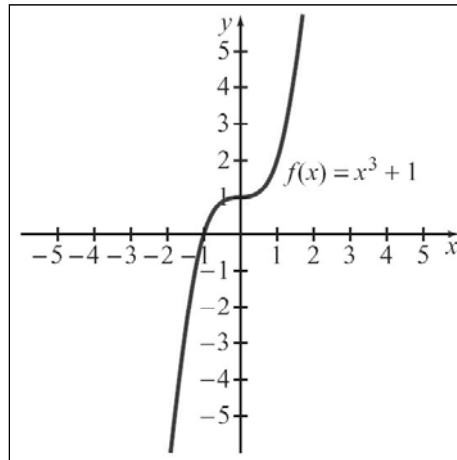
Figure 4.1.7: calculator screen showing the graph of a linear function and its inverse



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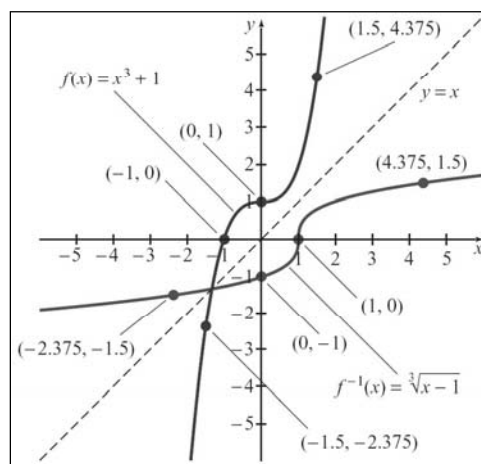
Figure 4.1.8: graph of a polynomial function



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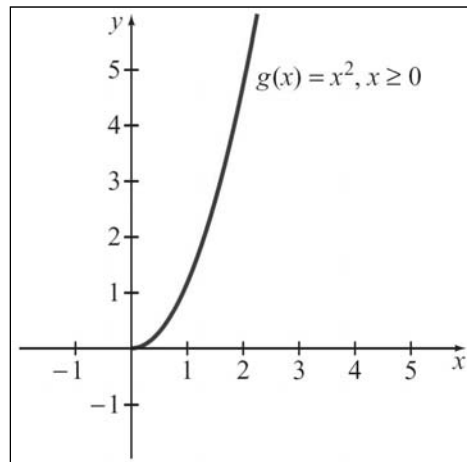
Figure 4.1.9: graph of a polynomial function and its inverse



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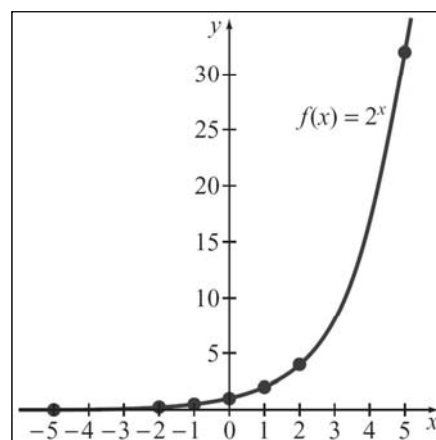
Figure 4.1.10: graph
of a polynomial function



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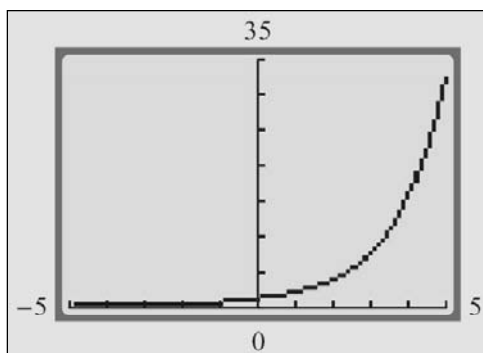
Figure 4.2.1: graph
of an exponential function



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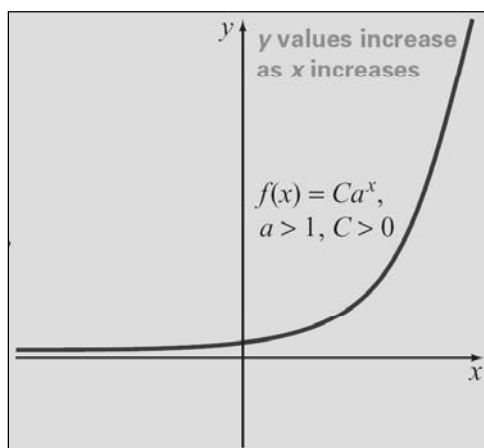
Figure 4.2.2: calculator screen with graph of an exponential function



