Statistics and the Number System

Day 3

MIAMI-DADE COUNTY PUBLIC SCHOOLS
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MAFS.912. N-RN.1.2

Which expression is equivalent to $\sqrt[5]{m}$

A. $m^{\frac{1}{5}}$

B. m^{5}

C. $m^{-\frac{1}{5}}$

D. m^{-5}

A

MAFS.912. N-RN.1.2

Which expression is equivalent to $5\sqrt[3]{g}$

A. $(5g)^{\frac{1}{3}}$

B. $(5g)^3$

C. $5g^{\frac{1}{3}}$

D. $5g^3$

C

MAFS.912. N-RN.1.2

Which expression is equivalent to $\sqrt[3]{27x}$

A. $9x^{\frac{1}{3}}$

B. $3x^{\frac{1}{3}}$

C. $9x$

D. $3x$

B

MAFS.912. N-RN.1.2

What is the value of x in the equation below?

$$\left(\sqrt[4]{\frac{p}{q}}\right)^{\frac{4}{3}} = \left(\frac{p}{q}\right)^{x}$$

A. $-\frac{3}{16}$

B. -3

C. $\frac{1}{3}$

D. $\frac{16}{3}$

C

MAFS.912. N-RN.1.2

Rewrite $\sqrt[3]{x^2yz^4} \cdot \sqrt[6]{x^2yz^4}$

A. $(x^2yz^4)^{\frac{1}{18}}$

B. $(x^2yz^4)^{18}$

C. $(x^2yz^4)^{\frac{1}{2}}$

D. $(x^2yz^4)^2$

C

MAFS.912. N-RN.1.2

Which of the following are equal to $(p^{-3})^{\frac{2}{5}}$? Assume that p is positive. Select all that apply.

- ❑ $\sqrt[5]{p^{-6}}$
- ❑ $\frac{1}{\sqrt{p^{15}}}$
- ❑ $\frac{1}{p^{30}}$
- ❑ $\sqrt[5]{(p^2)^{-3}}$
- ❑ $\frac{1}{p\sqrt[5]{p}}$
- ❑ $\sqrt[10]{p^{-1}}$

A, D, and E

MAFS.912. N-RN.1.2

Which expression is equivalent to $-\sqrt{27} - 3\sqrt{45} - \sqrt{20} + 2\sqrt{45}$?

A. $3\sqrt{3} - 5\sqrt{5}$

B. $-3\sqrt{3} - 5\sqrt{5}$

C. $-\sqrt{7} - \sqrt{45}$

D. $-\sqrt{27} - \sqrt{20} - \sqrt{45}$

B

MAFS.912. N-RN.1.1

What is $\frac{27^{\frac{1}{3}}}{9^{\frac{1}{2}}}$ simplified?

A. 1
B. 3
C. 4
D. 9

A

MAFS.912. N-RN.1.1

Which expression is equivalent to $(4x^3)^{\frac{1}{2}} \cdot (9x)^{\frac{1}{2}}$?

A. $6x^2$

B. $\sqrt{13x^4}$

C. $\sqrt{36x^4}$

D. $36x^{\frac{3}{4}}$

A

MAFS.912. N-RN.2.3

Which value is an irrational number?

A. $4 + \sqrt{7}$

B. $\sqrt{2}\sqrt{8}$

C. $\frac{\sqrt{3}\sqrt{12}}{5}$

D. $\sqrt{3} - 3^{\frac{1}{2}}$

A

MAFS.912. N-RN.2.3

Which statement is true about the value of $(\sqrt{27} - 3) \cdot 9$?

A. It is rational, because the product of two rational numbers is rational.
B. It is rational, because the product of a rational number and an irrational number is rational.
C. It is irrational, because the product of two irrational numbers is irrational.
D. It is irrational, because the product of an irrational number and a rational number is irrational.

D

MAFS.912. N-RN.2.3

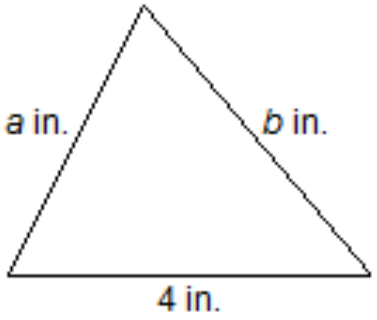
Which statement describes the product of m and $-\frac{1}{3}$ when m is an irrational number?

A. The product will always be a rational number.
B. The product will always be an irrational number.
C. The product will be rational only when m is an integer.
D. The product will be irrational only when m is an integer.

B

MAFS.912. N-RN.2.3

The perimeter of the triangle below is an irrational number.



Which of the following are possible values of a and b?

