

Name:

1. (3 points) Given that $m = \log_{21} 7$ show that

$$\log_7 27 = \frac{3(1 - m)}{m}$$

2. (3 points) The following

$$3^x + \frac{2}{9}, \quad 3^x, \quad 3^{x-1}$$

are the first three terms of an infinite geometric sequence.

(a) Find x .

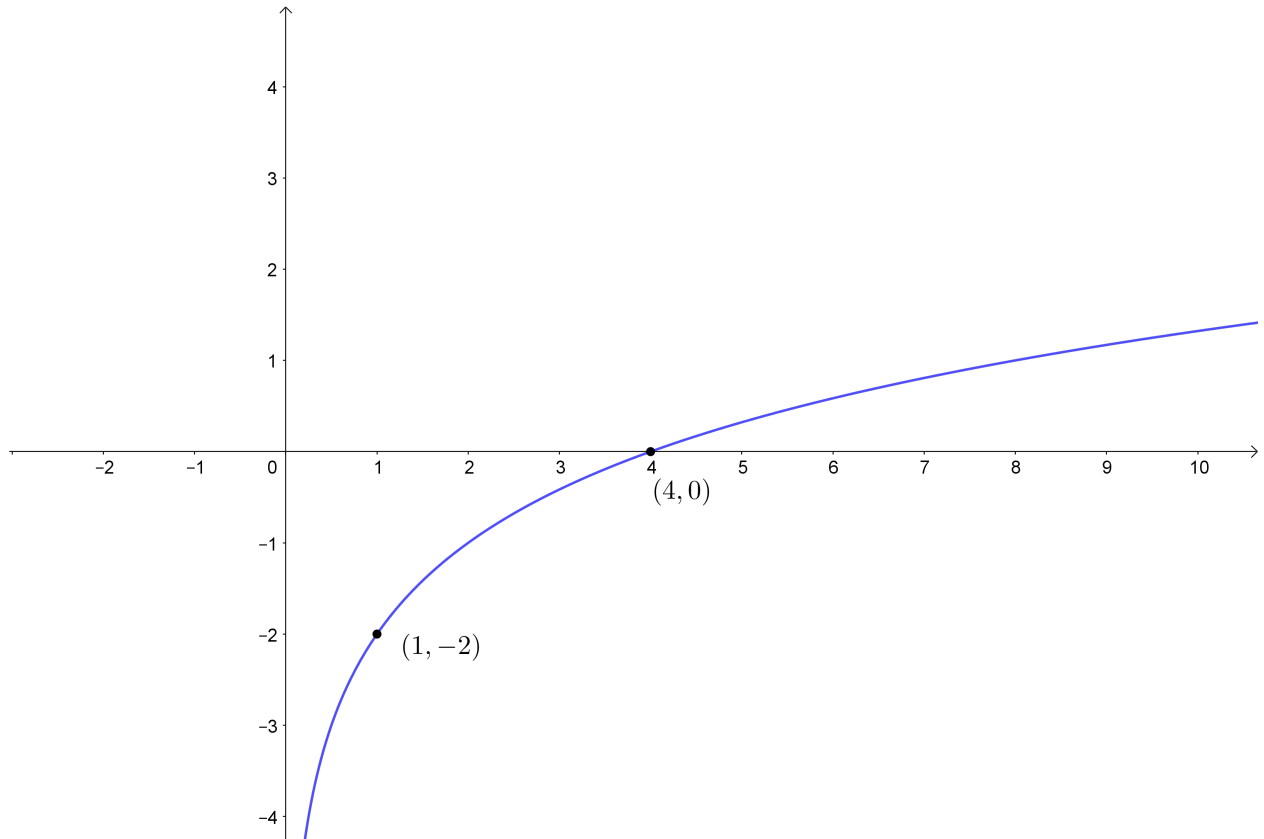
(b) Find the sum to infinity of this sequence.

3. (4 points) Find the domain and range of the function:

$$f(x) = \log_{\frac{\sqrt{2}}{2}}(8x - x^2)$$

4. (5 points) The diagram shows the graph of a function:

$$f(x) = a + \log_p x$$



(a) Find the values of a and p .

(b) Sketch the graph of $g(x) = |f(x + 2)|$.

(c) Solve the inequality:

$$g(x) > 1$$

5. (5 points) Solve the inequality:

$$\log_x 2 \times \log_{4x} 8 > \frac{3}{8}$$