Name_____ Period_____ Date_____

NON-CALCULATOR SECTION

Vocabulary: Define each word and give an example.

1. Exponential Decay Function

2. Arithmetic Sequence

3. Growth Factor

Short Answer:

4. What is the formula for finding the sum of the first n terms of a geometric series?

5. What is the domain and range of the exponential function $y = a \cdot b^x + c$ if $a < 0,$ and $b > 1$?

Review:

6. Write an equation for a parabola with vertex at $(0,0)$ and passing through the point $(-1,3)$.

7. Solve the equation: $2(1-3x)^{1/3} + 4 = 6$

8. Solve the equation: $\frac{10}{x(x-2)} + \frac{4}{x} = \frac{5}{x-2}$

Problems:

Be sure to show all work used to obtain your answer. **Circle or box in the final answer.**

9. Write a formula for the *n*th term of the sequence. $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \ldots$

10. Write a rule for the nth term of the arithmetic sequence. $25, 21, 17, 13, \ldots$

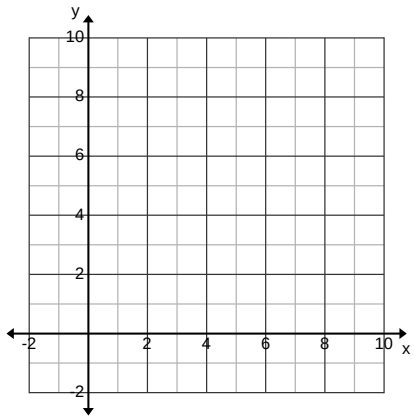
11. Find the sum of the first *n* terms of the arithmetic series. $-3.2, -1.2, 0.8, 2.8, \ldots; \; n = 15$

