1. For the scenario below, use the model for the volume of a cylinder as $V = \pi r^2 h$ to find the coefficient for the model of the new volume $V_{extnew} = kr^2 h$.

   Pepsi wants to increase the volume of soda in their cans. They've decided to increase the radius by 17 percent and increase the height by 10 percent. They want to model the new volume based on the radius and height of the original cans.

2. A town has an initial population of 100000. The town's population for the next 9 years is provided below. Which type of function would be most appropriate to model the town's population?

Year	1	2	3	4	5	6	7	8	9
Pop	100000	99986	99978	99972	99967	99964	99961	99958	99956

3. What model type would best describe the scenario below?

Social distancing is a common tactic to counter potential epidemics. This is due to the exponential increase in number of people infected as the density of people living in an area increases.

4. For the scenario below, model the rate of vibration (cm/s) of the string in terms of the length of the string. Then determine the variation constant k of the model (if possible). The constant should be in terms of cm and s.

   The rate of vibration of a string under constant tension varies based on the type of string and the length of the string. The rate of vibration of string ω decreases as the square length of the string increases. For example, when string ω is 5 mm long, the rate of vibration is 24 cm/s.

5. For the scenario below, use the model for the volume of a cylinder as $V = \pi r^2 h$ to find the coefficient for the model of the new volume $V_{extnew} = kr^2 h$.

Pepsi wants to increase the volume of soda in their cans. They've decided to decrease the radius by 13 percent and increase the height by 16 percent. They want to model the new volume based on the radius and height of the original cans.

6. A town has an initial population of 100000. The town's population for the next 9 years is provided below. Which type of function would be most appropriate to model the town's population?

Year	1	2	3	4	5	6	7	8	9
Pop	100018	100046	100058	100086	100098	100126	100138	100166	100

7. For the scenario below, model the rate of vibration (cm/s) of the string in terms of the length of the string. Then determine the variation constant k of the model (if possible). The constant should be in terms of cm and s.

The rate of vibration of a string under constant tension varies based on the type of string and the length of the string. The rate of vibration of string ω decreases as the cube length of the string increases. For example, when string ω is 3 mm long, the rate of vibration is 20 cm/s.

8. What model type would best describe the scenario below?

Social distancing is a common tactic to counter potential epidemics. This is due to the exponential increase in number of people infected as the density of people living in an area increases.

9. For the scenario below, find the variation constant k of the model (if possible).

In an alternative galaxy, the cube of the time, T (Earth years), required for a planet to orbit Sun χ increases as the cube of the distance, d (AUs), that the planet is from Sun χ increases. For example, when Ea's average distance from Sun χ is 2, it takes 82 Earth days to complete an orbit.

10. For the scenario below, find the variation constant k of the model (if possible).

In an alternative galaxy, the cube of the time, T (Earth years), required for a planet to orbit Sun χ decreases as the cube of the distance, d (AUs), that the planet is from Sun χ decreases. For example, when Ea's average distance from Sun χ is 4, it takes 67 Earth days to complete an orbit.