

Directions – Complete each problem in this summer assignment. The completed assignment is due the first day of class. The use of a graphing calculator is permitted. Show all work neatly and in order on separate paper – if you use a graph to help you solve a problem sketch the graph. You each have been given a copy of the book Precalculus with Limits. You should be familiar with every topic included in this summer assignment, however, should you need assistance all topics can be found in this textbook. In some instances you are asked to review/read through parts of the book in order to complete a problem in the assignment. Feel free to work together with a classmate if you wish. If you need further assistance – after consulting your Algebra 2 notes/work and the textbook you were given you may email me your question at [mary.short@fcps.edu](mailto:mary.short@fcps.edu) and I will assist you. Good luck and get to work! ☺

Mrs. Short

- Simplify the expression:  $\left(\frac{3m^{1/6}n^{1/3}}{4n^{-2/3}}\right)^2$
- Rationalize the denominator and then simplify the result:  $\frac{5}{\sqrt{10}}$
- Rationalize the denominator and then simplify the result:  $\frac{5}{\sqrt{14}-2}$
- Perform the indicated operation and simplify:  $\frac{2}{x^2-4} - \frac{1}{x+2}$
- Consider the graph of the function  $f(x) = \sqrt{x}$ . List the transformations made to  $f(x)$  when graphing  $y = -3\sqrt{x+5} - 6$ .
- List the domain of  $f(x)$  and  $g(x)$  then find  $(f \circ g)(x)$  given  $f(x) = \frac{3}{x^2-1}$ ,  $g(x) = x+1$ .
- Given  $f(x) = 1-x^3$  and  $g(x) = \sqrt[3]{1-x}$ , show that  $f$  and  $g$  are inverse functions algebraically and then graph the two functions on the same graph along with the line  $y = x$ , what do you notice?
- Without your calculator, perform the specified operation and write the result in standard form:
  - $(6-2i)(2-3i)$
  - $\frac{8-7i}{1-2i}$  (hint: multiply the numerator & denominator by the conjugate of  $1-2i$ )
- Algebraically solve each equation, use your graphing calculator to check your solutions:
  - $2x^4 - 15x^3 + 18x^2 = 0$
  - $\sqrt{x+1} - 3x = 1$
  - $\frac{x}{x^2-4} + \frac{1}{x+2} = 3$
- Divide by synthetic division:  $\frac{5x^3 + 18x^2 - 6}{x+3}$
- Read/study example 1 on page 233 and then try to divide  $\frac{6x^3 - 16x^2 + 17x - 6}{3x-2}$  using long division.
- Read/study example 6 on page 252 and then do the following...

Given that  $-1-3i$  is a zero of the function  $f(x) = x^3 + 4x^2 + 14x + 20$ , find all the zeros of  $f(x)$ .
- Checkpoint! Email me at [mary.short@fcps.edu](mailto:mary.short@fcps.edu) when you get this far!

14. How do you determine the vertical asymptotes or holes in the graph of a rational function? How do you determine the horizontal asymptote? (Recall: HAVAHO) (Sections 3.5 and 3.6)

15. Graph the function  $f(x) = \frac{5(x^2 - 4)}{x^2 - 36}$ . When giving your answer list the following – vertical asymptotes/holes, horizontal asymptote, x-intercepts, y-intercept.

16. Write the expression as the logarithm of a single quantity (i.e. condense it):

$$2\ln(x+5) - 3\ln x + \ln(x-2)^4$$

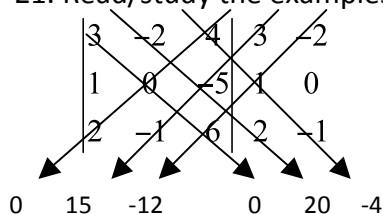
17. Read/study pages 309-310 and use this information/format to solve:  $-12 + 4e^{3x} = 8$

18. Solve:  $\log_3 x + \log_3(x^2 - 8) = \log_3 8x$

19. Find the determinant of the matrix:  $\begin{bmatrix} 5 & -3 \\ 6 & -4 \end{bmatrix}$

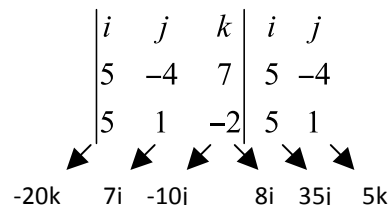
20. Solve for x:  $\begin{vmatrix} x^2 & x \\ 5 & 2 \end{vmatrix} = 12$  (Remember – the straight bars mean to do the determinant)

21. Read/study the examples below on how to do the determinant of a 3x3 matrix.



Basic Steps:

1. Copy the first 2 columns to the outside.
2. Multiply the entries in the diagonals of size three going right. These will be added.
3. Multiply the entries in the diagonals of size three going left. These will be subtracted.



Determinant =  $0 + 20 + -4 - 0 - 15 - (-12) = 13$

Determinant =  $8i + 35j + 5k - (-20k) - 7i - (-10j)$   
 $= 1i + 45j + 25k$

Evaluate: a)  $\begin{vmatrix} 1 & -2 & 3 \\ 5 & 2 & -1 \\ 0 & 3 & -6 \end{vmatrix}$

b)  $\begin{vmatrix} i & j & k \\ -3 & 2 & 5 \\ 4 & 7 & 1 \end{vmatrix}$

22. Find the sum of the arithmetic sequence:

$$\sum_{n=1}^{20} 2n + 5$$

23. Find the sum of the geometric sequence:

$$\sum_{j=1}^{15} 5(3)^{j-1}$$

24. Study/Memorize your unit circle!

