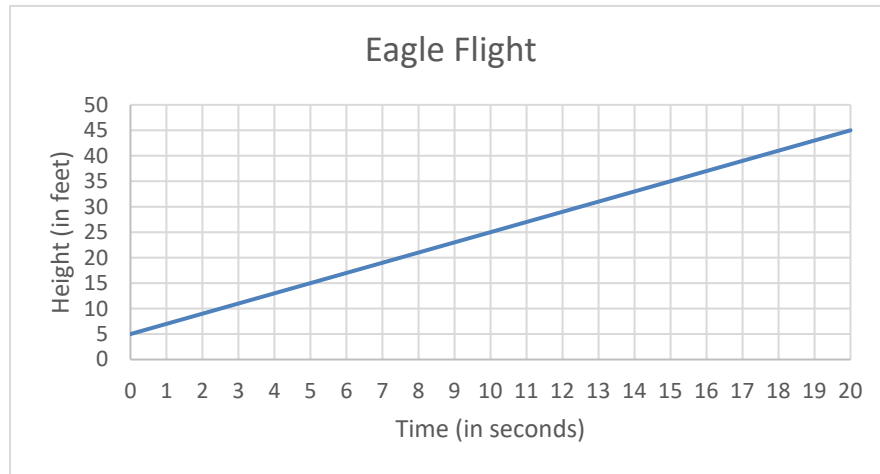


MATH



Constructing Linear Functions

1.



Determine the linear function that is being represented in the graph above, displaying the height an eagle can fly in relation to the time. What do the rate of change and the initial value represent here?

2.



Explain why the graph above does not represent a linear function.

3. For each of the tables below, determine if they represent linear functions. Those that do, construct the linear function, and explain the meaning of the rate of change and initial value.

a. This table represents the relationship between the amount of area on a wall a painter has left to paint, in relation to the time:

Amount of Area Remaining on the Wall (in ft ²)	Time (in hrs.)
950	2
875	5
687.5	12.5
400	24
⋮	⋮

b. This table represents the relationship between the amount of water being filled in a rain bucket during a rainstorm and the time:

Amount of Water in the Bucket (in oz ³)	Time (in mins.)
2.5	1.5
5	3
13.5	7.5
34	18
⋮	⋮

c. This table represents the relationship between the number of parrots and owls there are at a bird sanctuary:

Parrots	Owls
35	73
42	87
51	105
⋮	⋮

d. This table represents the relationship between the score someone receives on a test and the number of hours they spent studying:

Test Score	Study Time (in hrs.)
66	1.2
73	2.6
77	3.4
89	5.8
⋮	⋮

4. For each of the scenarios below, construct the linear function to represent it.

Part A: Today, the temperature was 47.5°F . 3 days from now, the temperature is expected to be 40°F . Then, 6 more days after that, the temperature is predicted to be 25°F . What linear function will represent this scenario?

Part B: A newborn salamander grows at a constant rate. After 1 week, the newborn grows to a length of 3.5 inches. After 3.5 weeks, the salamander grows to a length of 4.75 inches, and after 10 weeks, it grows to a length of 8 inches. What is the linear function representing this scenario?

Part C: At a car rental service, it costs \$113 to rent a car for three days and \$237 to rent a car for a week. How much does it cost to rent a car for 1 day? To answer this, construct the linear function.

Part D: A blue whale is currently diving down beneath the ocean. After 4 minutes, the blue whale is 33.7 meters below sea level, and after 13mins, the blue whale is 99.4 meters below sea level. If the blue whale is diving at a constant rate, how long will it take to reach a depth of 190.65 meters below sea level? To answer this, construct a linear function.

5. Scientists have been studying the population of mole rats in Southeast Indonesia for a number of years. After the first 6 years of this study, the population was recorded to be 2,490. After another 6 years, the population was recorded to be 1,992. Finally, 3 years later, at the end of their research, the population was recorded to be 1,743. Determine a linear function to represent this scenario. What does this function tell you about the population of mole rats in Southeast Indonesia? How much longer will it take for the population of mole rats to decrease to 1,328?