

Chapter 7 Test

BLM 7-12

1. Write as a single logarithm, then evaluate.

a) $\log_6 20 + \log_6 27 - \log_6 15$

b) $2\log_3 6 - \frac{1}{2}\log_3 16$

2. Solve.

a) $9^{2x-4} = 27^{2-x}$

b) $25^{k+6} = \left(\frac{1}{5}\right)^{3-k}$

c) $\log_3(2x-5) - 1 = \log_3 12$

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

3. Consider the functions

$$f(x) = \log(x+1) + 1 \text{ and}$$

$$g(x) = 2\log(x-2).$$

- a) Use your knowledge of the graph of $y = \log x$ and transformations to sketch the graphs of $y = f(x)$ and $y = g(x)$.

- b) Estimate the point of intersection.

- c) Check your answer by solving $\log(x+1) + 1 = 2\log(x-2)$ algebraically.

4. A car is purchased for \$21 000. Three years later, it is valued at \$13 000.

- a) Calculate the amount of time (to two decimal places) that it takes for the car's value to be reduced to one-half its original value.

- b) How long will it take for the car's value to be reduced to \$8000?

5. A radioactive substance decays from 42 mg to 12 mg in 48.6 min. Calculate the time required for 90% of the substance to be decayed.

6. The following data were gathered during an experiment.

| x | y |
|-----|-----|
| 0 | 1 |
| 1 | 10 |
| 2 | 17 |
| 3 | 23 |
| 4 | 27 |
| 5 | 29 |
| 6 | 30 |

- a) Create a scatter plot of the data.
- b) Could the data be fit by drawing an exponential curve (or a transformation of one)? Explain why or why not.
- c) Could the data be fit by drawing a quadratic curve (or a transformation of one)? Explain why or why not.
- d) Describe an experiment from which these data might have originated from that would be best fit by
- a quadratic curve
 - an exponential curve