

Mat 150 Summer 07' Practice Final Name _____
Professor Schultz

Directions: Show all algebraic steps and place your simplified answer in the provided blanks or on the given graph grids.

#1. Determine the domain of $g(x) = \frac{\sqrt{7-3x}}{x^2 - x - 6}$. Write your answer in interval notation.

Ans. _____

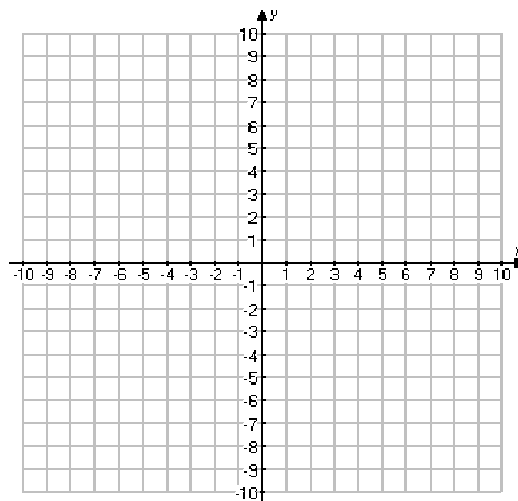
#2. Determine if the following function is even, odd, or neither using the algebraic techniques shown in class and in the text.

$$f(t) = \frac{t^4 + 1}{|t - 2|}$$

Ans. _____

#3. Accurately graph the given piecewise-function defined as:

$$f(x) = \begin{cases} x^2 - 2 & \text{if } -3 \leq x < 0 \\ \sqrt{x} + 1 & \text{if } 0 \leq x < 4 \\ x - 2 & \text{if } x \geq 4 \end{cases}$$



#4. Find the real zeros of $f(x) = 3x^2 - 12x + 9$ by factoring.

Ans. _____

#5. Find the zeros of $3x^2 - 5x + 1$ by the quadratic formula.

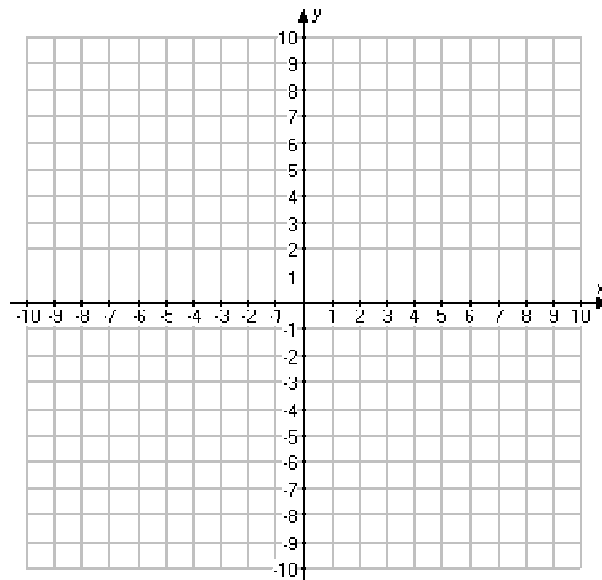
Ans. _____

#6. Find the zeros of $(x^2 + 2x)^2 + 5(x^2 + 2x) - 6 = 0$.

Ans. _____

#7. Graph the quadratic $f(x) = -x^2 + 4x - 3$

Vertex: _____, y-intercept: _____, Zeros: _____



#8. Consider the rational function:

$$h(x) = \frac{3(x+1)(x-2)(x+2)}{(x+2)(x-3)^2}$$

A. What is the exact y – intercept? _____

B. What are the x-intercept(s)? _____

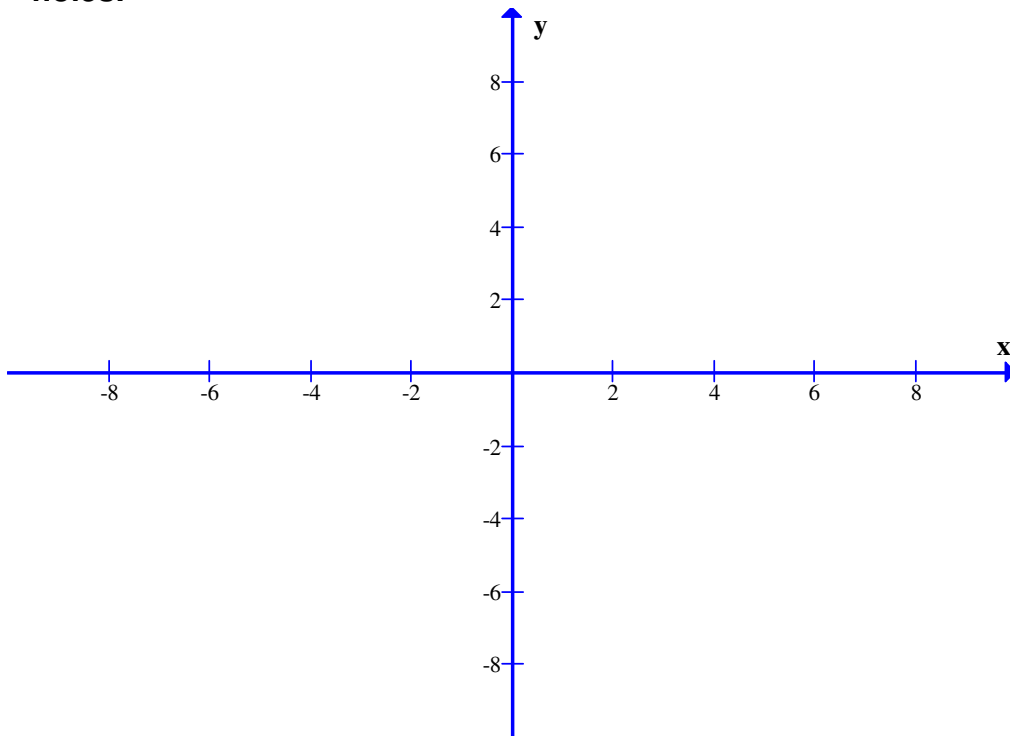
C. List any vertical asymptotes: _____

D. List any Holes: _____

E. List any horizontal asymptotes: _____

F. List any oblique asymptotes: _____

G. Graph the rational function. Draw all asymptotes, intercepts, and holes.



#9. . Find the oblique asymptote for:

$$r(t) = \frac{2t^4 - 2t^3 + 2t + 6}{t^3 + 4t}$$

Ans. _____

#10. Solve the rational inequality using the number-line method shown in class. Write your solution in interval notation.

$$\frac{(x-2)(x-3)}{(x-1)(x+4)} \leq 0$$

Ans. _____

#11. Solve for x. $\log_2(x+11) + \log_2(x+7) = 5$

Ans. _____

#12. Solve for x. $2^{x+1} = 5^{1-2x}$

Ans. _____

#13. Find $(f \circ g)(x)$ in reduced form if $f(x) = \frac{x+1}{x-1}$ and $g(x) = \frac{3}{x+2}$

Ans. _____

#14. The radioactive half-life of radium is 1690 years. Using the half-life

formula: $A(t) = A_0 \left(\frac{1}{2} \right)^{\frac{t}{\text{given_half_life}}}$, write the exact time it will take for 30 g to be reduced to 3 g.

Ans. _____

#15. Complete the square on the conic shown in standard form and classify it as Parabola, Ellipse, or Hyperbola. *You must complete the square and simplify correctly to get credit.*

$$2x^2 - 6y + 4x + 3y^2 - 13 = 0$$

Ans. _____

#16. Solve the following system using algebraic row reductions and back-substitution.

$$x - y + z = 8$$

$$2x + 3y - z = -2$$

$$3x - 2y - 9z = 9$$

Ans. _____

#17. Translate the following word problem into the matrix form

$$[\text{coefficient matrix}][\text{variable matrix}] = [\text{constant matrix}]$$

The theater department at Gilbert High School put on the play *Phantom of the Opera*. The ticket prices were \$3.50 for students, \$5.00 for adults, and \$2.50 for children under 12. They collected a total of \$1030 dollars from all sales. Additionally, twice as many adults attended as children under 12, and the number of students that attended was 20 more than one-half the number of adults.

Ans. _____

#18. Write the partial fraction decomposition for the following rational function.

$$\frac{x^2 - x - 8}{(x+1)(x+2)(x+3)}$$

Ans. _____

#19. Find the nth term $\{a_n\}$ for the sequence: $\frac{3}{2}, \frac{5}{4}, \frac{7}{6}, \frac{9}{8}, \dots$

Ans. _____

#20. Evaluate the sum: $\sum_{k=1}^4 [(-1)^k (k^2 - 2)]$

Ans. _____

#21. Using the formula $a_n = a_1 + (n - 1)d$ for arithmetic progressions, find the first term of the sequence, a_1 , if we know 5th term is - 2 and the 13th term is 30.

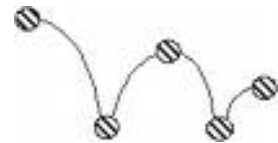
Ans. _____

#22. Write the first three terms of the geometric sequence defined as:

$$\left\{ \left(\frac{1}{3} \right)^n \right\}$$

Ans. _____

#23. A Tennis Ball is dropped from a height of 10 meters and each time it strikes the ground it rebounds $\frac{3}{4}$ of the previous height. What is the total vertical height distance traveled by the ball given that the sum of an infinite geometric series is given by $Sum = \frac{a_1}{1 - r}$?



Ans. _____

#24. Express the area of a circle as a function of its circumference.

Ans. _____