- ❑ $a = 3 + \sqrt{7}, b = 5 - \sqrt{7}$
- ❑ $a = 4, b = \frac{1}{5}$
- ❑ $a = \sqrt{13}, b = \sqrt{5}$
- ❑ $a = 3, b = \sqrt{5}$
- ❑ $a = 13.\overline{3}, b = 16.\overline{6}$
- ❑ $a = \frac{8}{3}, b = \frac{5}{3}$

C and D

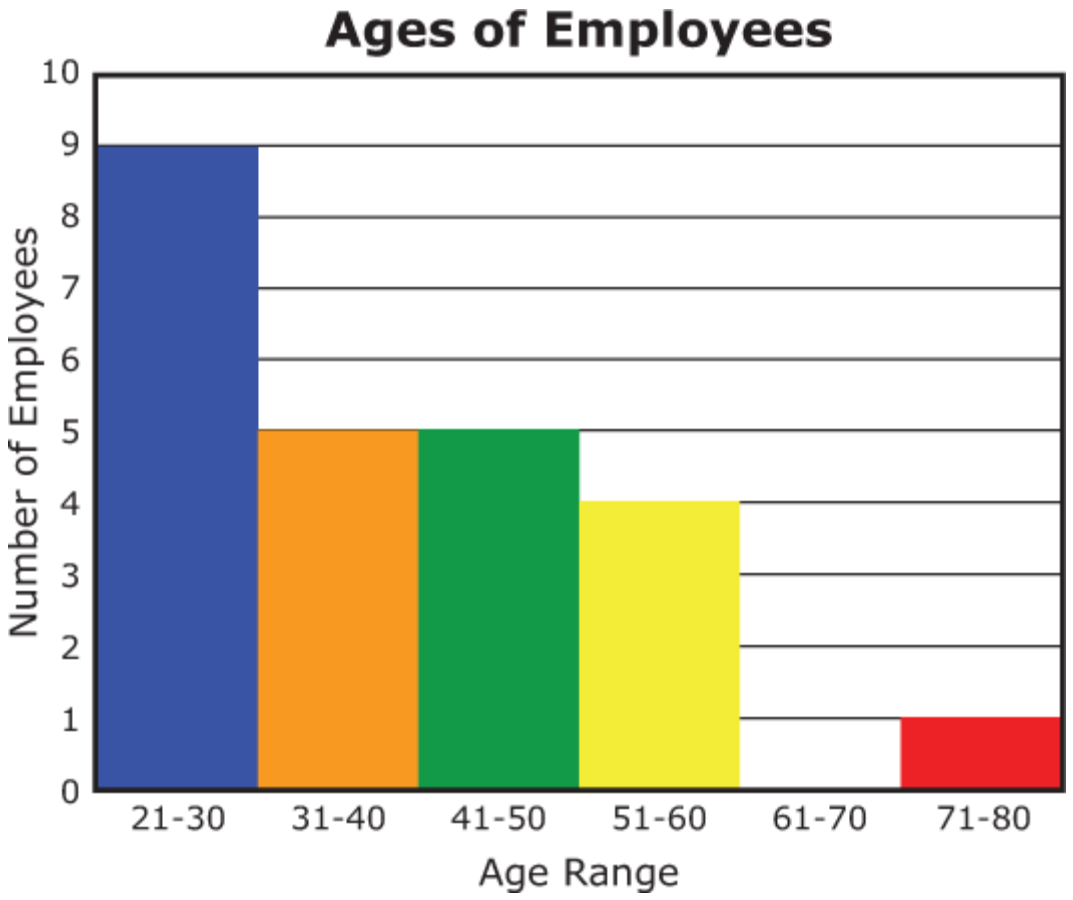
MAFS.912. N-RN.2.3

Is the product of $\sqrt{2}$ and $\sqrt{8}$ rational or irrational? Explain.

The product is rational because square root of 16 is 4 and 4 is a rational number.

MAFS.912. S-ID.1.1

The histogram below displays the ages of a company's employees.



The company hires 7 new employees. The ages of the new employees are 48, 51, 60, 61, 63, 70, and 71. What should the height of the bar for age range 61-70 be to represent the ages of the new employees?

A. 2

B. 3

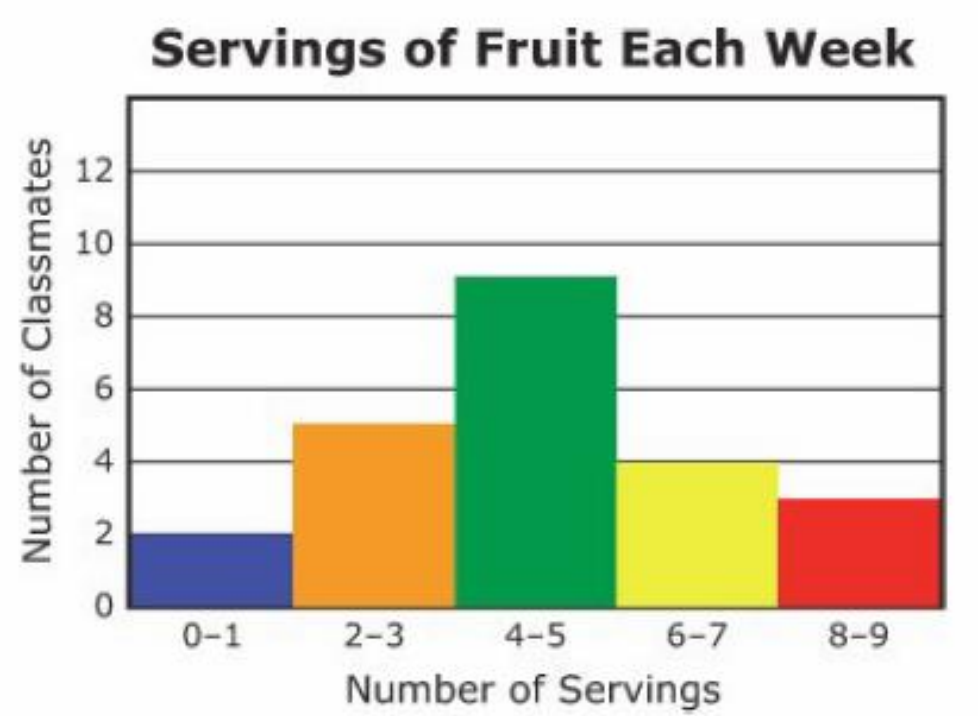
C. 4

D. 5

B

MAFS.912. S-ID.1.1

Vanessa collected data about how many servings of fruit her classmates eat each week. The histogram below displays the data..



