

College Algebra Sec 4 Practice Exam 3

1. Solve the equation  $3x^3 + 7x^2 - 22x - 8 = 0$  given that  $-\frac{1}{3}$  is a zero of

$$f(x) = 3x^3 + 7x^2 - 22x - 8.$$

2. Solve the following inequalities. Give your solution in interval notation.

a)  $\frac{1}{x+1} < \frac{1}{x-4}$

- b)  $3x^3 + 7x^2 - 22x - 8 > 0$ . (Note: you may use your work from problem 1 on this part.)

3. Suppose you have \$25,000 to invest.

- a) Which investment yields the greatest return over three years (i) 7% compounded monthly or (ii) 6.8% compounded continuously?

- b) If you choose option (i) and your \$25,000 is compounded monthly at a rate of 7%, how many years (rounded to the nearest tenth) will it take for your investment to be worth \$45,000?

4. Solve the following for  $x$ :  $4^{2x} - 4^x - 2 = 0$

5. Consider the function  $f(x) = \frac{-x}{x+1}$

- a) What are the vertical and horizontal asymptotes of the graph of  $f(x)$ ?

- b) Does the graph of  $f(x)$  have any symmetry? Be sure to show why or why not.

6. Condense the logarithmic expression:  $4 \log x - \frac{1}{2}(2 \log(x-1) + \log y)$

7. Divide using long division:  $(6x^3 + 13x^2 - 11x - 15) \div (3x^2 - x - 3)$

8. Use the rational root theorem to find all zeros of  $f(x) = x^3 - 2x^2 - x + 2$

9. Solve for  $x$ :  $2 \ln x = \ln 98 - \ln 2$ . Give an exact answer, no decimals.

10. Evaluate without a calculator. Explain why your answer is true:

a)  $\log_3 27$

b)  $\ln e^{17}$

c)  $\log_4 \frac{1}{\sqrt[3]{4}}$