Two-Variable Data

CollegeBoard Question Bank

Abstract

This exercise sheet contains

- an **Easy** category with 10 questions;
- a **Medium** category with 10 questions;
- a **Hard** category with 8 questions

for you to attempt. A digital copy of this sheet is available for you on moodle. Feel free to utilize the **Question Space** on Teams to ask for guidance.
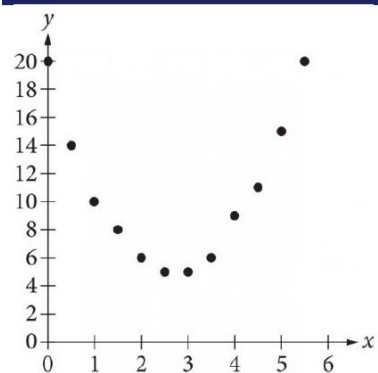
Best,
Omar :)

Two-Variable Data

Easy

(1) **82aaa0a1** MULTIPLE CHOICE   One answer only

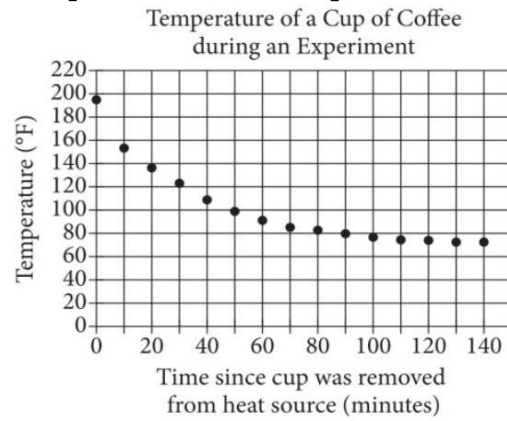Of the following, which is the best model for the data in the scatterplot?

a. $y = 2x^2 - 5x - 3$
b. $y = 2x^2 - 11x + 20$
c. $y = 2x^2 - 5x + 3$
d. $y = 2x^2 - 11x - 20$

(2) **83272c51** ☐MULTIPLE CHOICE☐ ☐One answer only☐

Temperature of a Cup of Coffee during an Experiment

Temperature of a Cup of Coffee
during an Experiment

Temperature (°F)

Time since cup was removed
from heat source (minutes)

   a. Between 50 and 60 minutes
   b. Between 0 and 10 minutes
   c. Between 90 and 100 minutes
   d. Between 30 and 40 minutes

(3) **ac5b6558** MULTIPLE CHOICE   One answer only

Temperature and Elevation
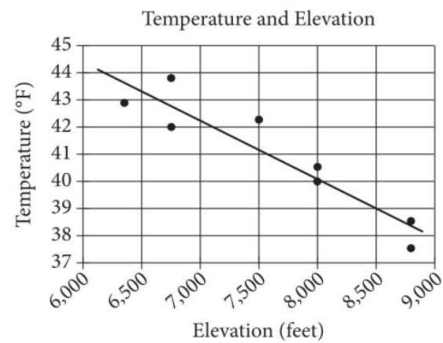
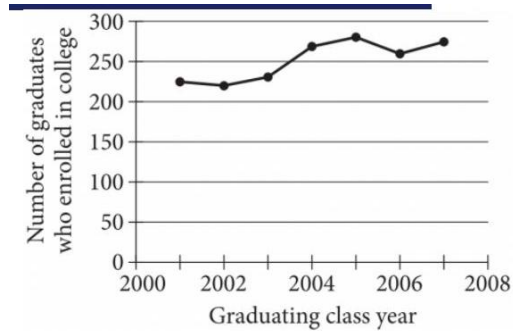
The scatterplot above shows the high temperature on a certain day and the elevation of 8 different locations in the Lake Tahoe Basin. A line of best t for the data is also shown. What temperature is predicted by the line of best t for a location in the Lake Tahoe Basin with an elevation of 8,500 feet?

   a. 41°F
   b. 37°F
   c. 39°F
   d. 43°F

(4) **74dee52b** MULTIPLE CHOICE   One answer only

The line graph shows the number of graduates from the classes of 2001 through 2007 at a certain school who enrolled in college within 24 months of graduation. Of the following, which class had the fewest graduates who enrolled in college within 24 months of graduation?

  a. 2005
  b. 2007
  c. 2002
  d. 2004

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(5) **9d88a3e3** [MULTIPLE CHOICE] [One answer only]

