Algebra 1   Name_____

HW41: Exponential Decay   Date_____ Period_____

Use the scenario to answer the questions.
You purchase a new car for $35,000. The car depreciates by 20% per year.

1) Write a function, V, that represents the value of the car after t years.

2) What is the value of the car after 10 years? Round to the nearest dollar.

3) After how many years is the car worth $5000?

4) One of the points generated by this function is $(11, 3006)$. What does this point represent in the context of the scenario?

Once we drink caffeine, the amount in our system decreases by 11% per hour.

5) Write a function that models the levels of caffeine in your system if you drink a beverage that has 120mg of caffeine.

6) Approximately how much caffeine remains in your system after 3 hours? (Use the function created above)

7) After how many hours is there approximately 75mg of caffeine in your system? (Use the function created above)

8) What does the point $(1, 106.8)$ represent in this scenario?

A hive of bees originally had 30,000 bees. The population began to decrease by 8% per month.

9) Write a function that describes the bee population after m months.

10) How many bees remain after 10 months?

11) A healthy bee hive will have at least 10,000 bees. How many months does it take for the hive to reach this level?

12) What does the point $(8, 15397)$ represent in this scenario?

Determine whether the function represents exponetial growth or exponential decay

13) $f(x) = 5 \cdot 0.4^x$

14) $f(x) = 1000 \cdot 5^x$

15) $f(x) = -7 \cdot 1.07^x$
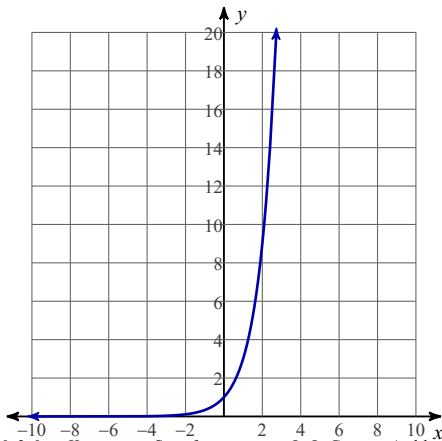
16) $f(x) = \left(\dfrac{3}{4}\right)^x$

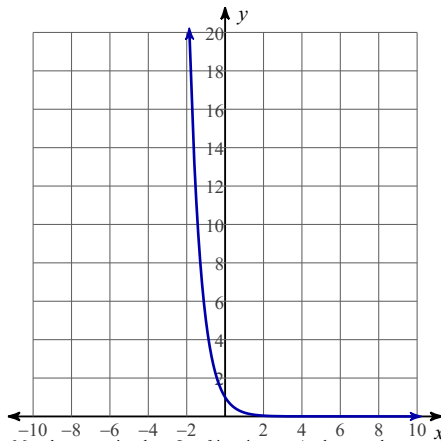17) $f(x) = \left(\dfrac{5}{8}\right)^x$

18) $f(x) = 0.035^x$

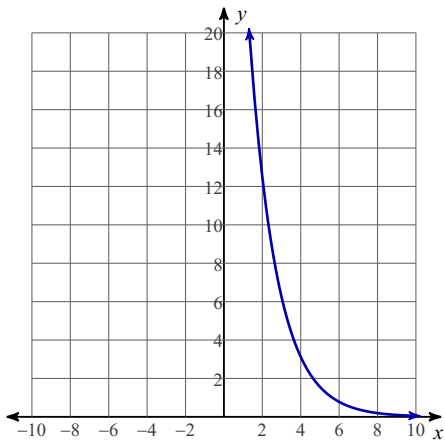19) $f(x) = \left(\dfrac{16}{3}\right)^x$
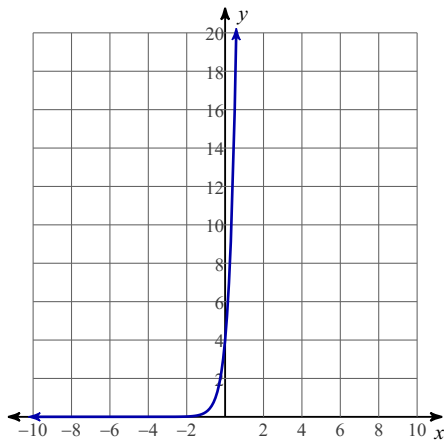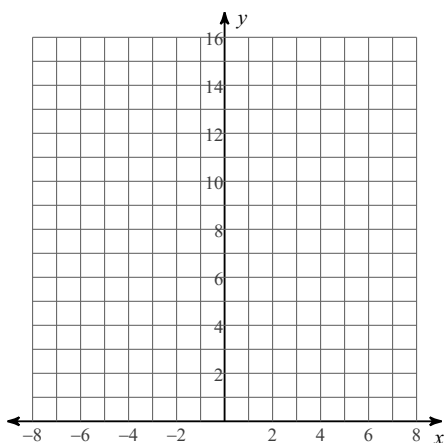
20) $f(x) = 150005 \cdot 1.03^x$
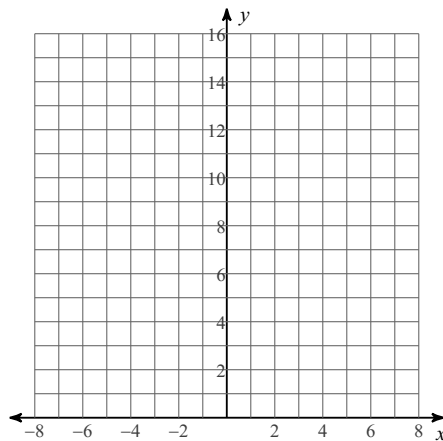
21)

22)

23)

24)

Identify the domain, the range, and the horizontal asymptote of the exponential decay function. Then create a table and graph the function. Table should be on a separate piece of paper.
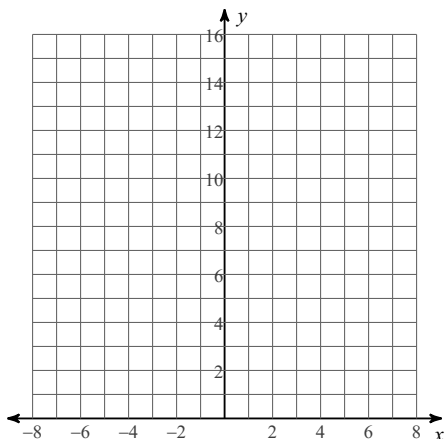
25) $f(x) = 2 \cdot \left(\dfrac{1}{2}\right)^{x}$

26) $f(x) = 0.3^{x}$

27) $f(x) = 5 \cdot 0.8^{x}$

28) $f(x) = 4 \cdot \left(\dfrac{1}{4}\right)^{x} + 3$