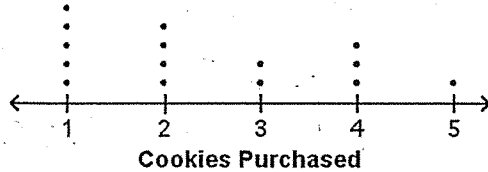


**S.ID.1\***

**SELECTED RESPONSE**

Select the correct answer.

1. The data sets below show the numbers of cookies purchased by students at a bake sale. Which of the data sets is represented by the dot plot?



- (A) 2 2 4 4 1 1 5 1 3 2 1  
 (B) 2 4 4 2 3 3 2 1 1 3 5 1  
 2 2 1  
 (C) 1 2 1 1 2 1 2 2 3 4 5 1  
 3 4 4  
 (D) 3 2 2 3 1 3 1 4 4 5 1 1  
 1 2 2

2. The data below are the percent change in population of 20 states between 1950 and 1960. Which of the following set of intervals should be used to make a histogram of the data?

3.7 5.3 6.8 7 8.1 10.2 13.3 13.7  
 14.7 15.5 18.3 21.8 21.9 21.9  
 24.1 25.5 31.1 31.5 39.4 39.9

- (A) 5.0% to 9.9%, 10.0% to 19.9%,  
 20.0% to 29.9%, and 30.0% to 34.9%  
 (B) 0.0% to 9.9%, 10.0% to 19.9%,  
 20.0% to 29.9%, and 30.0% to 39.9%  
 (C) 0.0% to 9.9%, 10.0% to 14.9%,  
 15.0% to 19.9%, 20.0% to 24.9%,  
 25.0% to 29.9%, and 30.0% to 39.9%  
 (D) 0.0% to 9.9%, 10.0% to 29.9%,  
 and 30% to 39.9%

Select all correct answers.

3. The data below are the distances (in megaparsecs) from Earth of several nebulae outside the Milky Way galaxy. Which of the following values are necessary to make a box plot of the data? (All computed values have been rounded to three decimal places.)

0.032 0.214 0.263 0.450 0.500  
 0.800 0.900 1.000 1.100 1.400  
 1.700 2.000

- (A) 0.032 megaparsec  
 (B) 0.357 megaparsec  
 (C) 0.377 megaparsec  
 (D) 0.850 megaparsec  
 (E) 0.863 megaparsec  
 (F) 1.250 megaparsecs  
 (G) 1.350 megaparsecs  
 (H) 2.000 megaparsecs

**CONSTRUCTED RESPONSE**

4. The data below are the number of beds in a sample of 15 nursing homes in New Mexico in 1988.

44 59 59 60 62 65 80 80 90  
 96 100 110 116 120 135

- a. Find the minimum and maximum of the data.

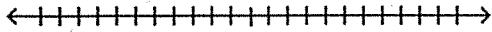
- b. Find the first, second, and third quartiles.

- c. Make a box plot of the data.



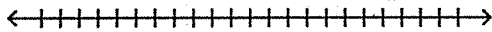
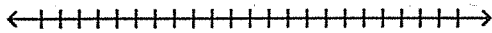
5. The data below are the average annual starting salaries (in thousands of dollars) of 20 randomly selected college graduates. Make a dot plot of the data values.

42 37 40 37 45 39 43 47 36  
34 40 43 42 40 37 44 36 46  
39 35



6. For the following data, create a dot plot and a box plot.

1 7 4 15 10 3 17 6 14 14 3  
6 9 7 11

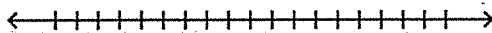
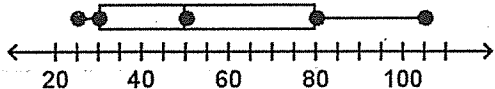


7. Billy incorrectly made a box plot for the following data. His work is shown below. Identify and correct his errors.

The following data are the amounts of potassium, in grams, per serving in randomly selected breakfast cereals.

25 25 30 30 35 35 40 45 50  
55 60 60 60 70 85 90 95 95  
105

Billy's box plot:




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8. The following data values are the percents of the vote that the Democratic candidate won in 20 randomly selected states in the 1984 presidential election.

37.5 33.9 43.1 48.1 27.9 48.7  
42.3 39.0 20.9 45.6 26.4 28.7  
30.1 35.5 38.2 47.7 41.8 44.0  
47.5 48.6

a. Order the data.

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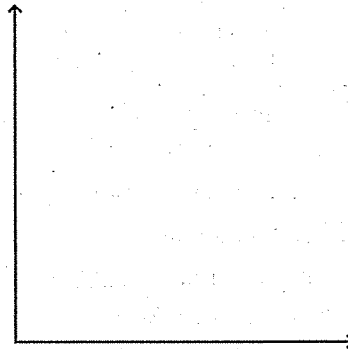


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b. Choose reasonable intervals and make a frequency table.

Percent Interval	Frequency

c. Create a histogram of the data.



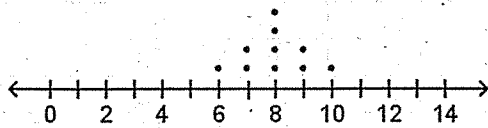
**S.ID.2\***

**SELECTED RESPONSE**

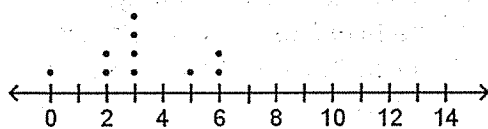
Select the correct answer.