How many of Vanessa's classmates eat more than 5 servings of fruit each week?

A. 3

B. 7

C. 16

D. 23

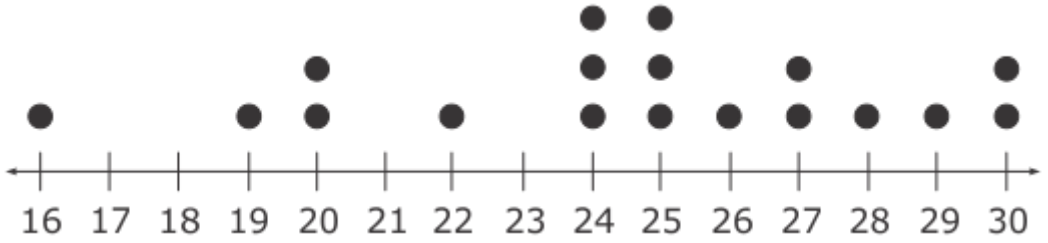
B

MAFS.912. S-ID.1.1

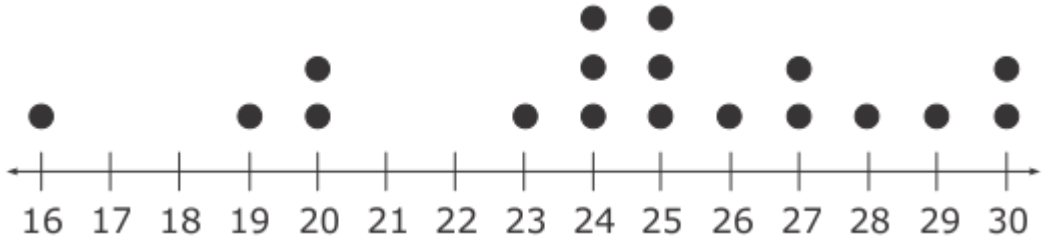
The data shows the approximate time it takes several students to run 3 miles. Which dot plot represents the data?

