Problem-Based Task 3.3.1: Careful Calculations

There are many things to think about when purchasing a new car: year, make, model, included options, and price. As important as these considerations are, it is also important to consider the decreasing value of the car over time.

Use the following key features to graph the value of a car over time:

- The average price of a car in the United States is approximately $30,750.
- The value decreases each year at an exponential rate and approaches the asymptote of $y = 0$.
- The average car loses nearly half its original value after 5 years.

For what values of x is the graph positive? What is the domain of this function? Identify the minimum and maximum of this graph.

Problem-Based Task 3.3.1: Careful Calculations

Coaching

a. What is the independent variable?

b. What is the minimum value of this variable?

c. What is the maximum value of this variable?

d. What is an appropriate scale for this variable?

e. What is the dependent variable?

f. What is the minimum value of this variable?

g. What is the maximum value of this variable?

h. What is an appropriate scale for this variable?

i. Is this situation modeled by a linear function or an exponential function?

j. How does the value after 5 years help you determine the shape of this graph?

k. Why does this graph have an asymptote of $y = 0$?

l. For what values of x is the graph positive?

m. Is the graph ever negative? Why or why not?

n. What is the minimum of this graph?

o. What is the maximum of this graph?

p. What is the domain of this function?