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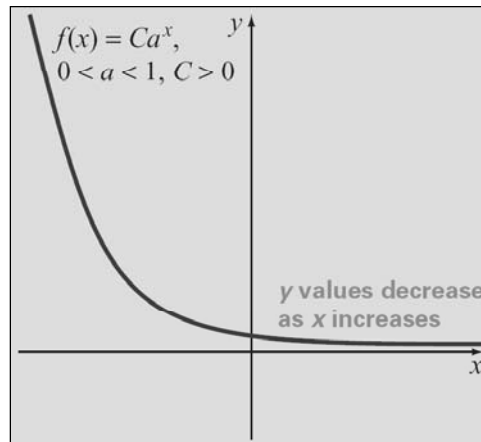
Figure 4.2.3: illustration of a graph showing exponential growth



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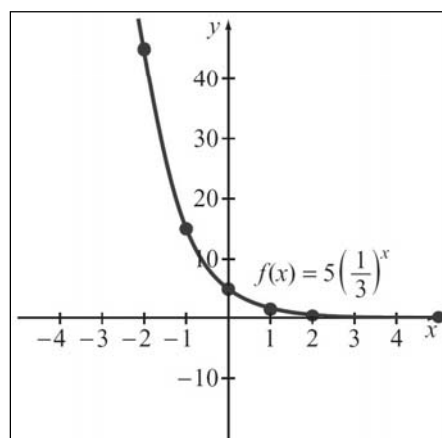
Figure 4.2.4: illustration of a graph showing exponential growth



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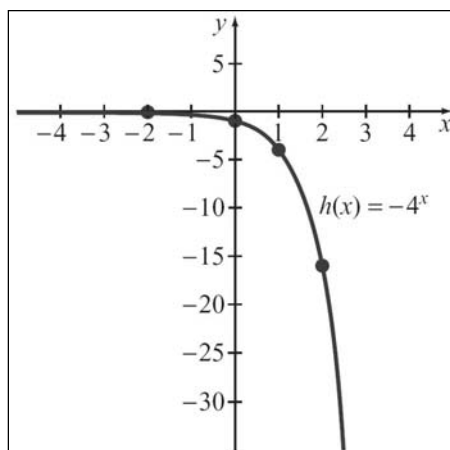
Figure 4.2.5: graph of an exponential function



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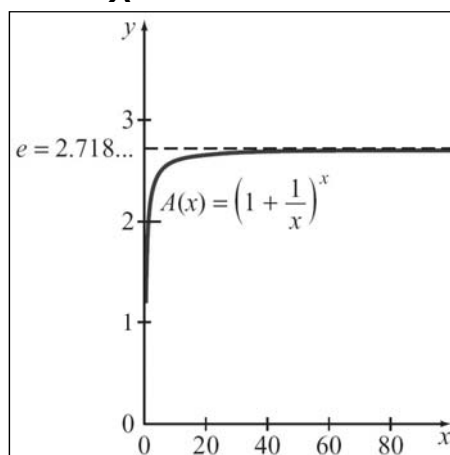
Figure 4.2.6: graph of an exponential function



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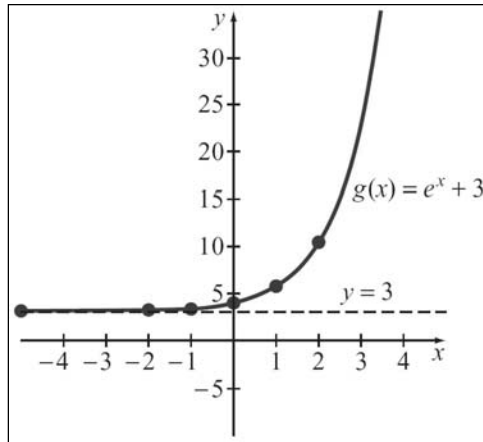
Figure 4.2.7: graph of $y = (1 + \frac{1}{x})^x$ approaching $y = e$