24, 20, 30, 25, 27, 26, 25, 20, 30, 24, 23, 29, 16, 24, 19, 25, 28, 27

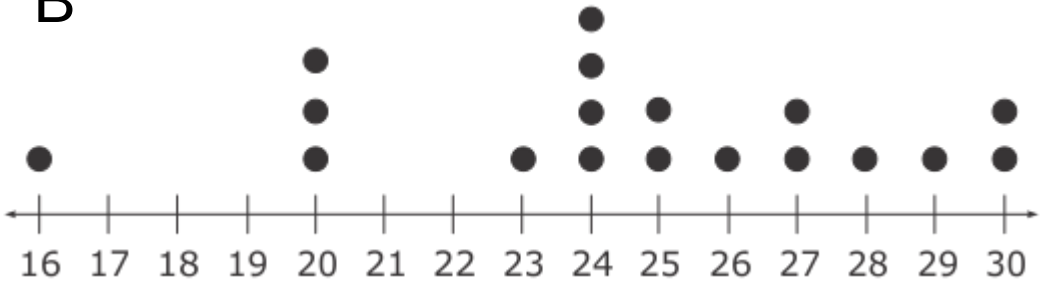
A



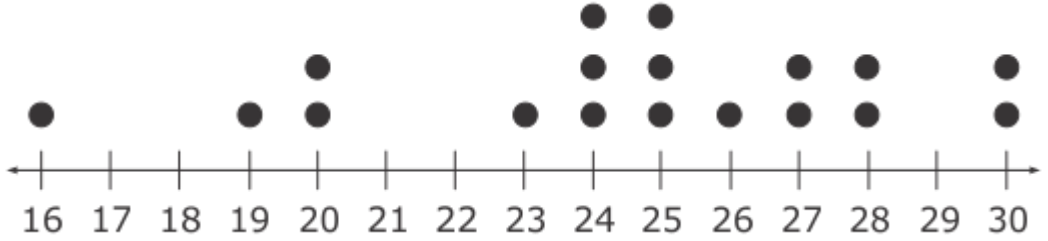
C



B



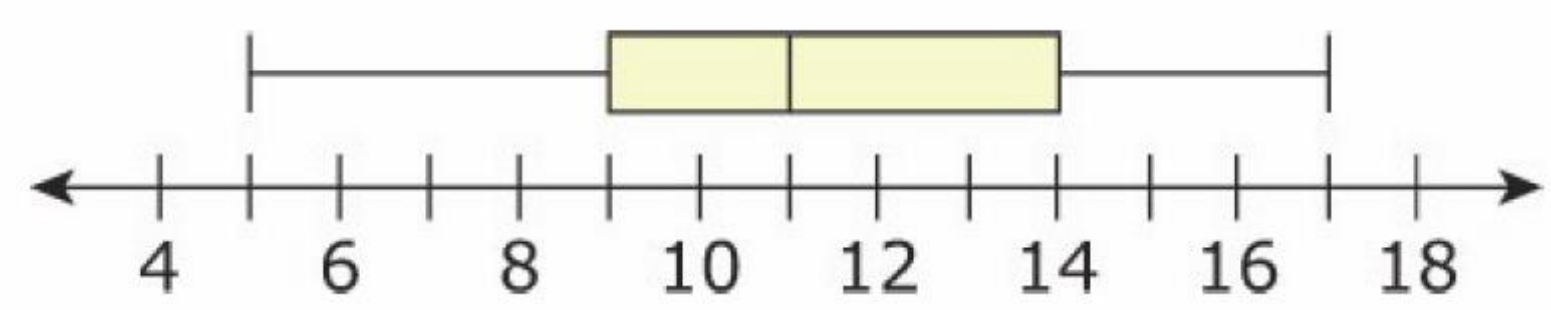
D



C

MAFS.912. S-ID.1.1

Which set of data can be represented by the box plot shown in the diagram below?



A. 5, 5, 10, 11, 11, 12, 16, 17

B. 5, 8, 10, 10, 12, 13, 13, 17

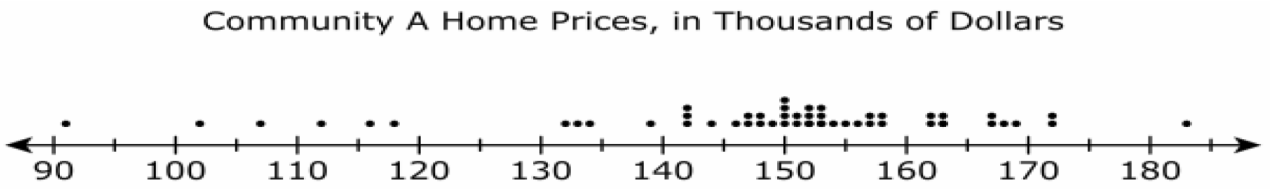
C. 5, 9, 9, 10, 11, 14, 14, 17

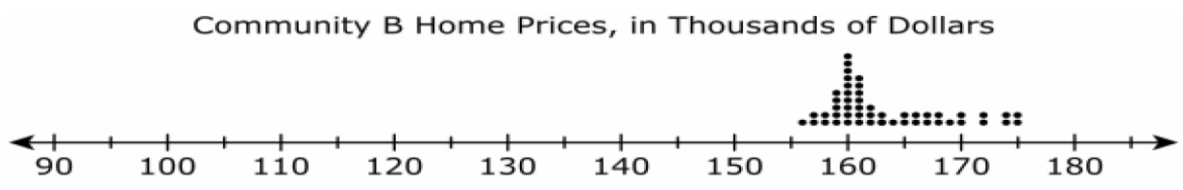
D. 5, 9, 9, 9, 13, 13, 15, 17

D

MAFS.912. S-ID.1.1

A real estate agent recorded the home prices, in thousands of dollars, for 50 randomly selected homes in two communities, A and B. The dot plots display the recorded data.





Part A: Which statement best describes the relationship between the home prices in community A and community B?

A. The homes in community A are typically more expensive and more consistent in price than those in community B.

B. The homes in community A are typically more expensive and less consistent in price than those in community B.

C. The homes in community A are typically less expensive and more consistent in price than those in community B.

D. The homes in community A are typically less expensive and less consistent in price than those in community B.

D

Part B: Which of the listed home prices most likely represents the third quartile for the 50 home prices in community B?

A. $160,000

B. $165,000

C. $167,000

D. $170,000

C

MAFS.912. S-ID.1.1

Tanner and Robbie discovered that the means of their grades for the first semester in Mrs. Merrell's mathematics class are identical. They also noticed that the standard deviation of Tanner's scores is 20.7, while the standard deviation of Robbie's scores is 2.7. Which statement must be true?

A. In general, Robbie's grades are lower than Tanner's grades.

B. Robbie's grades are more consistent that Tanner's grades.

C. Robbie had more failing grades during the semester than Tanner had.

D. The median for Robbie's grades is lower than the median for Tanner's grades.

B

MAFS.912. S-ID.1.2 and MAFS.912. S-ID.1.3

There are 4 voting regions in the town of Pleasantville. The chart below shows the number of people registered as Democrats, Republicans, or Independents.

Pleasantville Voter Registrations

Voting Region	Democrat	Republican	Independent
1	420	316	270
2	336	338	322
3	214	369	451
4	195	188	175

A. The median number of Democrats in the regions is greater than the median number of Republicans in the regions.
B. The median number of Republicans in the regions is greater than the median number of Democrats in the regions.
C. The median number of Republicans in the regions is less than the median number of Independents in the regions.
D. The median number of Independents in the regions is less than the median number of Democrats in the regions.

B

MAFS.912. S-ID.1.2 and MAFS.912. S-ID.1.3

The data sets below represent the results of surveys conducted with ten high school students to determine the number of hours per week they spend studying for their classes.

Algebra {3, 0, 8, 7, 4, 1, 9, 7, 4, 8}

Chemistry {5, 7, 3, 2, 8, 1, 2, 9, 11, 6}

English {2, 4, 0, 9, 1, 2, 6, 3, 10, 2}

US History {9, 1, 5, 2, 0, 0, 4, 2, 7, 3}

Which data set has the greatest interquartile range?

A. Algebra
B. Chemistry
C. English
D. US History

B

MAFS.912. S-ID.1.2 and MAFS.912. S-ID.1.3

Which of the following sets of four numbers has the largest possible standard deviation?

