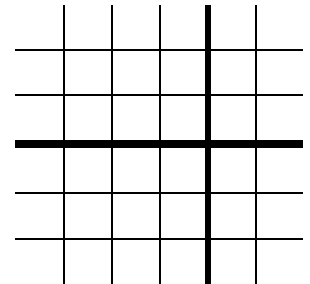


This test covers chapter five of *College Algebra* by Sullivan and Sullivan. Relax and read each question carefully. Unless otherwise indicated, each part of each problem is worth five points.

1. Graph $y = \log_2(x+3)$ on the right. Label the asymptote(s) and intercepts.



2. Change each exponential expression into an equivalent one involving a logarithm.
(3 points each)

a. $36 = 6^2$

b. $x^\pi = 3$

3. Suppose $\ln 2 = a$ and $\ln 5 = b$. Use the properties of logarithms to write $\ln 80$ in terms of a and b .

4. Write each of the following as a **sum and/or difference** of logarithms.

a. $\log(x^{19} \sqrt{5x^2 + 9})$

b. $\log_3\left(\frac{x^4}{x^2 - 16}\right)$

5. Evaluate the following logarithms **exactly**. (3 points each)

a. $\log_8 32$

b. $\log_a \sqrt[5]{a}$

6. Solve the following equations, express your answer correct to two decimal places.

a. $8^x = 150$

b. $xe^x = 7$ (Hint: use your calculator)

c. $\log(5x + 3) = 2$

d. $40e^{7x} = 5234$

10. The radioactive substance mathium-140 obeys the law $A = A_0e^{-0.05776t}$, where A_0 is the initial amount present and t is the time in minutes. What is the half-life of mathium-140?

11. The amount of mold on Dr. Caldwell's coffee cup obeys the law of uninhibited growth. Suppose there are 0.2 grams to begin with ($t=0$), and 1.6 grams after four days ($t=4$).

a. What is the growth rate k ?

b. How many grams of mold is there after one week ($t=7$)?

c. How many days until there are 6.4 grams?