

Deal or No Deal?

Week 3 Lesson Outline

CCSS:HSF.LE.A.2|HS.A-CED.A.2|ASF-BF.A.2

Lesson Guidance: Eureka Algebra 2 Module 3 Lesson 30

Prerequisite Outcome: Build and evaluate a function to model an exponential relationship, given a verbal description involving a savings plan

Basic Skills Requirements: Convert percent to decimal, basic arithmetic with rational expressions

Lesson Outcome: Evaluate a present value of annuity function to model car buying, given a verbal description

Key Vocabulary:

- Annuity - Present Value
- Common Ratio
- Finite Geometric Series
- Initial Value – Recurring Payment
- Interest

Essential Questions:

1. What additional costs go into buying and maintaining a car?
2. What is the significance of a down payment?
3. How might you compare various loan options?
4. How have some car dealerships used car sales and financing to treat people of color differently during the car buying experience?
5. What role might demographics play when seeking car insurance?

Materials: Paper, pencil, scientific calculator (on phone) recommended

Agenda:

- **(ENTER)** Warm Up
 - SEL component via Mindful Minute
- **(ENGAGE)** Direct Instruction Problem Set
 - Revisiting Formulas
 - Car Buying Research
 - Evaluate a present value of annuity function
- **(EXIT)** Reflection
 - What factors impact car buying?
 - Weekend Challenge

Lesson Extensions:

- **Building Fluency**

- Evaluate the function for a savings plan at various interest rates to use with vision setting car-buying goals
- Determine the price of a car you can afford to buy in 4 years given a monthly payment that you can afford

Lesson Problem Set and Additional Practice Samples:

Buying a Car

1. In your vision setting, you researched the price of a car that you might like to own. In this exercise, we determine how much a car payment would be for that price for different loan options.

If you did not find a suitable car, select a car and selling price from the list below:

Car	Selling Price
2005 Pickup Truck	\$9,000
2007 Two-Door Small Coupe	\$7,500
2003 Two-Door Luxury Coupe	\$1, 000
2006 Small SUV	\$8,000
2008 Four-Door Sedan	\$8,500

- a. When you buy a car, you must pay sales tax and licensing and other fees. Assume that sales tax is 6% of the selling price and estimated license/title/fees are 2% of the selling price. If you put a \$1,000 down payment on your car, how much money do you need to borrow to pay for the car and taxes and other fees?

- b. Using the loan amount you computed above, calculate the monthly payment for the different loan options shown below:

Loan 1	36-month loan at 2%
Loan 2	48-month loan at 3%
Loan 3	60-month loan at 5%

- c. Which plan, if any, keeps the monthly payment under \$175? Of the plans under \$175 per month, why might you choose a plan with fewer months even though it costs more per month?

2. Benji is 24 years old and plans to drive his new car about 200 miles per week. He has qualified for first-time buyer financing, which is a 60-month loan with 0% down at an interest rate of 4%. Use the information below to estimate the monthly cost of each vehicle.

CAR A: 2010 Pickup Truck for \$12,000, 22 miles per gallon

CAR B: 2006 Luxury Coupe for \$11,000, 25 miles per gallon

Gasoline: \$4.00 per gallon

New vehicle fees: \$80

Sales Tax: 4.25%

Maintenance Costs:

(2010 model year or newer): 10% of purchase price annually

(2009 model year or older): 20% of purchase price annually

Insurance:

Average Rate Ages 25–29	\$100 per month
If you are male	Add \$10 per month
If you are female	Subtract \$10 per month
Type of Car	
Pickup Truck	Subtract \$10 per month
Small Two-Door Coupe or Four-Door Sedan	Subtract \$10 per month
Luxury Two- or Four-Door Coupe	Add \$15 per month
Ages 18–25	Double the monthly cost

- How much money will Benji have to borrow to purchase each car?
- What is the monthly payment for each car?
- What are the annual maintenance costs and insurance costs for each car?
- Which car should Benji purchase? Explain your choice.

Buying a Car Example

Research

Car	Selling Price
Ms. Green: Honda CR-V	\$21,614
Ms. Kearney: Mini Cooper	\$17,275

$$A_p = R \left(\frac{1 - (1 + i)^{-n}}{i} \right)$$

Annotate

- a. When buying a car, you must pay sales tax and licensing and other fees. Assume that sales tax is 6% of the selling price and estimated license/title/fees are 2% of the selling price. If you put a \$1,000 down payment on your car, how much money do you need to borrow to pay for the car, taxes, and other fees?

Formulate

Compute

Interpret

My interpretation is that I will need to borrow _____.

Annotate

- b. Using the loan amount you computed above, calculate the monthly payment for the different loan options shown below:

Loan 1	36-month loan at 2% per year
Loan 2	48-month loan at 3% per year
Loan 3	60-month loan at 5% per year

Formulate

$$A_p = R \left(\frac{1 - (1 + i)^{-n}}{i} \right)$$

Compute

Interpret

and that I will make recurring monthly payments of _____ for loan 1,
_____ for loan 2, and _____ for loan 3.