

College Algebra, Section 5.3, #52
Exponential and Logarithmic Equations

Real Estate Inflation During a 10-year period of constant inflation, the value of a \$200,000 property is given by the equation $v = 200,000 e^{0.05t}$ dollars. In how many years will the value of this building be \$254,250? ¹

We can arrive at the answer two ways: algebraically and graphically. Let's start with the algebraic solution.

Let $v = 254,250$ and solve for t , the time it will take for the building to increase in value.

$$v = 200,000 e^{0.05t}$$

$$254,250 = 200,000 e^{0.05t}$$

$$\frac{254,250}{200,000} = e^{0.05t}$$

$$1.27125 = e^{0.05t}$$

$$\ln 1.27125 = \ln e^{0.05t}$$

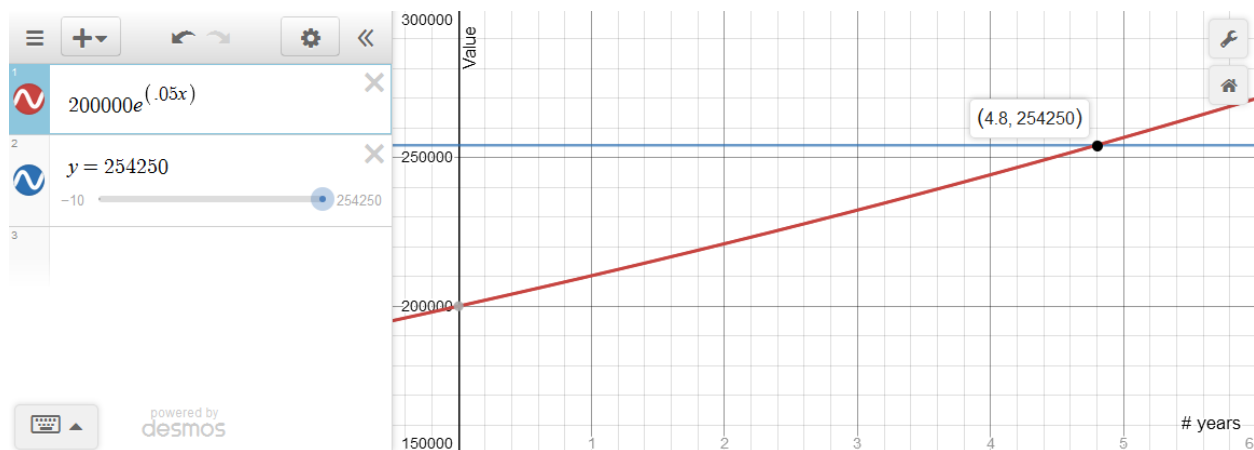
$$.2400 = 0.05t$$

$$4.800 = t$$

The value of the building will be \$254,250 in ~ 4.8 years.

And here's how this same problem would look if we did it graphically.

Graph the functions $v = 200,000 e^{0.05t}$ and $v = 254,250$ and look for their point of intersection. This point will have the form (*#years, \$value*).



The point of intersection, (4.8, 254250) shows us that value of the building will be \$254,250 in ~ 4.8 years.

¹Harshbarger/Yocco, *College Algebra In Context*, 5e, p. 355, #52.