Drill 3

Answers can be found in Part IV.

3

An oceanographer is trying to determine the concentration profile of dissolved oxygen in the ocean at depths lower than 10 meters. He determines that the dissolved oxygen concentration is 0.0022 g/L at a depth of 15 meters, and it is 0.00125 g/L at a depth of 20 meters. If $C(d)$ is the concentration of dissolved oxygen at d meters, which of the follow equations best describes the profile below 10 meters?

A) $C(d)=\frac{1}{2}-\frac{1}{d^2}$

B) $C(d)=\frac{1}{100d}$

C) $C(d)=\frac{1}{d}$

D) $C(d)=\frac{1}{2d^2}$

6

A shipping company pays a driver a fixed fee for each delivery, and deducts a separate fee daily for the use of the company's delivery truck. The driver's net pay in dollars, P, for one day is given by the equation $P = 8d - 40$, where d is the number of deliveries made in one day. What does the number 40 most likely represent?

A) The amount, in dollars, that the company deducts for use of the delivery truck

B) The amount, in dollars, that the driver is paid for each delivery

C) The average number of deliveries per hour made by the driver

D) The total number of deliveries made per day by the driver

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At a buffet restaurant, students pay $5 per meal and non-students pay $7. The total revenue, R, in dollars, earned per day by the restaurant is given by the equation $R = 5s + 7n$, where s is the number of student customers and n is the number of non-student customers. Which of the following represents the total number of customers on a given day?

A) $s - n$

B) $s + n$

C) sn

D) $\frac{s}{n}$

7

$$T(t) = \Delta T^{(-kt)}$$

The simple cooling of an object can be represented by the equation above, where T is temperature in degrees Celsius, k is a rate constant, and t is time. What might the quantity ΔT represent?

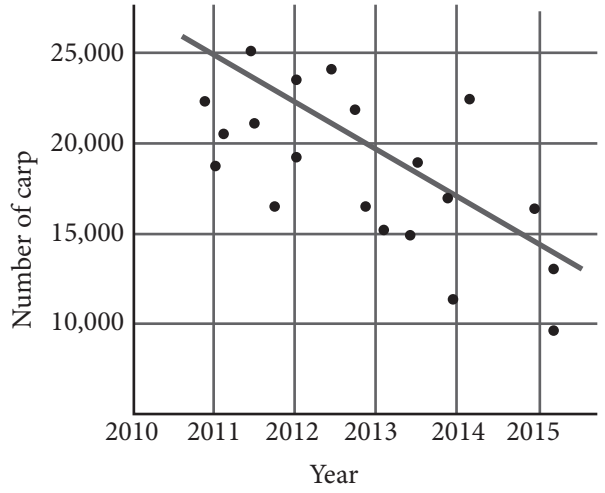
A) Temperature at a certain time

B) The difference between the initial temperature of the object and the temperature of its surroundings

C) A conversion from Celsius to Fahrenheit

D) A constant factor that is dependent on the object

10



Between 2010 and 2015, researchers tracked populations of Crucian carp in the Ohio River. The graph above displays population sizes as counted by the researchers. According to the line of best fit, what is the approximate average yearly decrease in the number of Crucian carp?

A) 1

B) 2.5

C) 1,200

D) 2,500

8

A group of students decided to have a car wash to raise funds for the school. The students charged the same rate to wash each car, and they paid for cleaning supplies out of the proceeds. If the net amount, $N(c)$, in dollars, raised from washing c cars is given by the function $N(c) = 8c - 0.40c$, which of the following can be deduced from the function?

A) The students paid a total of $8 for cleaning supplies.

B) The students paid a total of $40 for cleaning supplies.

C) The students paid $0.40 per car for cleaning supplies.

D) The students paid $8 per car for cleaning supplies.

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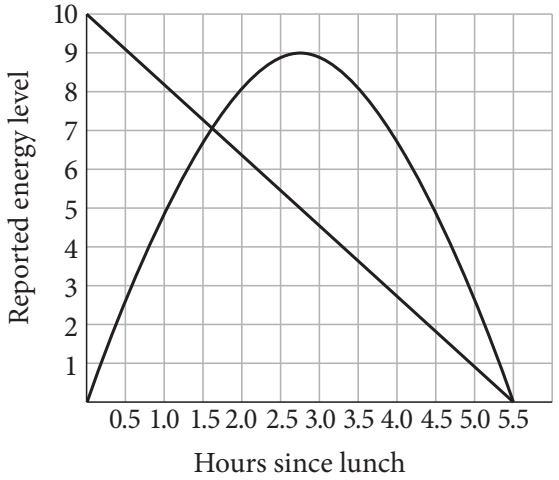

Two employees at a certain company were asked to gauge their energy levels on a scale of 1 to 10 after eating lunch at noon. The results were averaged and plotted as illustrated in the above figure. Which of the following statements is most consistent with the given data?

A) Both employees experienced the same fluctuation in energy during the afternoon hours.

B) Both employees were drowsy after eating big lunches.

C) One of the employees consumed energy-boosting foods and drinks and became less energetic throughout the afternoon.

D) One of the employees consumed foods that resulted in her feeling more energetic throughout the day.

11

Delphine is studying the growth of bacteria in a petri dish. She grows 100 colonies of bacteria in dishes at varying temperatures to find the optimal temperature for bacteria growth. The temperature of the 10 colonies with the most rapid growth is used to determine the optimal temperature range, which Delphine finds to be from 30° to 37°C, inclusive. Which of the following inequalities represents the optimal temperature range, t, for bacteria growth?

A) $|t + 7| \leq 37$

B) $|t - 3.5| \leq 33.5$

C) $|t - 30| \leq 7$

D) $|t - 33.5| \leq 3.5$

13

The sum, S, of a set of n consecutive integers is given by the equation $S = \left(\frac{a+k}{2}\right)n$. What does $a + k$ represent?

A) The sum of the two least integers
B) The sum of the least and greatest integers
C) The sum of the two middle integers
D) The sum of the two greatest integers

23

If interest deposits are made monthly into an account with a beginning balance of $250, supposing no withdrawals are made from the account, the balance B of an account with an annual interest rate of 5% after t years can be computed using the equation below.

$$B = 250\left(1 + \frac{0.05}{12}\right)^{12t}$$

Which of the following describes what the quantity $\frac{0.05}{12}$ represents in the equation?

A) The amount of money deposited into an account with balance B during a given month
B) The amount of money in an account with balance B after a monthly interest deposit is made
C) The percentage of the starting balance B added during a monthly interest deposit
D) The number of months over which interest payments will be made in a year