A. 1, 2, 5, 6

B. 4, 5, 5, 6

C. 1, 3, 5, 7

D. 6, 7, 8, 9

C

MAFS.912. S-ID.1.2 and MAFS.912. S-ID.1.3

There are four students in a classroom, ages 13,14,16, and 17. If a 15 year old student walks into the classroom, which changes will occur? Select all that apply.

- ❑ The median will decrease.
- ❑ The median will stay the same.
- ❑ The median will increase.
- ❑ The mean will decrease.
- ❑ The mean will stay the same.
- ❑ The standard deviation will decrease.
- ❑ The standard deviation will increase.

B, E, and F

MAFS.912. S-ID.2.5

Serena asked students at her school who was planning to work over the summer. Her results are recorded in the frequency table below.

	Working	Not Working
8th Grade	10	39
9th Grade	25	31
10th Grade	56	12

Which statement is true?

A. The percent of 10th graders working is about 6 times the percent of 8th graders working.

B. The percent of 10th graders working is about 4 times the percent of 8th graders working.

C. The percent of 10th graders not working is about 4 times the percent of 8th graders not working.

D. The percent of 8th graders not working is about 5.6 times the percent of 10th graders not working.

B

MAFS.912. S-ID.2.5

The relative frequency table below shows the type of ice cream chosen by 50 people at a party.

	Vanilla	Chocolate	Strawberry
Men	0.06	0.22	0.06
Women	0.08	0.08	0.14
Children	0.14	0.12	0.10

Approximately what percent of the people who chose vanilla were women?

A. 4%
B. 8%
C. 27%
D. 29%

D

MAFS.912. S-ID.2.5

The two-way frequency table shows the number of students who play sports and how long they practice each day.

Time Practicing Sports

	Soccer	Football	Basketball	Total
Practice less than one hour each day	13	21	52	86
Practice one hour or more each day	29	11	24	64
Total	42	32	76	150

What is the conditional relative frequency of students who play football given that they practice less than one hour each day? Round your answer to the nearest hundredth.

A. 0.14

B. 0.24

C. 0.37

D. 0.66

B

MAFS.912. S-ID.2.5

A random group of high school students was surveyed. Each student was asked whether it should be mandatory for all high school students to participate in a sport. The results are partially summarized in the two-way table.

	Agree	Disagree	No Opinion	Total
Freshman	53	12	7	
Sophomore	65	37	2	104
Junior	18	42	12	
Senior	56	67	4	
Total		158		375

In the freshman group, what percentage of students agree that it should be mandatory for all students to participate in a sport?

A. .4.1%
B. 22.6%
C. 53%
D. 73.6%

D

MAFS.912. S-ID.2.6, MAFS.912. S-ID.3.8, and 3.9

For an experiment on evaporation, Ginny filled a water tank. She then measured the level of the water several times to see how much had evaporated. The table below shows the number of centimeters below the top the water was at each given number of days where x represents the number of days and y represents the number of centimeters.

Data Point Coordinates

x	y
3	-13
5	-25
6	-31
9	-49
12	-67

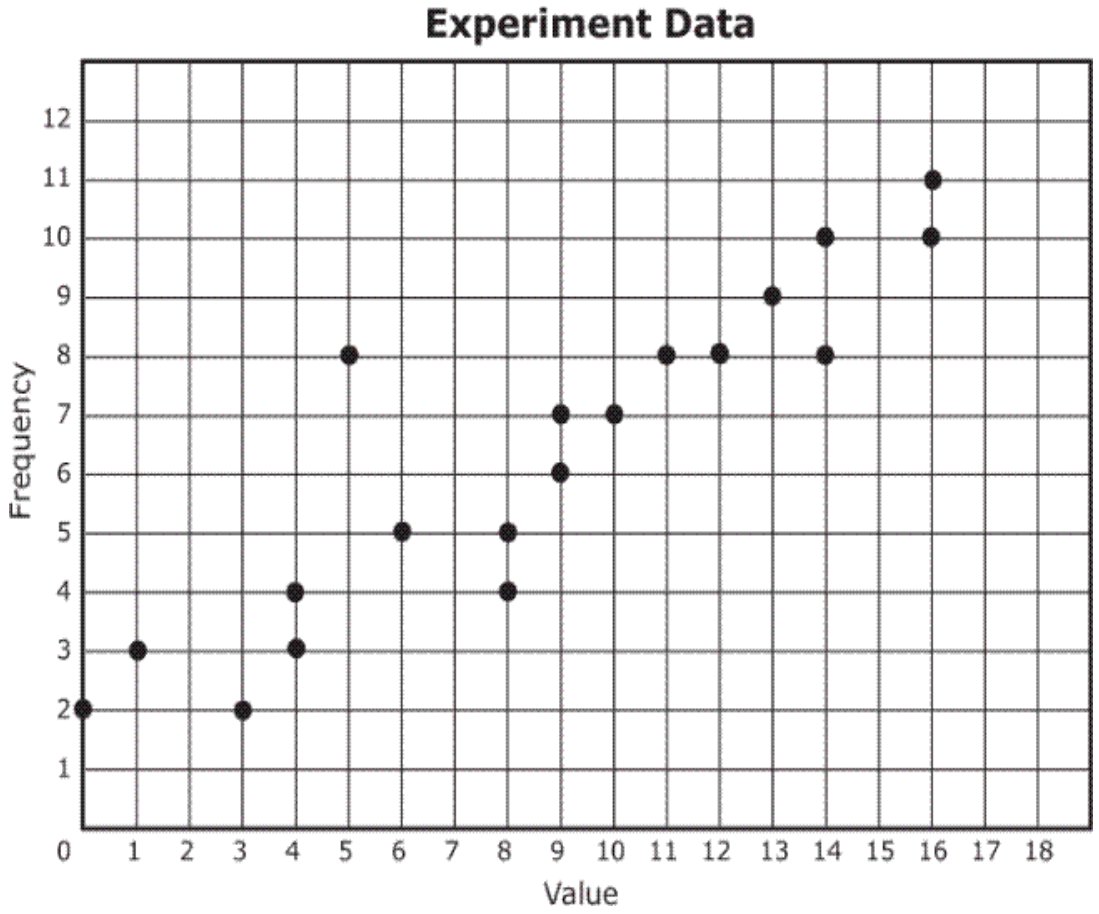
What is the slope of the line representing the rate of evaporation?

