

Exercise set 5.3: Log and exponential models

1. Solve the following equations for x :

a. $3^x = 5$

b. $6^{3x+1} = 30$

c. $4(1.5^{2x-1}) = 8$

2. Solve the following equations for x :

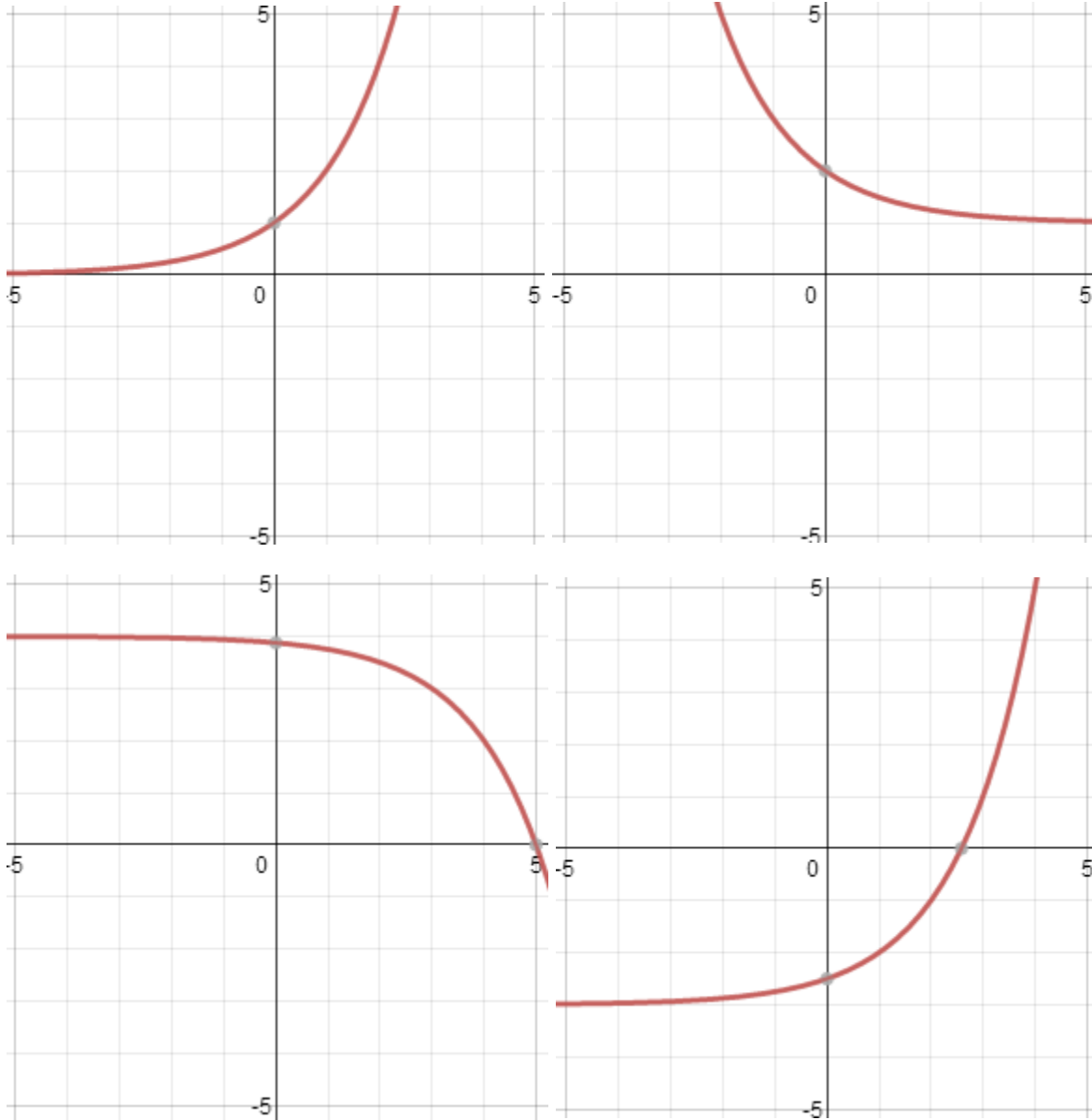
a. $\log x = 6.12$

b. $\log(2x+3) = 2$

c. $\log_4(x+1) = 6$

3. What is the equation of the exponential function that passes through the points (1, 6) and (3, 24)?

4. What are the equations of the functions below? (Hint: They are all based on 2^x .)



5. In the early stages of the AIDS epidemic during the 1980s, the number of cases in the US was increasing by about 50% every six months. By the start of 1983 there were approximately 1600 AIDS cases in the U.S.
- How many people would you have predicted would be infected by October 1, 1986?
 - By December 31, 1986? (The actual number of cases on December 31, 1986 was around 41,700.)
6. Soon after taking an aspirin tablet a patient has absorbed 300 mg of the drug. If half of the aspirin in the bloodstream is removed every two hours, how much aspirin will be in the bloodstream after 5 hours? When will the amount of aspirin in the bloodstream be 100 mg?
7. The amount of radium-226 remaining in a sample that originally contained A grams is approximately $C(t) = A(0.999567)^t$ where t is time in years. What is the half-life of radium-226?
8. The half-life of strontium-90 is 28 years. How long will it take 80% of a sample of strontium-90 to decay?

9. Sketch the function $f(x) = \frac{9}{1 + 3.5(2^{-x})}$ You can check your result using the online graphing utility at www.desmos.com/calculator.

10. Sketch the function $f(x) = \frac{6}{1 + 3(0.5^{-x})}$.