1. **a)** For each of the following exponential models, identify the initial amount, the growth rate, and the number of growth periods.

i) $A(t) = 45(1.23)^{11}$

ii) $N(t) = 1000(1.10)^{4}$

iii) $P(t) = 23(1.025)^{30}$

iv) $M(t) = 50(2)^{8}$

b) Use a calculator to evaluate the equations in part (a) to three decimal places.

2. A bank pays 5% interest yearly on deposits. Suppose an account is opened at this bank with \$1500 in it.

a) Write a function $A(t)$ that tells how much money is in the account after t years.

b) How much money is in the account after 9 years?

c) What does $A(5.5)$ represent? Does this point make sense? Why or why not?

d) What does $A(-3)$ represent? Does this point make sense? Why or why not?

4. Six hundred yeast cells in a bowl double in number every hour.

a) Write a function $N(t)$ that tells how many yeast cells are in the bowl after t hours.

b) Evaluate $N(10)$. What does this represent?

c) Graph the function from part (a).

d) Use the graph to estimate how much time has elapsed if there are 4000 cells in the bowl.

5. Simplify each expression.

a) $\left(\dfrac{x^8}{x^4}\right)^3 \div x^{10}$

b) $(5x^6y^2)^3$

c) $(2xy)^3(x^3y^2)^2$

d) $\left(\dfrac{3x^9y^4}{x^8y^6}\right)^{10}\left(\dfrac{x^5y^{17}}{9x^4y^{12}}\right)^5$

6.

Simplify each expression and rewrite it using only positive exponents. Assume $x, y \neq 0$.

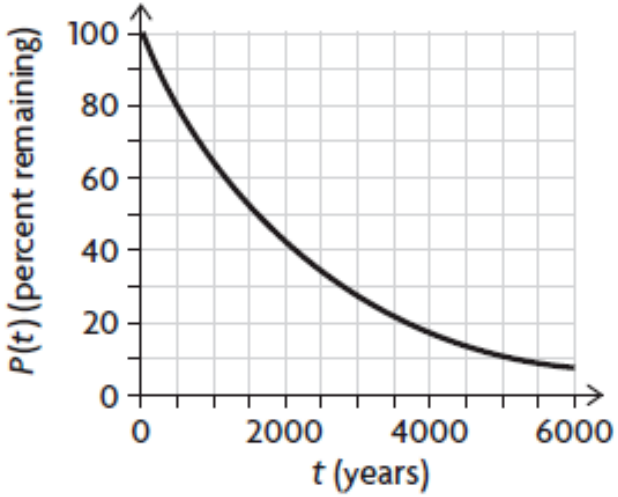
a) $\left(\dfrac{x^{-6}}{x^{2}}\right)^{-4} \div x^{40}$

b) $(4x^{-5}y^{2})^{-7}$

c) $(4xy^{2})^{-6} \div (8x^{-4}y^{3})^{-4}$

d) $\left(\dfrac{(5x^{-3}y^{-3})^{2}}{25x^{7}y^{5}}\right)^{-1}\left(\dfrac{625x^{-10}y}{9x^{-1}y^{-2}}\right)^{5}$

7. Examine the graph below of the decay of a radioactive substance over time.



a) Estimate the half-life of this element.

b) Use your answer from part (a) to find a formula for $P(t)$.

c) Use the formula from part (b) to determine to the nearest percent the amount of the element left after 9000 years.

3.

A. Use desmos find the regression of this data.

B. Using your model what is the temperature after 35 minutes?

Trial	Time after Initial Reading (min)	Temperature (°C)
0	0	89.23
1	1	89.23
2	2	85.42
3	3	82.53
4	4	79.91
5	5	77.67
6	6	75.61
7	7	73.67
8	8	71.75
9	9	70.2
10	10	68.92
11	11	67.41
12	12	66.02
13	13	64.67
14	14	63.48
15	15	62.21
16	16	61.26
17	17	60.05
18	18	58.97
19	19	58.14
20	20	57.26