

Unit 5 Lesson 15: Functions Involving Percent Change

1 Dandy Discounts (Warm up)

Student Task Statement

All books at a bookstore are 25% off. Priya bought a book originally priced at \$32. The cashier applied the storewide discount and then took another 25% off for a coupon that Priya brought. If there was no sales tax, how much did Priya pay for the book? Show your reasoning.

2 Owing Interests

Student Task Statement

To get a new computer, a recent college graduate obtains a loan of \$450. She agrees to pay 18% annual interest, which will apply to any money she owes. She makes no payments during the first year.

1. How much will she owe at the end of one year? Show your reasoning.
2. Assuming she continues to make no payments to the lender, how much will she owe at the end of two years? Three years?
3. To find the amount owed at the end of the third year, a student started by writing:
[Year 3 Amount] = [Year 2 Amount] + [Year 2 Amount] · (0.18) and ended with
= $450 \cdot (1.18) \cdot (1.18) \cdot (1.18)$ Does her final expression correctly reflect the amount owed at the end of the third year? Explain or show your reasoning.
4. Write an expression for the amount she owes at the end of x years without payment.

3 Comparing Loans

Student Task Statement

Suppose three people each have taken loans of \$1,000 but they each pay different annual interest rates.

1. For each loan, write an expression, using only multiplication, for the amount owed at the end of each year if no payments are made.

| years without payment | Loan A 12% | Loan B 24% | Loan C 30.6% |
|-----------------------|---------------|---------------|-----------------|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 10 | | | |
| x | | | |

2. Use graphing technology to plot the graphs of the account balances.
3. Based on your graph, about how many years would it take for the original unpaid balance of each loan to double?

4 Comparing Average Rates of Change (Optional)

Student Task Statement

The functions a , b , and c represent the amount owed (in dollars) for Loans A, B, and C respectively: the input for the functions is t , the number of years without payments.

1. For each loan, find the average rate of change per year between:
 - a. the start of the loan and the end of the second year
 - b. the end of the tenth year and the end of the twelfth year
2. How do the average rates of change for the three loans compare in each of the two-year intervals?