A. -19
B. -12
C. -6
D. -5

C

MAFS.912. S-ID.2.6, MAFS.912. S-ID.3.8, and 3.9

The scatter plot shows data collected from an experiment.



Which linear function best fits the data represented by the scatter plot?

A. $y = \frac{1}{2}x + 2$

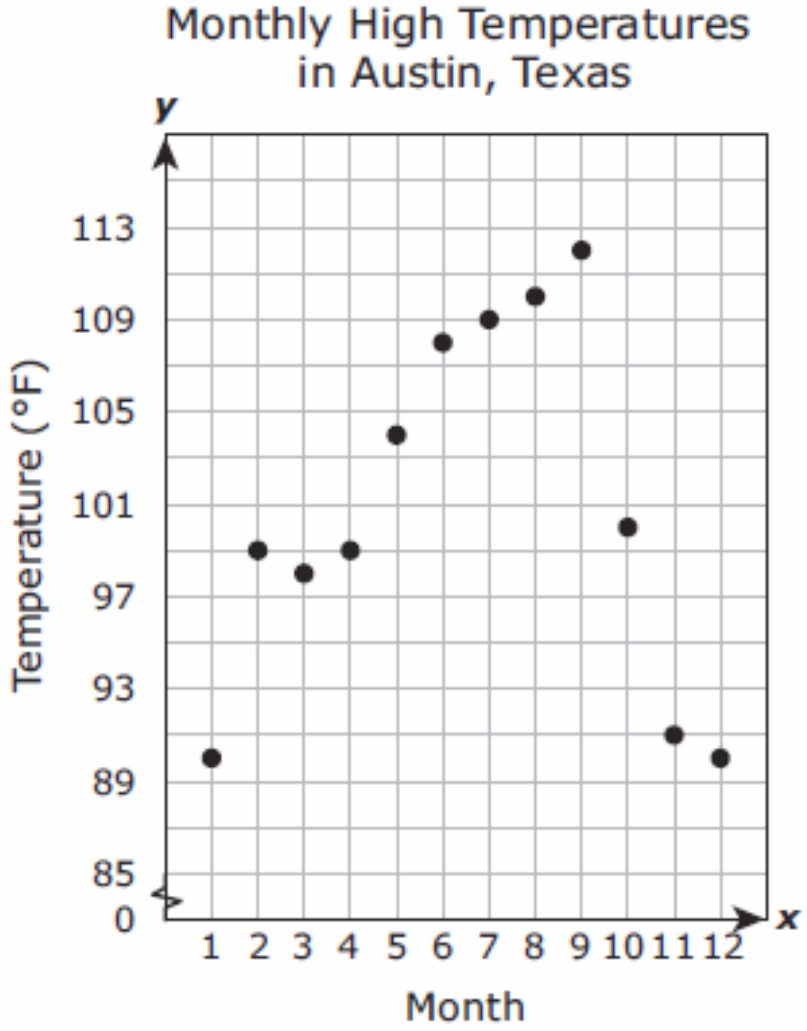
B. $y = \frac{2}{3}x$

C. $y = \frac{3}{2}x + 2$

D. $y = 2x$

A

MAFS.912. S-ID.2.6, MAFS.912. S-ID.3.8, and 3.9



The scatterplot shows the monthly high temperatures for Austin, Texas, in degrees Fahrenheit over a 12-month period.

Which function best models the data from Month 1 to Month 9?