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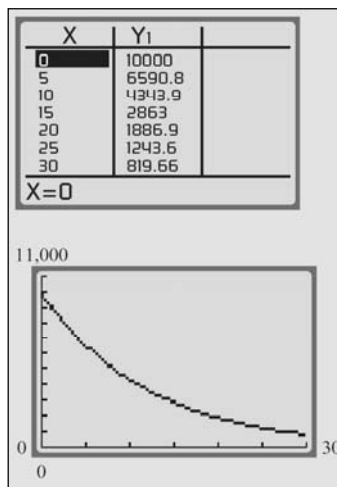
Figure 4.2.8: graph of an exponential function with base e



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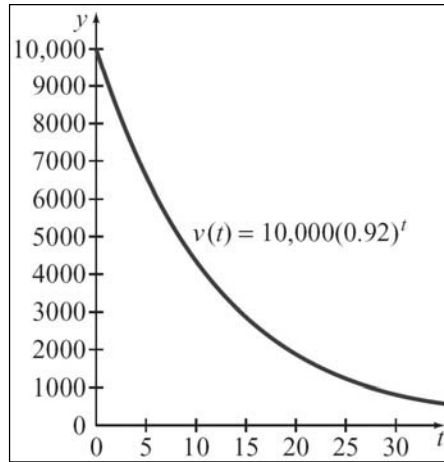
Figure 4.2.9: 2 calculator screens showing table and graph for an exponential function



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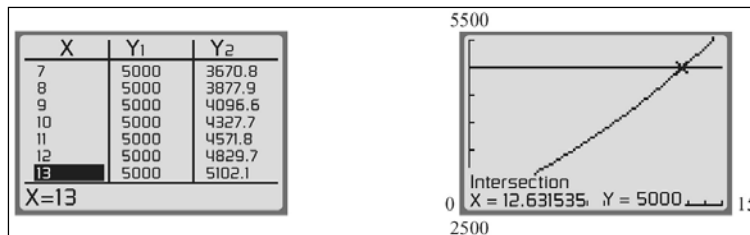
Figure 4.2.10: graph of an exponential decay function



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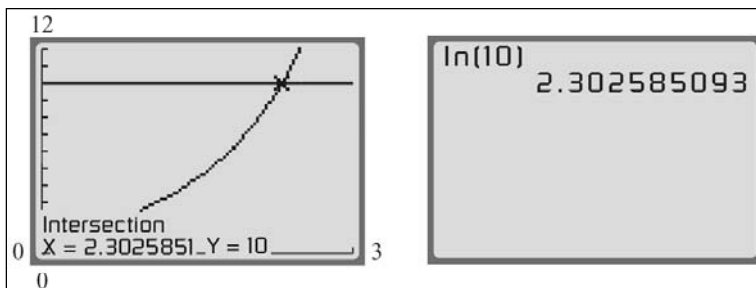
Figure 4.2.11: 2 calculator screens showing table and graph with intersection of an exponential function, to find doubling time



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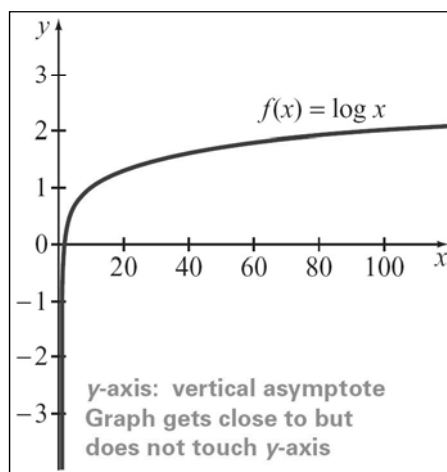
Figure 4.3.1: 2 calculator screens showing graph of e^x with intersection, and finding natural log



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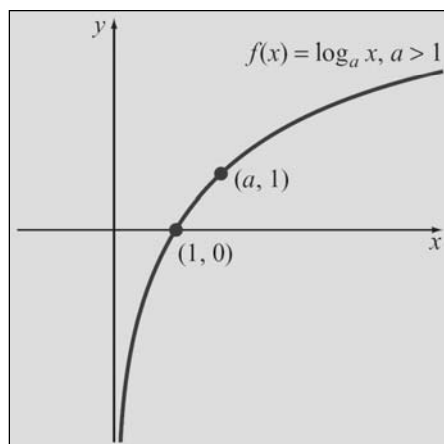
Figure 4.3.2: graph of $f(x) = \log x$