12. Write a rule for the *n*th term of the geometric sequence. $r = -2$, $a_1 = 7$

13. Write the repeating decimal as a fraction. 3.4545…

14. Graph the sequence below on the coordinate plane provided.

8, 4, 2, 1, 0.5,…



15. Find the inverse of the function.

a. $y = \log_3 x$

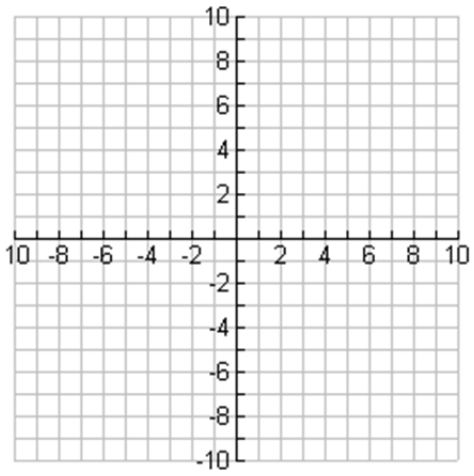
b. $y = 4^x$

16. Graph the function. State the domain and range.

a. $f(x)=3\left(\frac{1}{2}\right)^{x}-1$

Domain: _____

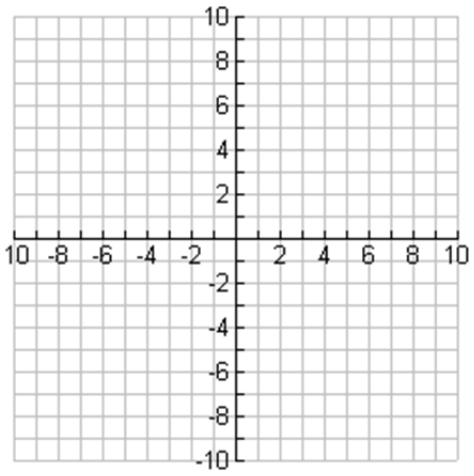
Range: _____



b. $f(x)=3^{x+3}-2$

Domain: _____

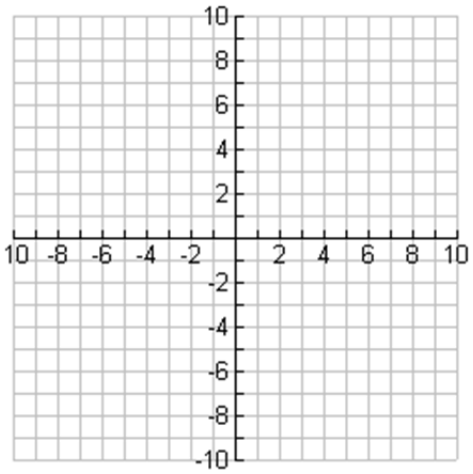
Range: _____



c. $f(x)=\log_3 x+2$

Domain: _____

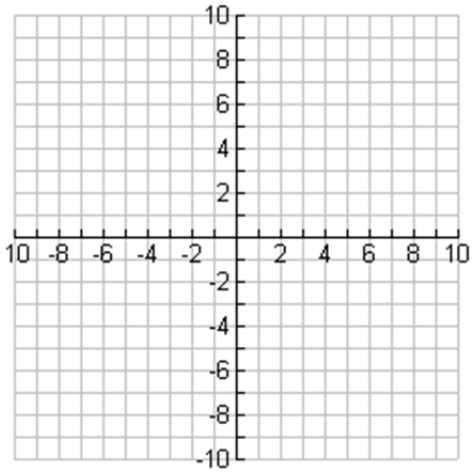
Range: _____



d. $y=\ln(x-3)$

Domain: _____

Range: _____



17. Describe the transformations of the function $g(x)=4\cdot 3^{x-2}+5$, when compared to its parent function $f(x)=3^{x}$. Then, state the domain and range of $g(x)$.

MULTIPLE CHOICE QUESTIONS

18. Which is a formula of the geometric sequence when $g_1 = 3$ and $g_6 = -96$?

A. $g_n = -3\left(1-(-2)^n\right)$

B. $g_n = \dfrac{3}{1-(-2)^{n-1}}$

C. $g_n = -3 \cdot 2^n$

D. $g_n = 3 \cdot (-2)^{n-1}$

19. A box of paper clips begins with 270 clips. A person takes one-third of the clips and passes the box to a second person who takes one-third of the remaining clips. Another person then takes one-third of the remaining clips. How many clips remain when a fourth person receives the box?

A. 10
B. 90
C. 80
D. 120

20. In the year 1995, about 20 million people used the internet. Between 1995 and 2001, the number of people who used the internet grew by about 75% per year. Which function best models the relationship between *p*, the number of people using the internet (in millions), and *t*, the number of years since 1995?

A. $p(t) = 20^{1.75t}$

B. $p(t) = (0.75)20^t$

C. $p(t) = 20(1.75)^t$

D. $p(t) = 20 + 0.75t$

21. Which of the following functions represents $f(x) = 9^x$ after a reflection on the x-axis and a vertical translation 5 units down?

A. $g(x) = -9^{x-5}$
B. $g(x) = -9^x - 5$
C. $g(x) = 9^{-x-5}$
D. $g(x) = -9^x + 5$

22. What is the equation of the asymptote for the function $f(x) = 0.5\left(4^{x-2}\right) + 3$?

A. $y = 3$
B. $x = 3$
C. $y = -3$
D. $y = 2$

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CALCULATOR SECTION

1. An object is dropped from an airplane. During the 1st second, the object falls 4.9 meters. During the 2nd second, it falls 14.7 meters. During the 3rd second, it falls 24.5 meters. During the 4th second, it falls 34.3 meters. If this pattern continues, how far will the object fall during the 10th second? Find the total distance the object will fall after 10 seconds.

2. Two companies, Company A and Company B, offer the same starting salary of $20,000 per year. Company A gives a raise of $1000 each year. Company B gives a raise of 4% each year.

   a. Write the rules giving the salaries in the nth year at both Company A and Company B and state whether it is arithmetic or geometric.

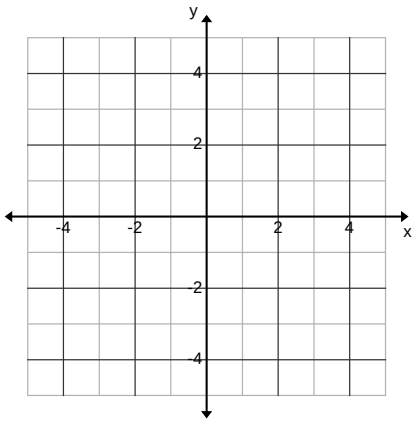
   b. For each company, find the sum of wages earned during the first 20 years of employment.

   c. Using your graphing calculator, find after how many years the total amount earned at Company B is greater than the total amount earned at Company A.

3. You buy a new computer for $2300. The value of the computer decreases by about 45% annually. Write an exponential decay model for the value of the computer and use the model to estimate the value after 2 years.

4. Graph the function with your calculator and sketch it below. $y = -\log(x+2) - 3$.

   Also, state the domain, range and the graph's asymptote.



5. In 2000, the average price of a football ticket for a Minnesota Vikings game was $48.28. During the next 4 years, the price increased an average of 6% each year.

   a. Write a model giving the average price *p* (in dollars) of a ticket *t* years after 2000. What is the domain for this function?

   b. Graph the model on your calculator. Estimate the year when the average price of a ticket was about $60.00

   c. Find the average ticket price for the year 2004.