A. $y = -1.6x + 111$

B. $y = 3.5x + 85$

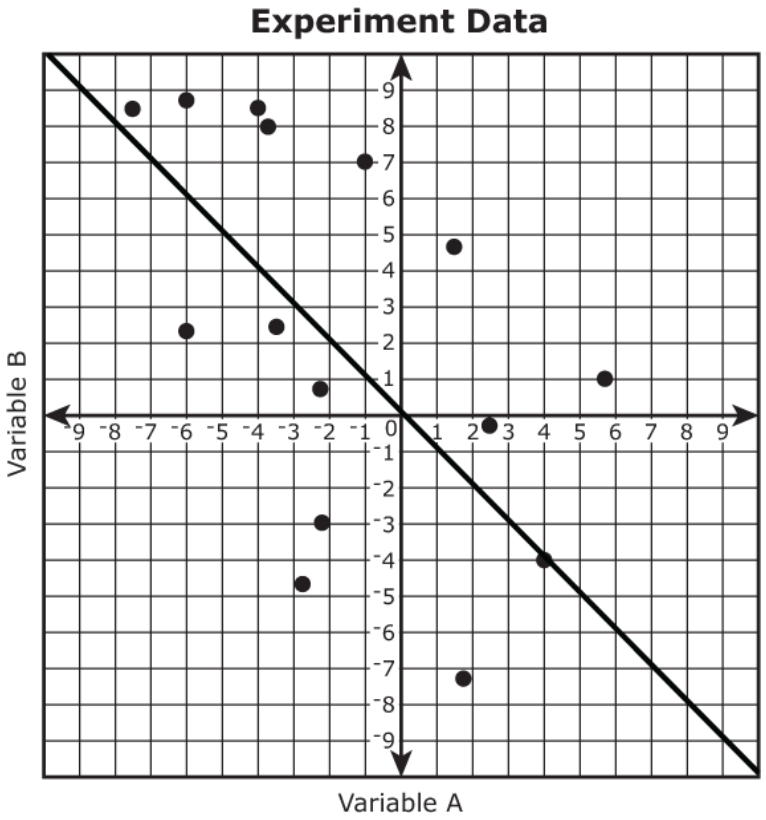
C. $y = 2.5x + 90$

D. $y = -3.3x+130$

C

MAFS.912. S-ID.2.6, MAFS.912. S-ID.3.8, and 3.9

The scatter plot below shows data about two variables, Variable A and Variable B, and the line of best fit.



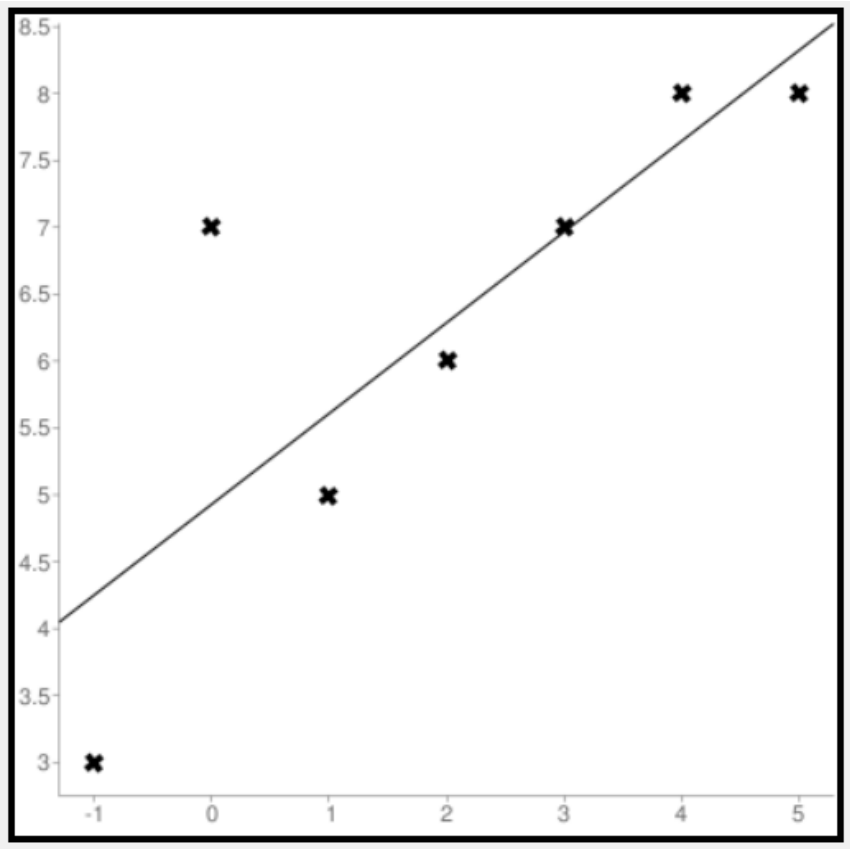
Which is the best estimate of the correlation coefficient of the data shown in the scatter plot?

A. 1.0
B. 0.5
C. -0.5
D. -1.0

C

MAFS.912. S-ID.2.6, MAFS.912. S-ID.3.8, and 3.9

The equation of the line of best fit for the data shown in the graph below is $y = 0.68x + 4.9$.



Using a line of best fit, what is the approximate value of the residual for the data at $x = 2$?

A. -0.815
B. -0.286
C. 0.286
D. 0.815

B

MAFS.912. S-ID.2.6, MAFS.912. S-ID.3.8, and 3.9

The table below shows the height of a plant at different amounts of time since it was planted.

