7.1/7.2 Exponential Functions and Models Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Write the model for each :

1. Simple growth or decay: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Compounded periodically: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Continuously compounded: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Exercises

**Determine whether the function represents exponential growth or exponential decay. Then find the *y*-intercept.**

**1.** *y =* 8000(1.15)*x* **2.** *y* = 20(0.75)*x*

**3. ** **4. **

**5.** A tree 3 ft tall grows 8% each year. How tall will the tree be at the end of 14 yr? Round the answer to the nearest hundredth.

**6.** The price of a new home is $126,000. The value of the home appreciates 2% each year. How much will the home be worth in 10 yr?

**7.** A butterfly population is decreasing at a rate of 0.82% per year. There are currently about 100,000 butterflies in the population. How many butterflies will there be in the population in 250 years?

**8.** A car depreciates 10% each year. If you bought this car today for $5000, how much will it be worth in 7 years?

**9.** Suppose you deposit $1500 in a savings account that pays interest at an annual rate of 6%. No money is added or withdrawn from the account.

**a.** How much will be in the account after 5 years?

**b.** How much will be in the account after 20 years?

**Write an exponential function to model each situation. Find each amount after the specified time.**

**10.** A population of 1,236,000 grows 1.3% per year for 10 years.

**11.** A population of 752,000 decreases 1.4% per year for 18 years.

**12.** A new car that sells for $18,000 depreciates 25% each year for 4 years.

**13.** Mr. Andersen put $1000 into an account that earns 4.5% interest. The interest is compounded monthly and there are no withdrawals. How much money will be in the account at the end of 30 years?

**14**. Bram invested $10,000 in an account that earns 5% interest compounded quarterly.

* 1. How much interest does the account earn in the first 10 years? Round to the nearest dollar.
  2. How much more would the account earn in interest in the first 10 years if the interest compounded continuously? Round to the nearest dollar.

**15.** You place $900 in an investment account that earns 6% interest compounded continuously. Find the balance after 5 years.

**16.** Mrs. Wilson put $1500 into an account that earns 2.5% annual interest. The interest is compounded monthly and there are no withdrawals. How much money will be in the account at the end of 30 years?

**Find the amount in a continuously compounded account for the given conditions.**

**17.** principal: $5000 **18.** principal: $20,000

annual interest rate: 6.9% annual interest rate: 3.75%

time: 30 yr time: 2 yr

**19.** In 2009, there were 1570 bears in a wildlife refuge. In 2010, the population had increased to approximately 1884 bears. If this trend continues and the bear population is increasing exponentially, how many bears will there be in 2020?

**20.** The value of a piece of equipment has a decay factor of 0.80 per year. After 5 years, the equipment is worth $98,304. What was the original value of the equipment?

**21.** Your friend drops a rubber ball from 4 ft. You notice that its rebound is 32.5 in. on the first bounce and 22 in. on the second bounce.

**a.** What exponential function would be a good model for the height of the ball?

**b.** How high will the ball bounce on the fourth bounce?