

College Algebra, Section 5.1, #50  
Exponential Functions

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**Inflation** An antique table increases in value according to the function  $v(x) = 850(1.04^x)$  dollars, where  $x$  is the number of years after 1990.<sup>1</sup>

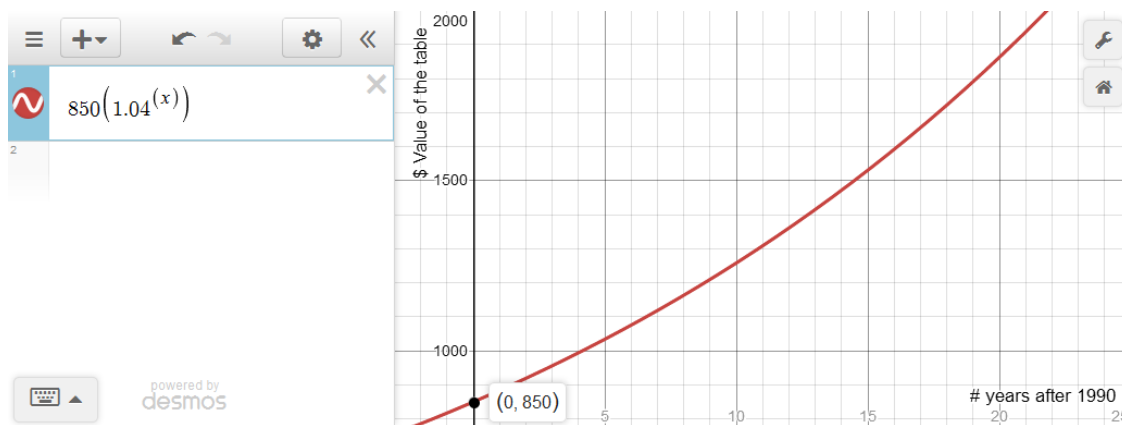
a. How much was the table worth in 1990?

Since 1990 is zero years after 1990, we'll let  $x = 0$  and solve for  $v(0)$ .

$$\begin{aligned}v(x) &= 850(1.04^x) \\v(0) &= 850(1.04^0) \\&= 850(1) \\&= 850\end{aligned}$$

The table was worth \$850 in 1990.

We can also see this from the graph of  $v(x)$ .



The point  $(0, 850)$  tells us that 0 years after 1990, the value of the table is \$850.

b. If the pattern indicated by the function remains valid, what was the value of the table in 2005?

2005 is 15 years after 1990 so we'll let  $x = 15$  and solve for  $v(15)$ .

$$\begin{aligned}v(x) &= 850(1.04^x) \\v(15) &= 850(1.04^{15}) \\&= 850(1.800943506) \\&= 1530.80198\end{aligned}$$

In 2005 the value of the table was \$1530.80.

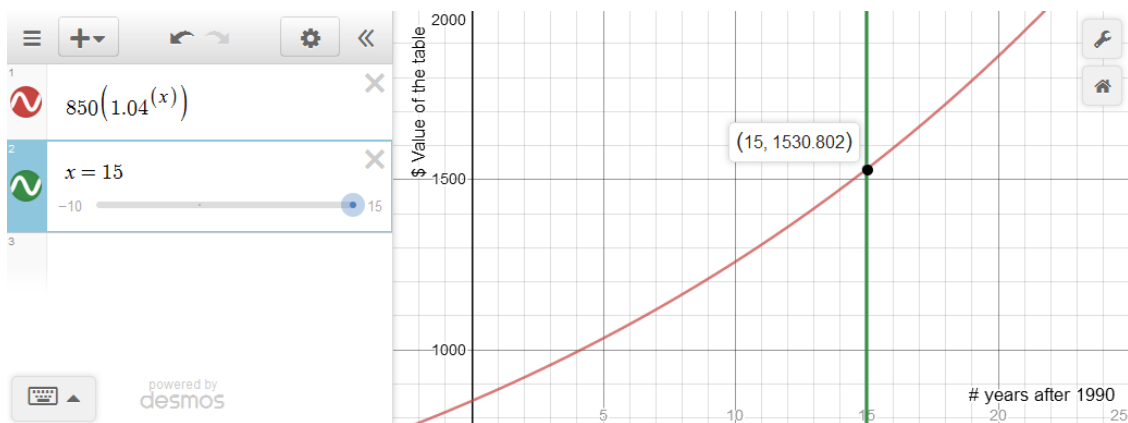
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<sup>1</sup>Harshbarger/Yocco, *College Algebra In Context*, 5e, p. 325, #50.

## College Algebra

### Exponential Functions

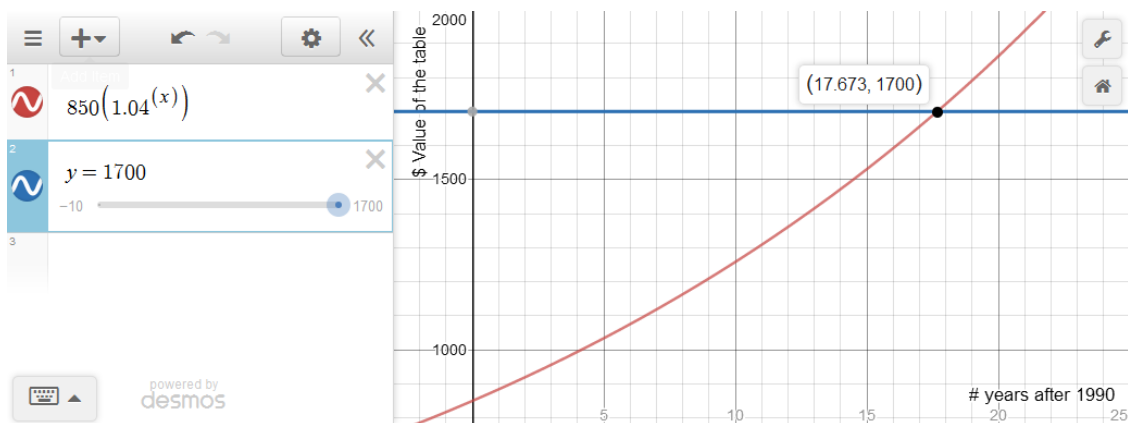
On the graph, we'll look for the intersection of  $v(x)$  and the vertical line  $x = 15$ .



The point  $(15, 1530.802)$  tells us that 15 years after 1990, in 2005, the value of the table is \$1530.80.

c. Use a table or graph to estimate the year when this table would reach double its 1990 value.

If the table was worth \$850 in 1990, double that value is \$1700. Since this is the value of the table and the vertical axis represents the function  $v(x)$ , we'll graph  $y = 1700$  and look for the point of intersection.



The point  $(17.673, 1700)$  tells us that 17.673 years after 1990, or in 2008, the value of the table has doubled to \$1700.