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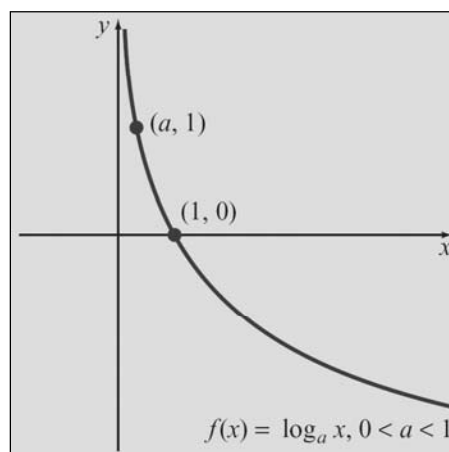
Figure 4.3.3: illustration of behavior of $\log_a x$, $a > 1$



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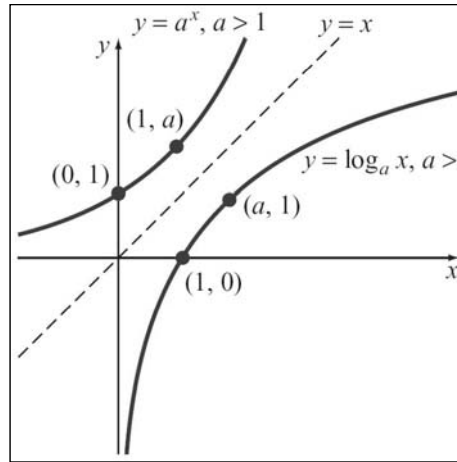
Figure 4.3.4: illustration of behavior of $\log_a x$, $a < 1$



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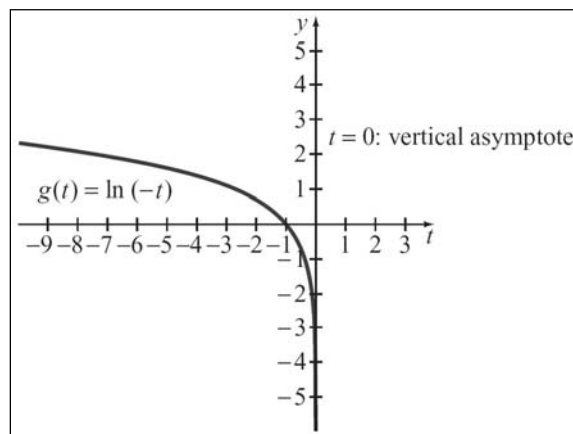
Figure 4.3.5: graph with $y = a^x$ and $y = \log_a x$



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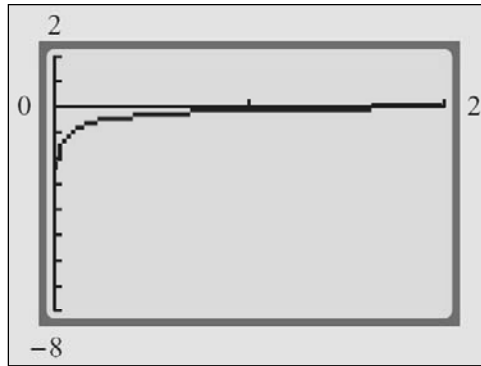
Figure 4.3.6: graph of a logarithmic function, with asymptote



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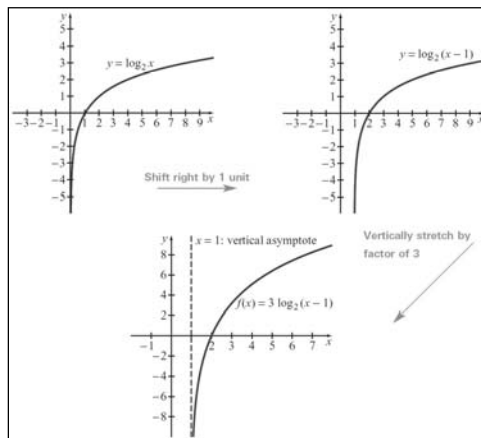
Figure 4.3.7: calculator screen with graph of $y = \log x$, which stops near the vertical axis