Theresa's Running Speed and Time
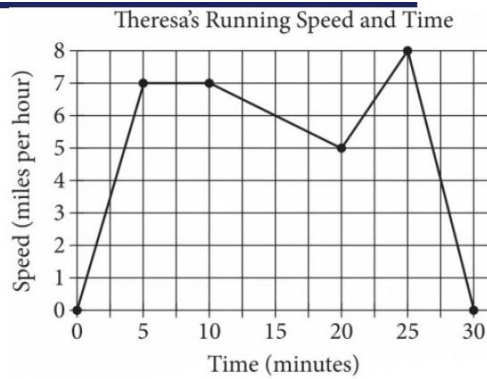
Theresa ran on a treadmill for thirty minutes, and her time and speed are shown on the graph above. According to the graph, which of the following statements is NOT true concerning Theresa's run?
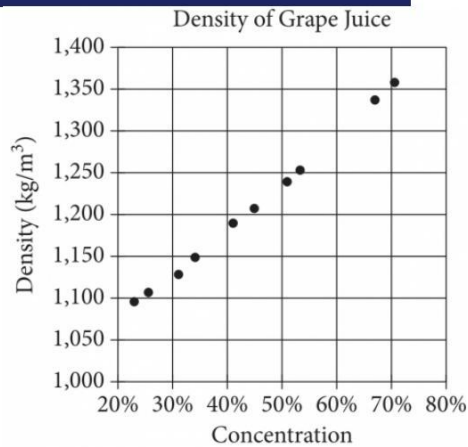
   a. Theresa's speed decreased at a constant rate during the last five minutes.
   b. Theresa ran at a constant speed for five minutes.
   c. Theresa's speed was increasing for a longer period of time than it was decreasing.
   d. Theresa's speed reached its maximum during the last ten minutes.
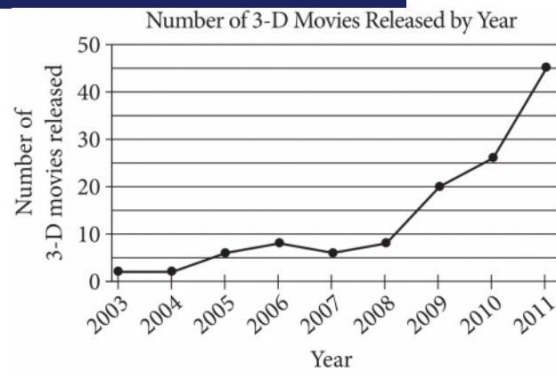
(6) **c9dd92b1** MULTIPLE CHOICE   One answer only

The densities of different concentrations of grape juice are shown in the scatterplot above. According to the trend shown by the data, which of the following is closest to the predicted density, in kilograms per cubic meter (kg/m^3), for grape juice with a concentration of 60% ?

a. 1,350
b. 1,300
c. 1,200
d. 1,250

6

(7) **a6b2fcce** | MULTIPLE CHOICE | | One answer only |
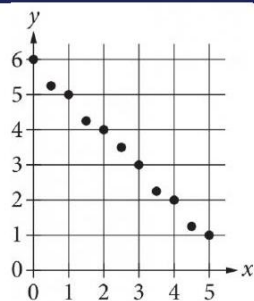

Number of 3-D Movies Released by Year

According to the line graph above, between which two consecutive years was there the greatest change in the number of 3-D movies released?

a. 2010-2011
b. 2009-2010
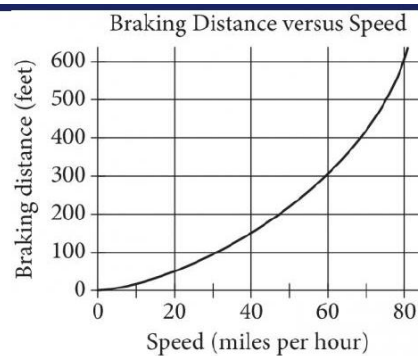c. 2008-2009
d. 2003-2004

(8) **9296553d** MULTIPLE CHOICE One answer only

Which of the following could be an equation for a line of best fit for the data in the scatterplot?

a. $y = -x - 6$
b. $y = 6x + 1$
c. $y = -x + 6$
d. $y = 6x - 1$

(9) **d6121490** MULTIPLE CHOICE   One answer only

Braking Distance versus Speed

The graph above shows the relationship between the speed of a particular car, in miles per hour, and its corresponding braking distance, in feet. Approximately how many feet greater will the car's braking distance be when the car is traveling at 50 miles per hour than when the car is traveling at 30 miles per hour?

