

For each question (except multiple choice), you must show work that explains your reasoning.

$$y = mx + b$$

$$y = ax^2 + bx + c$$

$$y = a \cdot b^x = a \cdot e^{kx}$$

$$y = b^x \Leftrightarrow x = \log_b y$$

$$\log_b(b^x) = x$$

$$x^0 = 1$$

$$x^1 = x$$

$$x^{-1} = 1/x$$

$$\log_b 1 = 0$$

$$b^{\log_b x} = x$$

$$(x^m)(x^n) = x^{m+n}$$

$$x^m / x^n = x^{m-n}$$

$$(x^m)^n = x^{m \cdot n}$$

$$\log_b(A^r) = r \log_b(A)$$

$$\log_b(AC) = \log_b(A) + \log_b(C)$$

$$\log_b(A/C) = \log_b(A) - \log_b(C)$$

$$\log_b(A) = \log_c(A) / \log_c(b)$$

1. For each of the four tables below, could the table represent a function that is linear, quadratic, exponential, or none of these? Circle the appropriate choice next to each table.

x	f(x)
1	12
2	24
3	48
4	96
5	192

linear

quadratic

exponential

none of these

x	g(x)
1	12
2	36
3	74
4	126
5	192

linear

quadratic

exponential

none of these

x	h(x)
1	12
2	57
3	102
4	147
5	192

linear

quadratic

exponential

none of these

x	j(x)
1	12
2	72
3	119
4	158
5	192

linear

quadratic

exponential

none of these

2. Which of the following are equivalent to $-3\log x^{1/2}$? Assume $x > 0$. Circle all that apply.

$$-2\log x^{1/3}$$

$$-\frac{1}{2}\log x^3$$

$$\log\left(\frac{3}{2}\right)^{-x}$$

$$-\log x^{3/2}$$

$$-\frac{3}{2}\log x$$

$$\frac{1}{3}\log x^{-2}$$

$$\frac{3}{2}\log \frac{1}{x}$$

$$\log\left(\frac{1}{x^2}\right)^3$$

3. An exponential function goes through the points (1, 48) and (3, 3). Determine a formula for this exponential function by:
a) writing down sufficient relevant equations that use given information, then b) doing the algebra.

4. The bacteria in a particular bacterial culture grow at an hourly rate of 20% per hour. The count $C(t)$ of the approximate number of bacteria after t hours is given by the function $C(t) = 10(1.20)^t$.

a) How many bacteria are there after 10 hours?

b) After how many hours are there 10,000 bacteria? Answer accurately to 2 decimal places.

c) The hourly growth rate of these bacteria is 20% per hour. What is the equivalent continuous growth rate of these bacteria? Answer accurately to 2 decimal places.