Time (weeks)	**Height** (cm)
1	1
2	4
3	6
4	9
5	11

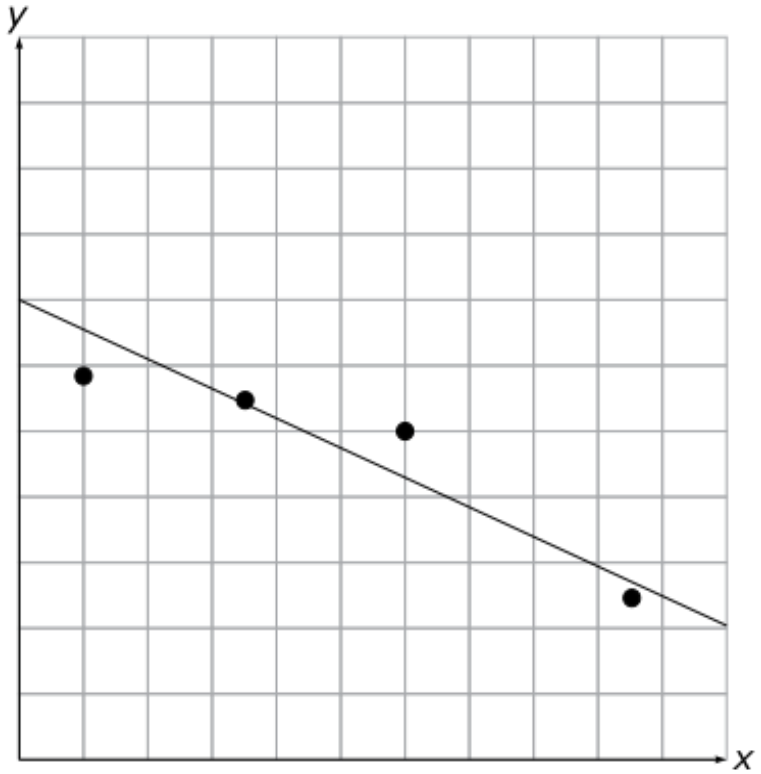
Which best describes the correlation between plant height and time?

A. weak negative correlation.
B. weak positive correlation.
C. strong negative correlation.
D. strong positive correlation.

D

MAFS.912. S-ID.2.6, MAFS.912. S-ID.3.8, and 3.9

A scatterplot and line of best fit are shown below.



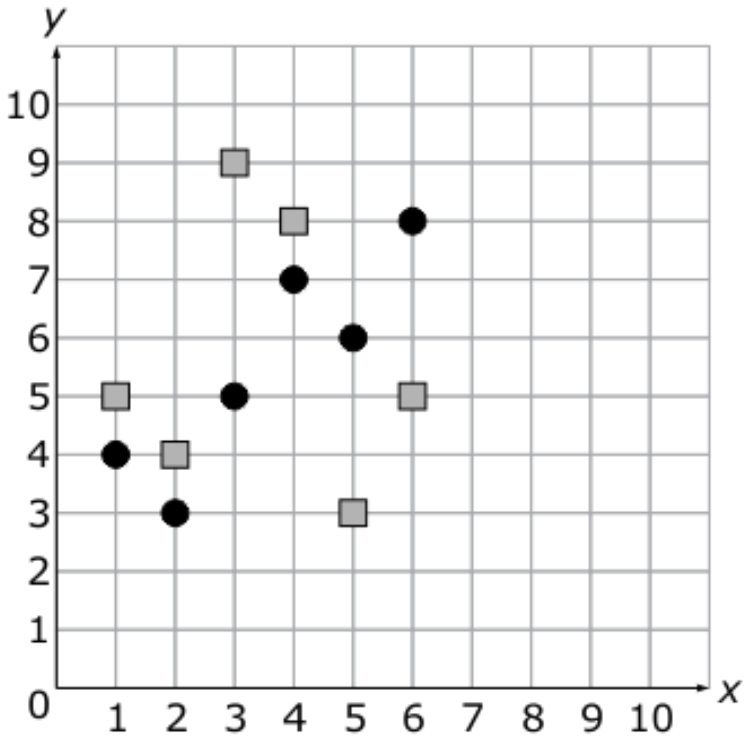
Which correlation coefficient best fits the scatter plot?

A. 0.9470
B. 0.3406
C. –0.3406
D. –0.9470

D

MAFS.912. S-ID.2.6, MAFS.912. S-ID.3.8, and 3.9

Two unique sets of data are represented by either circles or squares on the graph below.



Which statement is true about the best-fit linear model for each set of data?

A. The circle data set has a strong, negative correlation.

B. The square data set has a strong, positive correlation.

C. The circle data set has a strong, positive correlation.

D. The square data set has a strong, negative correlation.

C

MAFS.912. S-ID.2.6, MAFS.912. S-ID.3.8, and 3.9

A student is trying to determine whether there is an association between the number of years of education and the amount of money a person makes. Which of the following would be a reasonable correlation coefficient and interpretation for this situation?

A. The correlation coefficient is -5.1 which indicates no association between the number of years of education and the amount of money a person makes.
B. The correlation coefficient is 8.2 which indicates a strong positive linear association between the number of years of education and the amount of money a person makes.
C. The correlation coefficient is 0.79 which indicates a strong positive linear association between the number of years of education and the amount of money a person makes.
D. The correlation coefficient is -0.94 which indicates a weak negative linear association between the number of years of education and the amount of money a person makes.

C

MAFS.912. S-ID.2.6, MAFS.912. S-ID.3.8, and 3.9

Which statement best describes the relation between correlation and causation?

A. Correlation results in causation.
B. Correlation does not imply causation.
C. Correlation and causation are unrelated.
D. Correlation and causation are the same thing.

B

MAFS.912. S-ID.2.6, MAFS.912. S-ID.3.8, and 3.9

Which description is a causation relationship?

A. a person's age and the number of siblings the person has.
B. the distance a person can run in 1 hour and the size of the person's shoes.
C. the number of students in a class and the number of students in the class who wear glasses.
D. the number of questions a student answers correctly on an exam and the student's score on the exam.

D

MAFS.912. S-ID.2.6, MAFS.912. S-ID.3.8, and 3.9

What type of relationship exists between the number of pages printed on a printer and the amount of ink used by that printer?

A. positive correlation, but not causal
B. positive correlation, and causal
C. negative correlation, but not causal
D. negative correlation, and causal

B