  a. 250
  b. 175
  c. 75
  d. 125

(10) **8156d446** SHORT ANSWER   Case-Insensitive
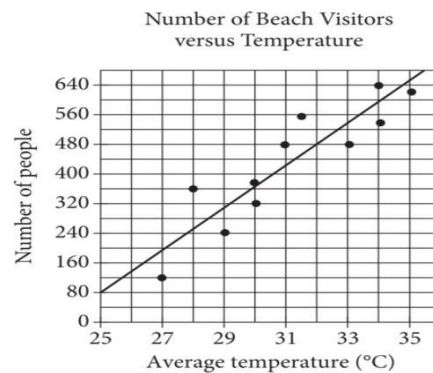
**Number of Beach Visitors
versus Temperature**

Each dot in the scatterplot above represents the temperature and the number of people who visited a beach in Lagos, Nigeria, on one of eleven different days. The line of best fit for the data is also shown. According to the line of best fit, what is the number of people, rounded to the nearest 10, predicted to visit this beach on a day with an average temperature of 32°C?

Medium

(1) **1adb39f0** MULTIPLE CHOICE · One answer only

The scatterplot shows the relationship between two variables, x and y. A line of best fit for the data is also shown. Which of the following is closest to the difference between the y-coordinate of the data point with $x = 1$ and the y-value predicted by the line of best fit at $x = 1$?
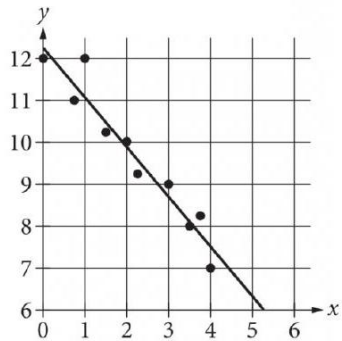
a. 1
b. 12
c. 5
d. 2

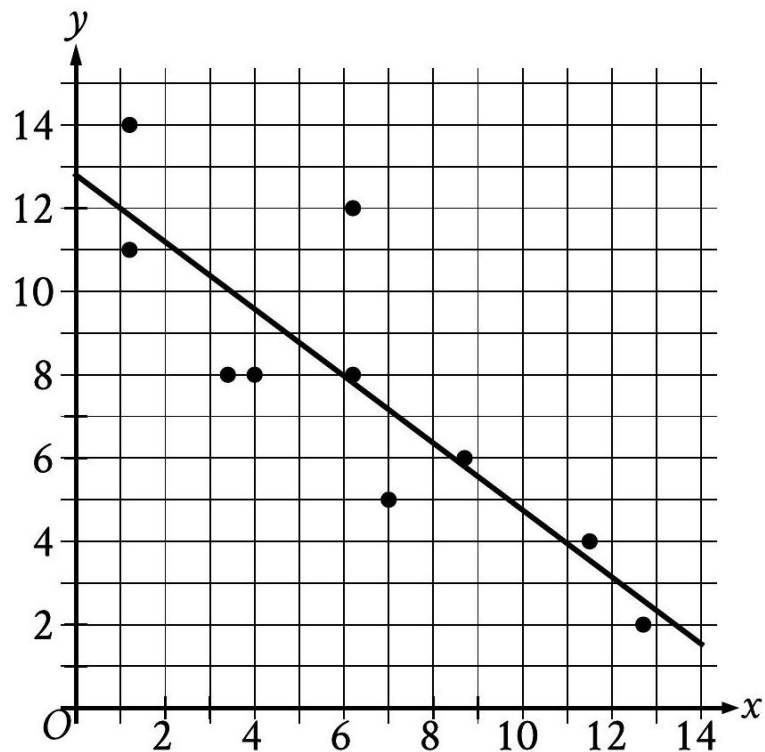(2) **9a144a01** $\boxed{\text{MULTIPLE CHOICE}}$ $\boxed{\text{One answer only}}$

Which of the following is true about the values of 2^X and $2x + 2$ for $x > 0$?

    a. For all $x > 0$, it is true that $2^x < 2x + 2$.
    b. There is a constant c such that if $0 < x < c$, then $2^x < 2x + 2$, but if $x > c$, then $2^x > 2x + 2$.
    c. For all $x > 0$, it is true that $2^x > 2x + 2$.
    d. There is a constant c such that if $0 < x < c$, then $2^x > 2x + 2$, but if $x > c$, then $2^x < 2x + 2$.

