

### PRE-CALCULUS UNIT 3 REVIEW

Exponential and Logarithmic Functions Standard 24: Create exponential equations in a modeling context

Growth

- Decay
- Compound Interest

Standard 25: Utilize the properties of exponents to simplify expressions.

Standard 26: Utilize the properties of logarithms to expand and condense expressions.

Standard 27: Solve exponential and logarithmic equations.

Standard 28: Explain the inverse relationship between exponents and logarithms.

Standard 29: Model nonlinear regression lines (exponential and logarithmic regression lines).

Standard 30: Solve real-world application problems using exponents and logarithms.

## STANDARD 24: CREATE EXPONENTIAL EQUATIONS IN A MODELING CONTEXT

I buy a car brand new for \$34,500. A normal car depreciates at a rate of 15% per year. What will my car be worth 10 years from now?

## STANDARD 24: CREATE EXPONENTIAL EQUATIONS IN A MODELING CONTEXT

I invest \$100,000 in a bank account which yields 4.2% annual interest compounded monthly. Assuming I make no withdrawals, how much will be in my account after 7 years?

## STANDARD 24: CREATE EXPONENTIAL EQUATIONS IN A MODELING CONTEXT

I invest in Florida-Georgia Line tickets which cost me \$28 each. As the concert gets closer and closer the value of the tickets grows exponentially at a rate of 35% per day. What will my tickets value be the day of the show – assuming the show is 9 days away?

## STANDARD 25: UTILIZE THE PROPERTIES OF EXPONENTS TO SIMPLIFY EXPRESSIONS.

$$\frac{2x^{-7}y^9}{6x^4y^{-4}}$$

$$15r^{7}s^{4}t^{-1}$$

 $5r^{-6}s^{-4}$ 

# STANDARD 26: UTILIZE THE PROPERTIES OF LOGARITHMS TO EXPAND AND CONDENSE EXPRESSIONS.

Expand or condense:

$$\log_5 2 + \log_5 x + 4 \log_5 y + 2 \log_5 z$$



## STANDARD 27: SOLVE EXPONENTIAL AND LOGARITHMIC EQUATIONS.

Solve:

$$\cdot 2 + \log_7(5x+3) = 5$$

• 
$$16^{5x} = 64^{x+7}$$

### STANDARD 28: EXPLAIN THE INVERSE RELATIONSHIP BETWEEN EXPONENTS AND LOGARITHMS.

Write the inverse relationship functions between exponents and logarithms.

### STANDARD 29: MODEL NONLINEAR REGRESSION LINES (EXPONENTIAL AND LOGARITHMIC REGRESSION LINES).

A cup of soup is left on a countertop to cool. The table below gives the temperatures, in degrees Fahrenheit, of the soup recorded over a 10 minute period. Write an exponential regression equation for the data, rounding all values to the nearest thousandth.

Minutes (x)	Temperatur e in F (y)
0	180.2
2	165.8
4	146.3
6	135.4
8	127.7
10	110.5

### STANDARD 30: SOLVE REAL-WORLD APPLICATION PROBLEMS USING EXPONENTS AND LOGARITHMS.

Changing a value of any of the variables of a loan may dramatically affect the loan payments. The monthly payment for a 30 year loan for \$150,000 at 6% interest is \$899.33, with a total payment amount of \$323,757.28. Calculate the monthly payment and the total amount of the loan for each of the scenarios:

--- Putting a \$10,000 down payment on the purchase.

--- Making an extra payment each month.

--- Paying 3% interest instead of 6%.

Which of the options above saves you the most money?