Exponential Growth and Decay Practice   Name:

Determine the growth or decay factor for the following rates.

1) 5% growth

2) 12 % decay

3) 30% growth

4) 98% decay

5) 1% decay

6) 300% growth

7) 0.85% growth

8) 2.5% decay

9) tripling

10) halving

State whether the formula models growth or decay. Graph the function in you calculator to check your answer.

11) $y = 3^x$

12) $y = 0.25^x$

13) $f(x) = 1.01^{2x}$

14) $f(x) = 0.033^x$

15) $g(x) = 6 \cdot 5^x$

16) $k(x) = 6 \cdot \left(\frac{1}{2}\right)^x$

Solve each growth and decay problem.

17) E.coli bacteria double in population every thirty minutes. If the initial population is 85, what is the population of bacteria after three hours? After one day?

18) You decide to borrow money at 22% interest per year, how much will you owe on a loan of $5,000 after one year? What about after three years?

25) John invests $18,000 at a rate of 4.5% compounded annually. What will his new balance be after 6 years?

26) You invest $1,000 at a rate of 3% compounded quarterly. What will your new balance be after 5 years?

19) The population of Bloom Falls, Mass. (population 937) is slowly moving to a bigger city. Every year the population drops by 4.5%. What is the population after 3 years?

20) You bought a Boston Whaler in 2004 for $12,500. The boat's value depreciates by 7% a year. How much is the boat worth in 2012? What will it be worth in 2020?

21) The original value of a painting is $1400, and the value increases by 9% each year. Write an exponential growth function to model this situation. Then find the value of the painting in 25 years.

22) The po;ulation of a town is decreasing at a rate of 1% per year. In 2000 there were 1300 people. Write an exponential decay function to model this situation. Then find the population in 2008.

23) Maria's parents invested $14,000 at 6% per year compounded monthly. How much money will there be in the account after 10 years?

24) Find the final value of $2000 invested at an interest rate of 3% compounded quarterly for 8 years.

Answers to (ID: 1)

1) 1.05

2) 0.88

3) 1.3

4) 0.02

5) 0.99

6) 4

7) 1.0085

8) 0.975

9) 3

10) $\dfrac{1}{2}$

11) Growth

12) Decay

13) Growth

14) Decay

15) Growth

16) Decay

17) 5,440 ; 23,925,373,020,405,760

18) $6,100 ; $9,079.24

19) Approximately 816

20) 2012: $6,994.77   2020: $3,914.15

21) $y = 1400 \cdot 1.09^{t}$; $12,072.31

22) $y = 1300 \cdot 0.99^{t}$; Approx. 1200 people

23) Approximately $25,471.55

24) Approximately $2540.22

25) Approximately $23,440.68

26) Approximately $1,161.18

27) No solution.

28) $\left\{ -\dfrac{2}{3} \right\}$

29) $\{-2\}$

30) $\left\{ \dfrac{1}{2} \right\}$

31) $\left\{ -\dfrac{5}{6} \right\}$

32) $\{0\}$

33) $\{0\}$

34) $\left\{ \dfrac{1}{5} \right\}$