(3) **03a16790** MULTIPLE CHOICE   One answer only

The scatterplot shows the relationship between two variables, x and y. A line of best fit is also shown.

Which of the following is closest to the slope of the line of best fit shown?

   a. -0.8
   b. -2.4
   c. 0.8
   d. 2.4

(4) **7ac5d686** $\boxed{\text{MULTIPLE CHOICE}}$ $\boxed{\text{One answer only}}$

An inspector begins a day of work with a large sample of shirts that need to be checked for defects. The inspector works at a constant rate throughout the morning. What type of model is best to model the number of shirts remaining to be checked for defects at any given time throughout the morning?

    a. An exponential decay model
    b. A linear model with a positive slope
    c. A linear model with a negative slope
    d. An exponential growth model

(5) **7fd284ac** MULTIPLE CHOICE   One answer only

**Income and Percent of Total Expenses Spent on Programs for Ten Charities in 2011**
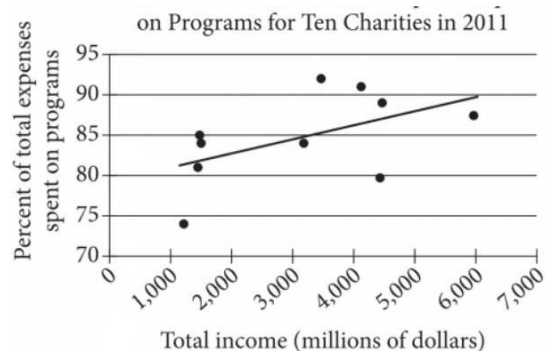
The scatterplot above shows data for ten charities along with the line of best fit. For the charity with the greatest percent of total expenses spent on programs, which of the following is closest to the difference of the actual percent and the percent predicted by the line of best fit?

  a. 7%
  b. 4%
  c. 1%
  d. 10%

(6) **3d985614** `MULTIPLE CHOICE` `One answer only`
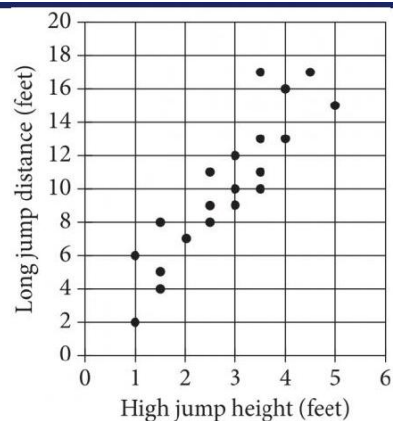
Each dot in the scatterplot above represents the height x, in feet, in the high jump, and the distance y, in feet, in the long jump, made by each student in a group of twenty students. The graph of which of the following equations is a line that most closely fits the data?

   a. $y = 0.82x + 3.30$
   b. $y = 3.30x - 3.30$
   c. $y = 0.82x - 0.82$
   d. $y = 3.30x + 0.82$

(7) **3c5b19ef** MULTIPLE CHOICE | One answer only

Railroad Museum Visitors
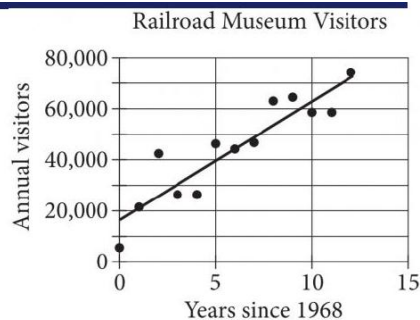
The scatterplot above shows the number of visitors to a railroad museum in Pennsylvania each year from 1968 to 1980, where t is the number of years since 1968 and n is the number of visitors. A line of best fit is also shown. Which of the following could be an equation of the line of best fit shown?

   a. $n = 4,690 + 16,090t$
   b. $n = 16,090 + 4,680t$
   c. $n = 9,060 + 16,090t$
   d. $n = 16,090 + 9,060t$

(8) **ab7740a8** MULTIPLE CHOICE   One answer only

In which of the following tables is the relationship between the values of x and their corresponding y-values nonlinear?

a.

x	1	2	3	4
y	6	12	24	48

b.

x	1	2	3	4
y	4	8	12	16

c.

x	1	2	3	4
y	8	13	18	23

d.

