

1. A town has an initial population of 30000. The town's population for the next 10 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.	29980	29960	29940	29920	29900	29880	29860	29840	29820

- A. Linear
- B. Exponential
- C. Non-Linear Power
- D. Logarithmic
- E. None of the above

2. For the information below, construct a linear model that describes the total time T spent on the path in terms of the distance of a particular part of the path *if we know that all parts of the path are equal length.*

A bicyclist is training for a race on a hilly path. Their bike keeps track of their speed at any time, but not the distance traveled. Their speed traveling up a hill is 5 mph, 8 mph when traveling down a hill, and 6 mph when traveling along a flat portion.

- A. $240.000D$
- B. $0.492D$
- C. $19.000D$
- D. The model can be found with the information provided, but isn't options 1-3
- E. The model cannot be found with the information provided.

3. For the information provided below, construct a linear model that describes her total costs, C , as a function of the number of months, x she is at UF.

Aubrey is a college student going into her first year at UF. She will receive Bright Futures, which covers her tuition plus a \$800 educational expense each year. Before college, Aubrey saved up \$5000.

She knows she will need to pay \$900 in rent a month, \$60 for food a week, and \$56 in other weekly expenses.

- A. $C(x) = 1016x$
- B. $C(x) = 5800$
- C. $C(x) = 5800x$
- D. $C(x) = 1016$
- E. None of the above.

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4. A town has an initial population of 20000. The town's population for the next 10 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.	19970	19940	19910	19880	19850	19820	19790	19760	19730

- A. Linear
- B. Logarithmic
- C. Non-Linear Power
- D. Exponential
- E. None of the above

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5. What is the **best** way to describe the domain of the scenario below?

Bridges on highways often have expansion joints, which are small gaps in the roadway between one bridge section and the next. The gaps are put there so the bridge will have room to expand when the weather gets hot. Assume the gap width varies constantly with the temperature.

Suppose a bridge has a gap of 1.3 cm when the temperature is 22 degrees C and that the gap narrows to 0.9 cm when the temperature warms to 30 degrees C.

- A. Subset of the Integers
- B. Subset of the Natural numbers

- C. Proper subset of the Real numbers
 - D. There is no restricted domain in this scenario
 - E. Subset of the Rational numbers
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6. For the information provided below, construct a linear model that describes her total income, I , as a function of the number of months, x she is at UF.

Aubrey is a college student going into her first year at UF. She will receive Bright Futures, which covers her tuition plus a \$1000 educational expense each year. Before college, Aubrey saved up \$10000. She knows she will need to pay \$1100 in rent a month, \$80 for food a week, and \$64 in other weekly expenses.

- A. $I(x) = 11000x$
 - B. $I(x) = 1000x + 10000$
 - C. $I(x) = 11000$
 - D. $I(x) = 10000x + 1000$
 - E. None of the above.
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7. What is the **best** way to describe the domain of the scenario below?

Chemists commonly create a solution by mixing two products of differing concentrations together. A 10% and 30% solution can make an acid solution of some value between these, such as a 24% acid solution. The chemist wants to make differing solution percentages of 7 liters each.

- A. Subset of the Natural numbers
- B. Subset of the Rational numbers
- C. Proper subset of the Real numbers
- D. Subset of the Integers
- E. There is no restricted domain in this scenario

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8. Using the situation below, construct a linear model that describes the cost of the coffee beans $C(h)$ in terms of the weight of the high-quality coffee beans h .

Veronica needs to prepare 70 of blended coffee beans selling for \$3.84 per pound. She has a high-quality bean that sells for \$4.79 a pound and a low-quality bean that sells for \$3.19 a pound.

- A. $C(h) = -1.60h + 335.30$
B. $C(h) = 3.99h$
C. $C(h) = 4.79h$
D. $C(h) = 1.60h + 223.30$
E. None of the above.

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9. For the information below, construct a linear model that describes the total time T spent on the path in terms of the distance of a particular part of the path *if we know that all parts of the path are equal length*.

A bicyclist is training for a race on a hilly path. Their bike keeps track of their speed at any time, but not the distance traveled. Their speed traveling up a hill is 5 mph, 11 mph when traveling down a hill, and 8 mph when traveling along a flat portion.

- A. $0.416D$
B. $440.000D$
C. $24.000D$
D. The model can be found with the information provided, but isn't options 1-3
E. The model cannot be found with the information provided.

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10. Using the situation below, construct a linear model that describes the cost of the coffee beans $C(h)$ in terms of the weight of the high-quality coffee beans h .

Veronica needs to prepare 240 of blended coffee beans selling for \$3.23 per pound. She has a high-quality bean that sells for \$4.19 a pound and a low-quality bean that sells for \$2.56 a pound.

- A. $C(h) = 4.19h$
 - B. $C(h) = 3.38h$
 - C. $C(h) = 1.63h + 614.40$
 - D. $C(h) = -1.63h + 1005.60$
 - E. None of the above.
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