Write an exponential model that describes the situation. Then find the value after the given years.

1.   You bought a sculpture for $380. Each year the value of the sculpture increases by 8%. What is the value after 20 years?

      Model: _____   Value/Answer: _____

2.   You buy a new car valued at $19,000. It decreases at a rate of 14% each year. What is the value of the car in 3 years?

      Model: _____   Value/Answer: _____

Without graphing, give the initial value and determine whether each equation represents exponential growth or exponential decay. Then determine the percent increase or decrease.

3. $y = 2(.6)^x$ Initial Value: _____   4. $y = 3(1.184)^x$ Initial Value: _____

                    Growth/Decay? _____   Growth/Decay? _____

                    % increase/decrease? _____   % increase/decrease? _____

Solve each equation using inverse operations. You must show your work! Round your answer to 4 decimal places. Circle your final answer.

5. $\log_4(x-2) = 3$ 6. $2^{x-1} - 3 = 12$

7. $2\ln(x+3) = 4$ 8. $\log_6 x + \log_6(x-5) = 2$

9. $\dfrac{1}{2}e^{3x} = 62$ 10. $4^x + 2 = 8$

11. $e^{2x-1} - 7 = 12$ 12. $\log(x^2) = \log(8x+20)$

13. $3^{x+8} = 27^{x-1}$ 14. $\ln 3x - \ln 7 = -2$

Solve each problem below. You MUST show equation used and all work for credit.

15.   You deposit $1000 in an account that pays 8.5% interest compounded quarterly, how long will it take for the balance in the account to triple in value? (Round to the nearest tenth of a year)

16.   Suppose you deposit $3000 in an account that pays 4% interest compounded semi-annually. What is the balance in the account after 12 years?

17. Suppose $250 is deposited in a savings account. The interest rate is 5% compounded monthly. How long will it be until the account has $600?

18. The half-life of plutonium is 24,000 years.   How much of a 2 gram sample of plutonium will remain 4,500 years?

19. Carbon-14 has a half-life of 5730 years. A sample of fossilized wood initially contained 24g of C-14 when alive. How many years will it take the sample to decay to 1.5g.

20.   A $40,000 car purchased in 2012 depreciates at a constant rate of 12% per year. What was the value of the car in 2016. (Let t = 0 represent 2012).

21. In a swamp, the number of bugs increases at a rate of 6% each hour. If there are currently 3500 bugs, how many bugs will there be in 8 hours?

Graph. Give the domain and the equations of any asymptotes.
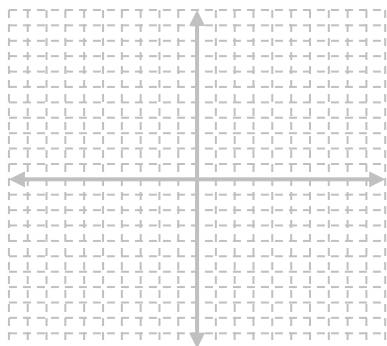
22. $y = 3^x$

Domain: _____

Range: _____

Asymptote: _____

y-intercept: _____

23.   Find the equation of the inverse of #34 and graph.

Equation: _____

Domain: _____

Range: _____

Asymptote: _____

x-intercept: _____