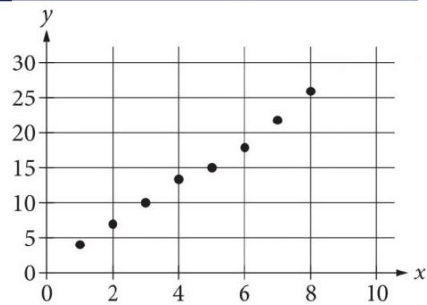| x	1	2	3	4
y	8	11	14	17

18

(9) **9eb896c5** MULTIPLE CHOICE | One answer only
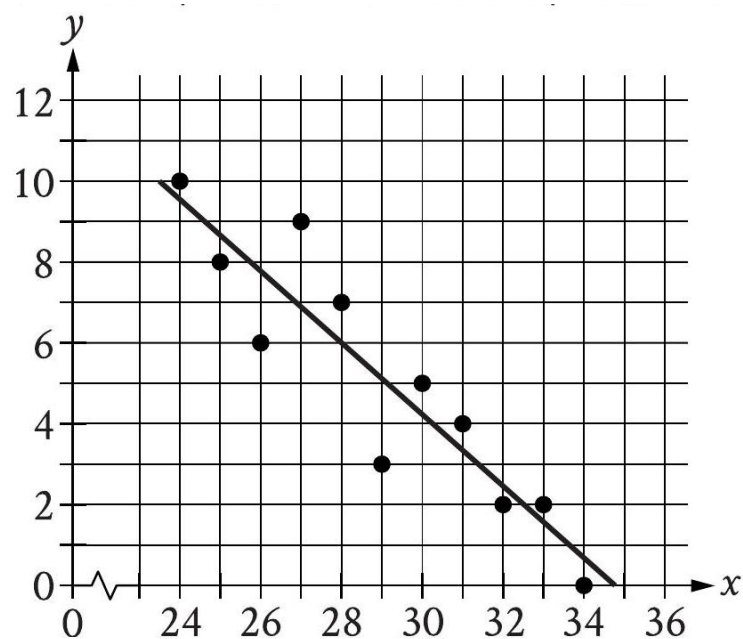

Which of the following could be the equation for a line of best fit for the data shown in the scatterplot above?

a. $y = -3x + 0.8$
b. $y = 3x + 0.8$
c. $y = -0.8x + 3$
d. $y = 0.8x + 3$

(10) **fdfc90e4** | MULTIPLE CHOICE | | One answer only |

The scatterplot shows the relationship between two variables, x and y. A line of best fit for the data is also shown.
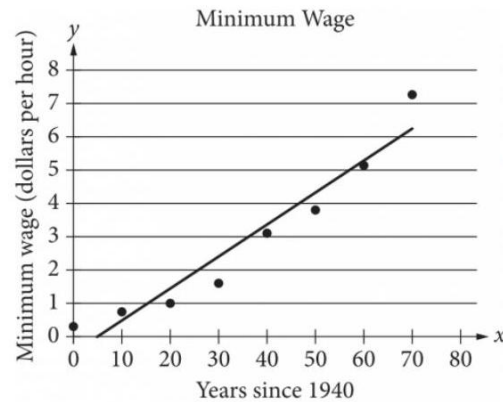

At $x = 32$, which of the following is closest to the y-value predicted by the line of best fit?

   a. 1.5
   b. 2.4
   c. 0.4
   d. 3.3

Hard

(1) **d6af3572** MULTIPLE CHOICE   One answer only

The scatterplot above shows the federal-mandated minimum wage every 10 years between 1940 and 2010. A line of best fit is shown, and its equation is $y = 0.096x - 0.488$. What does the line of best fit predict about the increase in the minimum wage over the 70-year period?

   a. Each year between 1940 and 2010, the average increase in minimum wage was 0.49 dollars.

   b. Every 10 years between 1940 and 2010, the average increase in minimum wage was 0.096 dollars.

   c. Every 10 years between 1940 and 2010, the average increase in minimum wage was 0.488 dollars.

   d. Each year between 1940 and 2010, the average increase in minimum wage was 0.096 dollars.