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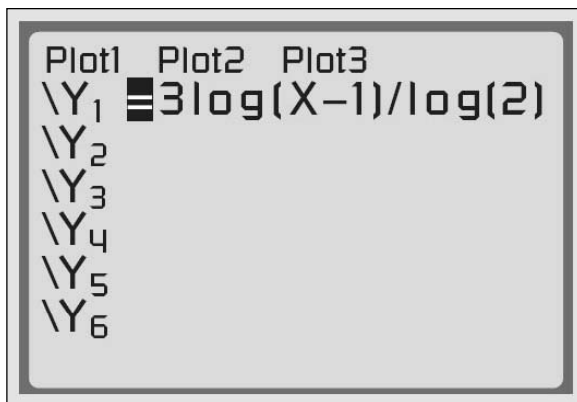
Figure 4.3.8: 3 graphs showing transformations of the graph of a logarithmic function



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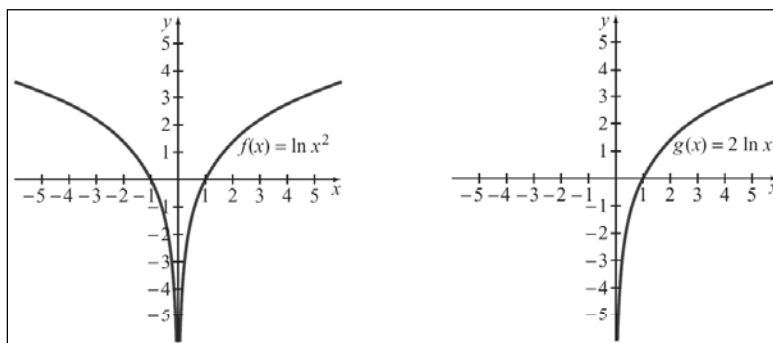
Figure 4.3.9: calculator screen with Y= screen for logarithmic equation including change of base needed to graph



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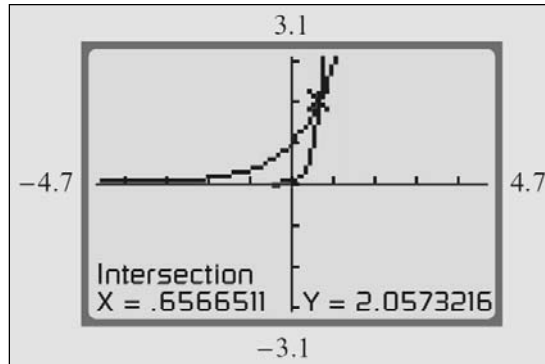
Figure 4.4.1: graphs of $\ln x^2$ and $2 \ln x$



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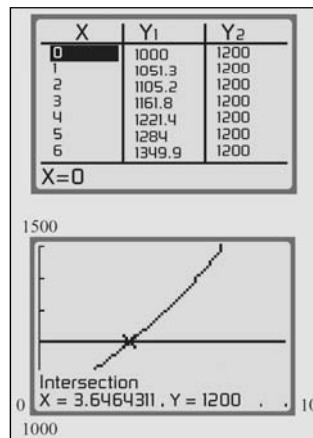
Figure 4.5.1: calculator screen using INTERSECT feature to solve an exponential equation



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Figure 4.5.2: 2 calculator screens, showing table and graph with intersection to solve an exponential equation



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Figure 4.5.3: calculator screen with table of values for an exponential function

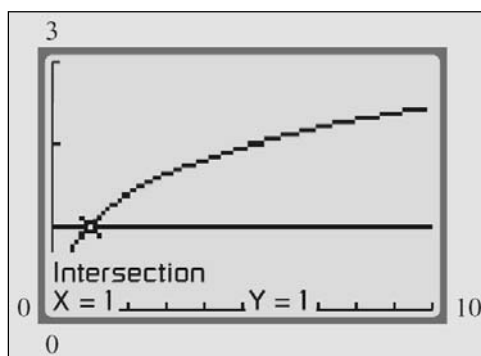
X	Y1
0	10.7
1	5.136
2	2.4653
3	1.1833
4	.568
5	.27264
6	.13087

