

Section 7.1 Extra Practice

1. State which of the following are exponential. Explain your answer.

$$y = x^7$$

$$y = 0.5^x$$

$$y = 4^x$$

$$y = x^{\frac{1}{3}}$$

2. Is $y = (-2)^x$ an exponential function? Explain.

3. Graph each function and identify the following:

- the x -intercept and y -intercept
- whether the function is increasing or decreasing
- the domain and range
- the equation of the horizontal asymptote

a) $y = 3^x$

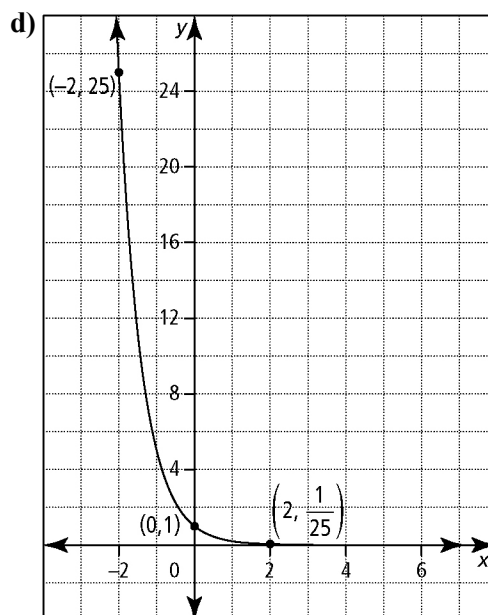
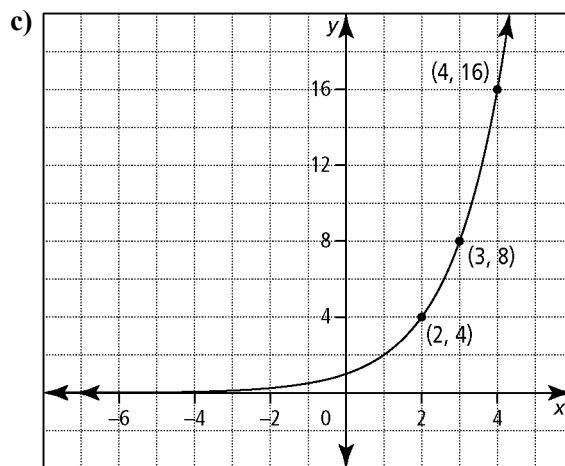
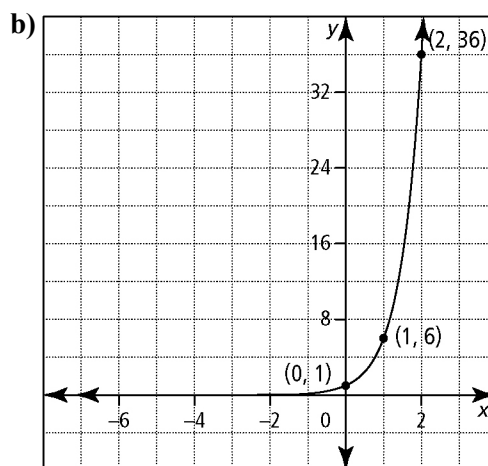
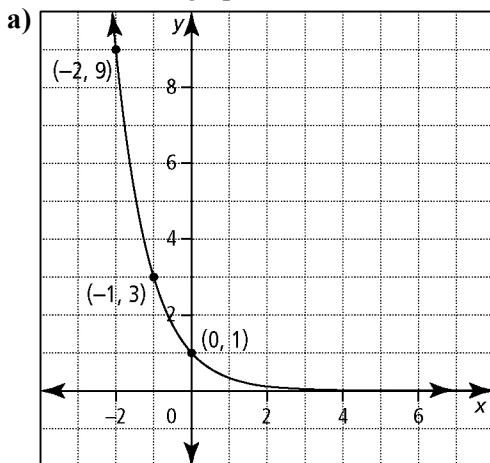
b) $y = (0.5)^x$

4. a) Graph the functions $y = 2^x$, $y = 3^x$, and $y = 4^x$ on the same grid.
- b) For what x -value do all three functions have the same y -value? What is the y -value?
- c) Graph the functions $y = \left(\frac{1}{2}\right)^x$, $y = \left(\frac{1}{3}\right)^x$,

and $y = \left(\frac{1}{4}\right)^x$ on the same grid as you used

for part a). Explain what you notice about these functions in relation to each other, and the functions you graphed in part a).

5. What function in the form $y = c^x$ can be used to describe the graph shown?



6. Atmospheric pressure varies with altitude above the surface of Earth. For altitudes up to 10 km, the pressure, P , in kilopascals (kPa), is given by $P = 100e^{-0.139a}$, where e is the base (approximately equal to 2.7183) and a is the altitude in kilometres. What would the pressure be at 5 km above the surface of Earth? Express your answer to the nearest kilopascal.
7. A sample of water contains 200 g of pollutants. Each time the sample is passed through a filter, 20% of its pollutants are removed.
 - a) Write a function that relates the amount of pollutant, P , that remains in the sample to the number of times, t , the sample is filtered.
 - b) Graph the function.
 - c) Determine an expression that gives the amount of pollutants still in the water after it passes through 5 filters. How many grams are there after 5 filters, rounded to the tenth of a gram?
8. Iodine-126 has a half-life of 13 days.
 - a) Write an exponential function that can be used to represent the radioactive decay of 100 g of Iodine-126.
 - b) Graph the function.
 - c) How much Iodine-126 will be left after 50 days? Round your answer to hundredths of a gram.
 - d) Describe how you might use your graph to calculate the length of time it will take for 100 g of Iodine-126 to decay to 15 g. How long with this decay take, to the nearest half day?
9. The population of rabbits in a park is increasing by 70% every 6 months. Presently there are 200 rabbits in the park.
 - a) What will the base be for the exponential function that represents this scenario? Explain.
 - b) Write an exponential function that represents this scenario. Use P to represent the rabbit population, and t to represent the time in months.
 - c) How many rabbits will there be in 15 months?
10. Jennifer and Brody are going scuba diving. In the particular spot they are diving, the intensity of light is reduced by 2% for each metre that they descend below the surface of the water.
 - a) Write the exponential decay model that relates the amount of light, L , that is available at each depth, d , in 1-m increments.
 - b) What are the domain and range of the function for this situation?
 - c) Graph the function for an appropriate domain.
 - d) Use your graph to determine at what depth, to the nearest metre, the intensity of light is only 10% of the intensity at the surface.