(2) **1e1027a7** MULTIPLE CHOICE   One answer only
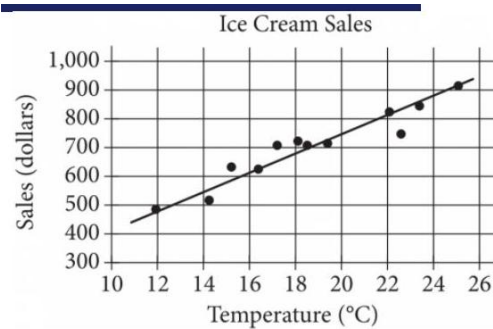
Ice Cream Sales

The scatterplot above shows a company's ice cream sales d, in dollars, and the high temperature t, in degrees Celsius (°C), on 12 different days. A line of best fit for the data is also shown. Which of the following could be an equation of the line of best fit?

a. $d = 0.03t + 402$
b. $d = 33t + 300$
c. $d = 10t + 402$
d. $d = 33t + 84$

The scatterplot shows the relationship between the length of time y, in hours, a certain bird spent in flight and the number of days after January 11, x.
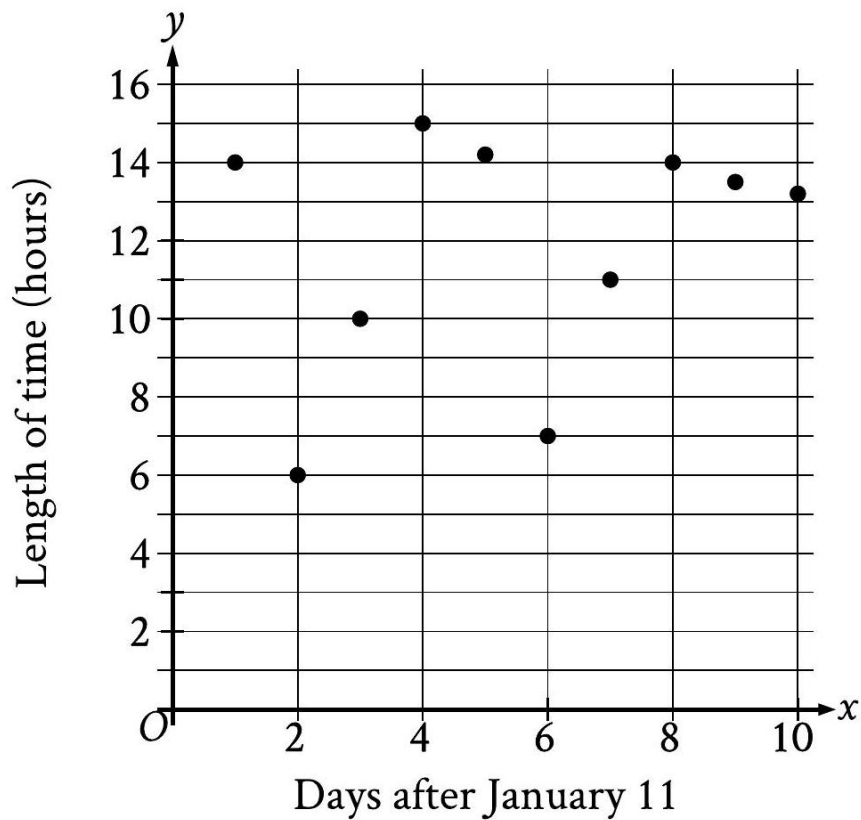
What is the average rate of change, in hours per day, of the length of time the bird spent in flight on January 13 to the length of time the bird spent in flight on January 15?

23

(4) **d0430601** SHORT ANSWER | Case-Insensitive
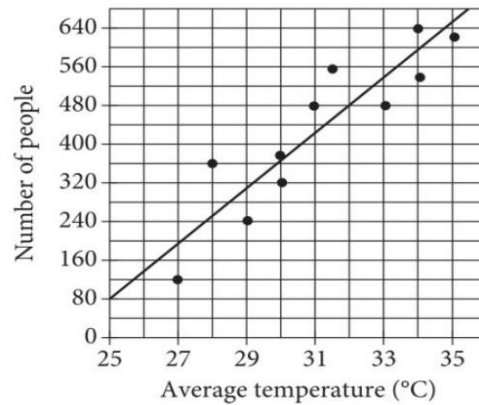
Number of Beach Visitors versus Temperature

Each dot in the scatterplot above represents the temperature and the number of people who visited a beach in Lagos, Nigeria, on one of eleven different days. The line of best fit for the data is also shown. The line of best fit for the data has a slope of approximately 57. According to this estimate, how many additional people per day are predicted to visit the beach for each 5°C increase in average temperature?

