

Week 9 Math 1508 Review for Exam 2

[Section 6.1]

1. State the domain for the function; identify all asymptotes (horizontal, vertical or slant) and identify all intercepts.

a. $f(x) = \frac{6x-9}{3x+5}$

Domain: $\left(-\infty, -\frac{5}{3}\right) \cup \left(-\frac{5}{3}, \infty\right)$

Horizontal Asymptote: $y = 2$

Vertical Asymptote: $x = -\frac{5}{3}$

Slant Asymptote: None

x - intercept: $\left(\frac{3}{2}, 0\right)$

y - intercept: $\left(0, -\frac{9}{5}\right)$

b. $f(x) = \frac{2x^2+7x-15}{2x^2-8x+15}$

Domain: $(-\infty, \infty)$

Horizontal Asymptote: $y = 1$

Vertical Asymptote: None

Slant Asymptote: None

x - intercept: $(-5, 0)$ & $\left(\frac{3}{2}, 0\right)$

y - intercept: $(0, -1)$

[Chapter 3]

2. Use the properties of logarithms to expand the expression as a sum, difference, and/or constant multiple of logarithms.

a. $\log(\sqrt{6} x^2 y^6)$

$\frac{1}{2} [\log(2) + \log(3)] + 2 \log(x) + 6 \log(y)$

b. $\ln\left(\frac{\sqrt{x^5}}{y^4 z^7}\right)$

$\frac{5}{2} \ln(x) - 4 \ln(y) - 7 \ln(z)$

3. Condense the expression to the logarithm of a single quantity.

a. $\log(4) + 4\log(x) - \frac{1}{2}[\log(5) + \log(z)]$

$$\log\left(\frac{4x^4}{\sqrt{5z}}\right)$$

b. $\ln(x) - [3\ln(y) + \ln(z - 4)]$

$$\ln\left(\frac{x}{y^3(z - 4)}\right)$$

4. Solve for x: Provide exact solutions for all problems.

a. $\log_3(x^2 + x + 3) = 2$

$$x = -3 \text{ and } x = 2$$

b. $5 + 4^{x-2} = 15$

$$x = \frac{\ln(10)}{\ln(4)} + 2$$

c. $12 - 5\ln(x) = 27$

$$x = e^{-3} \text{ or } \frac{1}{e^3}$$

d. $\log(x + 1) + \log(x - 5) = \log(7)$

$$x = 6$$

[Chapter 7]

5. Use Gaussian Elimination to solve the following systems of linear equations

a.
$$\begin{cases} 3x - 6y = 6 \\ 4x - 4y = -2 \end{cases}$$

$$\left(-3, -\frac{5}{2}\right)$$

b.
$$\begin{cases} x + y - 2z = 3 \\ 2x - y - z = -6 \\ 5x + 2y + 3z = -7 \end{cases}$$

$$(-2, 3, -1)$$

6. Write the partial decomposition of the rational expression

a. $\frac{x+2}{x^2+5x-14}$

$$\frac{x+2}{x^2+5x-14} = \frac{5/9}{x+7} + \frac{4/9}{x-2}$$

b. $\frac{64}{x^5-16x}$

$$\frac{64}{x^5-16x} = \frac{-4}{x} + \frac{1}{x-2} + \frac{1}{x+2} + \frac{-2}{x^2+4}$$

[Chapter 8]

7. Use the matrices below to evaluate a through d .

$$A = \begin{bmatrix} 1 & 16 & -2 \\ 2 & 2 & 0 \end{bmatrix} \quad B = \begin{bmatrix} 1 & -3 \\ -1 & 6 \end{bmatrix} \quad C = \begin{bmatrix} 1 & 2 \\ -2 & 4 \\ -8 & -7 \end{bmatrix} \quad D = \begin{bmatrix} -1 & 1 \\ 1 & -1 \end{bmatrix}$$

a. $3B - 7D$

$$\begin{bmatrix} 10 & -16 \\ -10 & 25 \end{bmatrix}$$

b. BA

$$\begin{bmatrix} -5 & 10 & -2 \\ 11 & -6 & 2 \end{bmatrix}$$

c. $AC + B$

$$\begin{bmatrix} -5 & 70 \\ -12 & 22 \end{bmatrix}$$

d. B^{-1}

$$\begin{bmatrix} 2 & 1 \\ 1/3 & 1/3 \end{bmatrix}$$

e. D^{-1}

Students will solve this one on their own.