

# Unit 4 Lesson 2: Representations of Growth and Decay

## 1 One Fourth at a Time (Warm up)

### Student Task Statement

Priya borrowed \$160 from her grandmother. Each month, she pays off one fourth of the remaining balance that she owes.

1. What amount will Priya pay her grandmother in the third month?
2. Discuss with a partner why the expression  $160 \cdot \left(\frac{3}{4}\right)^3$  represents the balance Priya owes her grandmother at the end of the third month.

## 2 Climbing Cost (Optional)

### Student Task Statement

The tuition at a college was \$30,000 in 2012, \$31,200 in 2013, and \$32,448 in 2014. The tuition has been increasing by the same percentage since the year 2000.

1. The equation  $c(t) = 30,000 \cdot (1.04)^t$  represents the cost of tuition, in dollars, as a function of  $t$ , the number of years since 2012. Explain what the 30,000 and 1.04 tell us about this situation.
2. What is the percent increase in tuition from year to year?
3. What does  $c(3)$  mean in this situation? Find its value and show your reasoning.
4.
  - a. Write an expression to represent the cost of tuition in 2007.
  - b. How much did tuition cost that year?

### 3 Two Vans and Their Values (Optional)

#### Student Task Statement

A small business bought a van for \$40,000 in 2008. The van depreciates by 15% every year after its purchase.

1. Which graph correctly represents the value of the van as a function of years since its purchase? Be prepared to explain why each of the other graphs could not represent the function.

Graph A



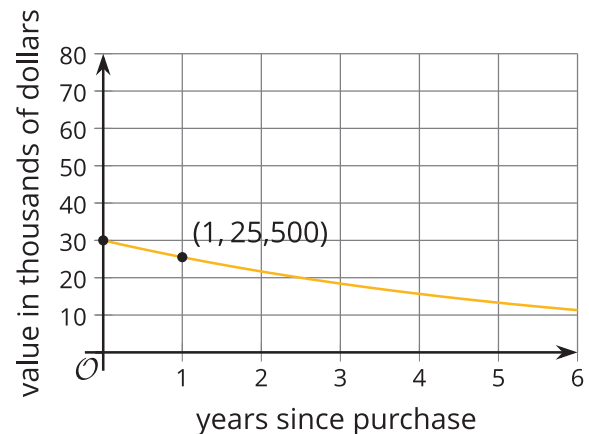
Graph B



Graph C



Graph D



2. Find the value of the van 8 years after its purchase. Show your reasoning.
3. In the same year (2008), the business bought a second van that cost \$10,000 less than the first van and depreciates at 10% per year. Would the second van be worth more or less than the first van 8 years after the purchase? Explain or show your reasoning.
4. On the same coordinate plane as the graph you chose in the first question, sketch a graph that shows the value of the second van, in dollars, as a function of years since its purchase.