Name_

Show/explain your work on all problems. All problems are worth 8 points unless otherwise indicated.

Solve the equation. Express the solution using interval notation.

1)
$$1 \le \left| \frac{4x + 12}{3} \right| < 4$$
 1) _____

Graph the following equation. Find the center, foci, and vertices as applicable.



(4 pts) Determine whether the equation defines y as a function of x. If it is a function, is it 1-to-1?

3) $x^2 - 4y^2 = 1$

(4 pts) Find the domain of the function.

4)
$$f(x) = \frac{x}{x^2 + 5}$$

4) _____

3) _____



Find the function.

6) Find the function that is finally graphed after the following transformations are applied to the graph of y = |x|. The graph is shifted right 3 units, stretched by a factor of 3, shifted vertically down 2 units, and reflected across the x-axis.

6) _____

Graph the function. Show all intercepts and asymptotes as applicable.



7) _____

Use the Rational Zero Theorum to help you find all zeros of the function and write the polynomial as a product of linear factors. 1 . 2 8) ______

8)
$$f(x) = 3x^4 - 4x^3 + 28x^2 - 36x + 9$$

Find the inverse function of f. State the domain and range of f(x).

9)
$$f(x) = \frac{3x - 2}{x + 5}$$
 9) _____

For the given functions f and g, find the requested composite function. State the domain of the composite function.

10)
$$f(x) = \frac{2}{x-6}$$
, $g(x) = \frac{5}{4x}$; Find $(f \circ g)(x)$. 10) _____

Solve the equation. 11) $\log_5 (x - 1) = 3 - \log_5 (x - 2)$

13) $f(x) = 3 \log_3 (x + 1)$ 13) _ ← ______ 5 ______ -___ 5 10 x ______ -10 ____ -5 5 10 x < +++ -10

Graph the function using a transformation of $\log_3(x)$. Show all asymptotes and intercepts.

Solve the system of equations using any matrix method.

14)

 $\begin{cases} x + y + z = 1 \\ x - y + 2z = -4 \\ 5x + y + z = -11 \end{cases}$

14) _



Solve for x.
15)

$$\begin{vmatrix} 5 & -3 & 1 \\ -2 & -2 & x \\ 8 & 2 & -1 \end{vmatrix} = 28$$

Find the inverse of the matrix. Be sure to check your answer.

16)				
	[2	3	4	
	0	1	2	
	0	0	1_	

(4 pts) Solve the system. 17) $\begin{cases}
x + 2y + 3z = 6 \\
x + y + z = 8 \\
-x + y + 2z = 5
\end{cases}$ The inverse of $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 1 & 1 \\ -1 & 1 & 2 \end{bmatrix}$ is $\begin{bmatrix} 1 & -1 & -1 \\ -3 & 5 & 2 \\ 2 & -3 & -1 \end{bmatrix}$. 16) _____

Solve the problem.

18) A reflecting telescope contains a mirror with a cross section shaped like a paraboloa. If the mirror is 16 inches across at its opening and is 24 inches deep, where will the light be concentrated? (hint: the light is concentrated at the focus.)

18) _____

Solve the system of equations.

19) $\begin{cases} 3x^2 - 3y^2 = 36 \\ 4x^2 + 5y^2 = 84 \end{cases}$

19) _____

(4 pts) Find the sum of the sequence. Simplify your answer. 20) -3 + 1 + 5 + 9 + 13 + ... + (4n - 7)

Solve the problems.

21) (4 pts) A group of 12 friends goes bowling. How many different possibilities are there for the order in which they play if the youngest person is to bowl first?

22) (4 pts) How many different license plates can be made using 2 letters followed by 5 digits
 22) selected from the digits 0 through 9, if digits may be repeated but letters may not be repeated?

22) _____

21) _____

23) In survey of 50 households, 25 responded that they have an HDTV television, 35 responded that they had a multimedia personal computer and 15 responded they had both. How many households had neither an HDTV television nor a multimedia personal computer?

23) _____

Solve the problem.

24) What is the probability of getting a 5-card poker hand consisting of three hearts and two cards that are not hearts? There are 13 hearts in a deck of 52 cards.

25) _____

25) What Annual Percentage yield do you need to find if you want \$100,000 to grow to \$900,000 in 30 years?

26) How much would your monthly deposits be if you want to accumulate \$100,000 in 10 years in an account earning 6% annual interest compounded monthly?