X=0

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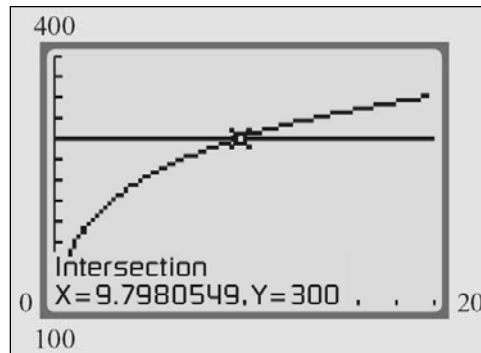
Figure 4.5.4: calculator screen using INTERSECT feature to solve a logarithmic equation



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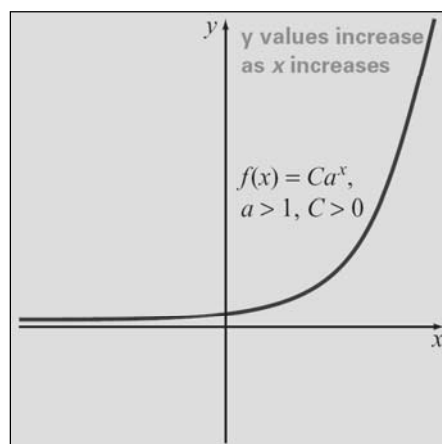
Figure 4.5.5: calculator screen using INTERSECT feature to solve a logarithmic equation



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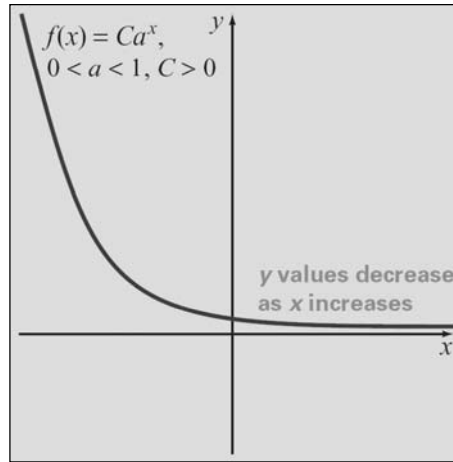
Figure 4.6.1: illustration of a graph showing exponential growth



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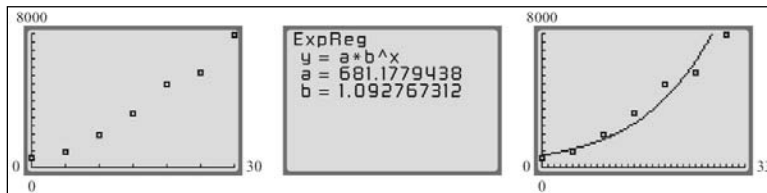
Figure 4.6.2: illustration of a graph showing exponential decay



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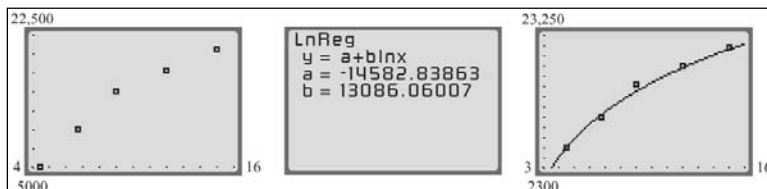
Figure 4.6.3: 3 calculator screens showing scatter plot, exponential regression, and graph with the exponential model and scatter plot



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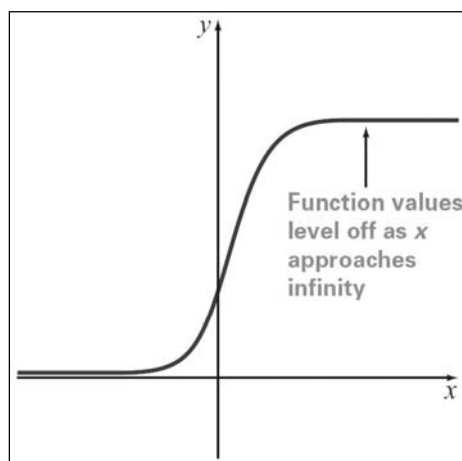
Figure 4.6.4: 3 calculator screens showing scatter plot, logarithmic regression, and graph with the logarithmic model and scatter plot



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Figure 4.6.5: *Graph of logistic function*



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Figure 4.6.6: 3 calculator screens showing scatter plot, finding logistic model, and graph with the logistic model and scatter plot