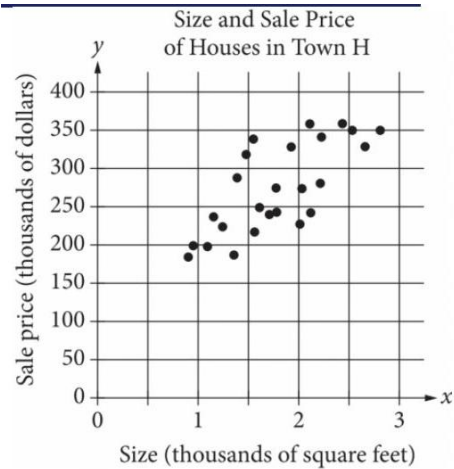(5) **e821a26d** $\boxed{\text{MULTIPLE CHOICE}}$ $\boxed{\text{One answer only}}$

The scatterplot below shows the amount of electric energy generated, in millions of megawatt-hours, by nuclear sources over a 10-year period.

**Electric Energy
Generated by Nuclear Sources**
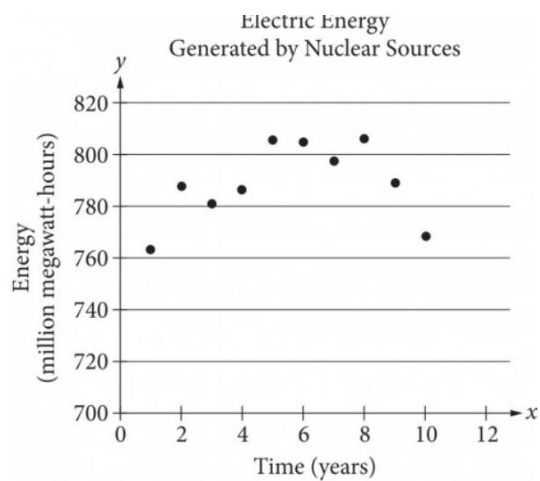
Of the following equations, which best models the data in the scatter-plot?

   a. $y = 1.674x^2 + 19.76x + 745.73$
   b. $y = -1.674x^2 - 19.76x - 745.73$
   c. $y = 1.674x^2 + 19.76x - 745.73$
   d. $y = -1.674x^2 + 19.76x + 745.73$

(6) **79137c1b** MULTIPLE CHOICE | One answer only

Size and Sale Price
of Houses in Town H

The scatterplot above shows the size x and the sale price y of 25 houses for sale in Town H. Which of the following could be an equation for a line of best fit for the data?

a. $y = 100x$
b. $y = 50x + 100$
c. $y = 100x + 100$
d. $y = 200x + 100$

(7) **af142f8d** MULTIPLE CHOICE One answer only

	Amount invested	Balance increase
Account A	$500	6% annual interest
Account B	$1,000	$25 per year

Two investments were made as shown in the table above. The interest in Account A is compounded once per year. Which of the following is true about the investments?

  a. Account A always earns more money per year than Account
  b. B. Account A always earns less money per year than Account
  c. C. Account A earns more money per year than Account B at first but eventually earns less money per year.
  d. Account A earns less money per year than Account B at first but eventually earns more money per year.

(8) **9d95e7ad** MULTIPLE CHOICE   One answer only

Total Protein and Total Fat for Eight Sandwiches
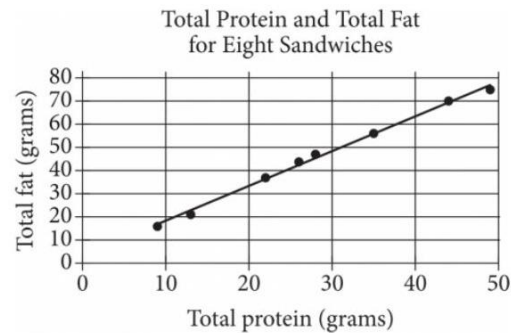
The scatterplot above shows the numbers of grams of both total protein and total fat for eight sandwiches on a restaurant menu. The line of best fit for the data is also shown. According to the line of best fit, which of the following is closest to the predicted increase in total fat, in grams, for every increase of 1 gram in total protein?

    a. 2.0
    b. 1.5
    c. 1.0
    d. 2.5

Total of marks: 28