**7.1 Exponential Functions**

**To see if an exponential function is increasing or decreasing, graph the function and look at it from left to right.**

**Interest Formula:**

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| --- |
| **Simplified Interest/Exponential Growth** |
| $ A=P(1+r)^{t}$ for Increasing $A=P\left(1-r\right)^{t}$ for Decreasing P = Principal or original amount of money/starting amountr = interest rate, expressed as a decimalt = time in years the money is in the accountA= final amount |

**Example:** You purchase a new car for $14,850 but it decreases 4.75% per year. Answer the questions, round to two decimal places.

1. Write an exponential equation to model c. using your equation from part a, what

the value of the car after t years. will the value of the car be after 5 years?

1. Graph the function from part a. Be sure d. Using your equation from part a, when

to label the axes and the x and y max in your window. will the car be worth $7,000?

**Example:** A piece of equipment costs $85,000 new but increases 11% per year. Round to two decimal places.

|  |  |
| --- | --- |
| a. Write an exponential equation to model the value of the equipment after “t” years. | c. Using your equation from part a, what will the value of the equipment be after 10 years? |
| b. Graph the function from part a. Be sure to label the axes and the x and y max in your window. | d. Using your equation from part a, when will the value be worth $100,000? |

**Example:** Mr. Peterson wrote a check of $7820 to pay off a loan, which was given to him at a rate of 5% simple interest for 3 years. How much money did he borrow originally? Round to two decimal places.

**Example:** Jack deposited $1400 in his bank account. After 3 years, the account is worth $1,694. Find the simple interest rate the account earned. Round to two decimal places.

**Review:**

Solve: 3x2 +3x = -8

**Transformations: f(x)=a(x-h) +k**

**a= h= k= negative=**

f(x)=$\left|x\right|$ f(x)=x2 f(x)=$\sqrt{x}$ f(x)=x3 f(x)=$\sqrt[3]{x}$

**7.2 Compounded and Continuous Interest**

|  |  |
| --- | --- |
| **Compound Interest** | **Continuous Interest** |
| $$A=P\left(1+\frac{r}{n}\right)^{nt}$$n = the number of times that the interest is compounded during the year. | $$A=Pe^{rt}$$e = Euler constant, e is a number similar to pi,$$e≈2.718281828…$$ |

Example 1: Austin deposits $450 into a savings account with a 2.5% interest rate compounded monthly. How much money will Austin have after 5 years?

 A = P = r =

 n = t =

Example 2: If Nick has $20,000 now, how long will it take him to save $50,000 in an account that carries an interest of 5.83% compounded quarterly?

Example 3: Emily invested $1250 in an account that had an interest rate of 0.5% compounded continuously. How long will it take her to reach $1280?

 A = P = r =

 t =

Example 4: Analeigh is given the option of investing $12,000 for 3 years at 7% compounded monthly or at 6.85% compounded continuously. Which option should she choose and why?

**7.3 Growth and Decay Word Problems**

|  |  |
| --- | --- |
| **Decreased by a Percent/Exponential Decay** | **Increased by a Percent/Exponential Growth** |
| $$A=P\left(1-r\right)^{t}$$ | $$A=P\left(1+r\right)^{t}$$ |