1. What is the best measure of center to use to compare the two data sets?

Grams of sugar per serving in cereal brand A:



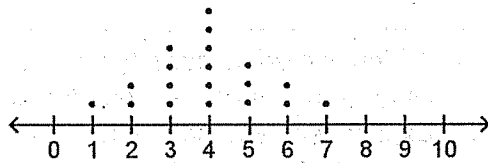
Grams of sugar per serving in cereal brand B:



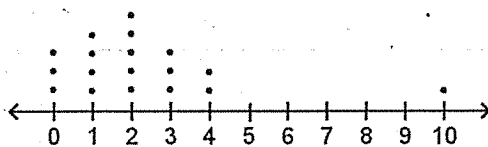
- (A) Median
- (B) Either the mean or the median
- (C) Interquartile range
- (D) Either the standard deviation or the interquartile range

2. What is the best measure of center to use to compare the two data sets?

Data Set A:



Data Set B:



- (A) Median
- (B) Either the mean or the median
- (C) Interquartile range
- (D) Either the standard deviation or the interquartile range

3. What is the best measure of spread to use to compare the two data sets?

Income of ten recent graduates from college A (in thousands of dollars per year):

0 35 38 39 45 47 50 51 52 52

Income of ten recent graduates from college B (in thousands of dollars per year):

29 35 36 37 38 39 41 42 46 400

- (A) Median
- (B) Either the mean or the median
- (C) Interquartile range
- (D) Either the standard deviation or the interquartile range

Select all correct answers.

4. Set A below is skewed left, set B is roughly symmetric, and set C is skewed right. Choose the values below that should be used to compare the spread of the data sets.

Set A	Set B	Set C
23	35	40
42	38	42
43	42	44
48	45	45
55	49	45
56	52	47
57	57	49
59	61	70

- (A) 5.0
- (B) 8.5
- (C) 8.8
- (D) 13.5
- (E) 14.0
- (F) 14.5
- (G) 46.9
- (H) 47.8

### CONSTRUCTED RESPONSE

5. The annual salaries (in thousands of dollars) of 15 randomly selected employees at two small companies are given. Indicate the shape of the data distributions. Then, compare the center and spread of the data and justify your method of doing so.

Company 1:

22 36 37 37 37 39 39 42 42  
45 45 46 46 150 200

Company 2:

21 37 38 38 38 39 42 45 45  
46 46 47 48 62 250

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6. The heights, in inches, of randomly selected members of a choral company are given according to their voice part.

Soprano (in.)	Alto (in.)	Tenor (in.)	Bass (in.)
60	60	64	66
62	61	66	68
62	62	66	68
64	63	67	69
65	64	68	70
65	65	70	70
66	66	72	71
66	69	73	72
67	70	74	73
68	72	76	75

a. Which two voice parts typically have the tallest singers? Explain why you chose the statistic you used to compare the data sets.

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b. Which two voice parts typically have singers that vary the most in height? Explain why you chose the statistic you used to compare the data sets.

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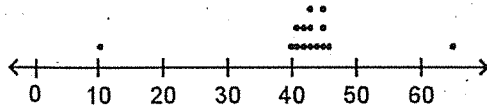
**S.ID.3\***

**SELECTED RESPONSE**

Select all correct answers.

1. If the extreme values are removed from this data set, which of the following statistics change by more than 1?

10	40	41	41	42
42	43	43	43	44
45	45	45	46	65



- (A) Mean
- (B) Standard deviation
- (C) Median
- (D) Interquartile range
- (E) Range

Select the correct answer.

2. The data set below shows 15 students' scores on a test. Describe the shape of the data distribution if the student who scored 100 is not included in the data set.

70	72	73	74	74
75	75	75	75	76
77	77	78	80	100

- (A) The data distribution is skewed right.
  - (B) The data distribution is symmetric.
  - (C) The data distribution is skewed left.
  - (D) It is impossible to determine the shape of the data distribution.
3. The ages of ten employees at a small company are shown below.  
30, 32, 35, 35, 38, 38, 38, 40, 40, 45
- If the data set were expanded to include a new employee who is 20 years old, how would the mean of the data set change?
- (A) The mean decreases by 2 years.
  - (B) The mean decreases by about 1.6 years.
  - (C) The mean increases by about 1.6 years.
  - (D) The mean does not change.

Select the correct answer for each lettered part.

4. The table shows the batting averages of 12 professional baseball players last season. If the value 0.360 is removed from the data set, how do each of the following statistics change?

0.360	0.325	0.325	0.319
0.305	0.296	0.296	0.291
0.285	0.279	0.279	0.277

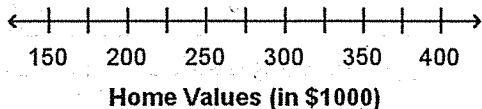
- a. Mean  Decreases  No change  Increases
- b. Median  Decreases  No change  Increases
- c. Standard deviation  Decreases  No change  Increases
- d. Interquartile range  Decreases  No change  Increases
- e. Range  Decreases  No change  Increases

**CONSTRUCTED RESPONSE**

5. The values of several homes sold by a realtor are listed below.

- \$150,000      \$175,000      \$175,000      \$200,000      \$200,000
- \$200,000      \$225,000      \$250,000      \$250,000      \$400,000

a. Create a line plot for the data, where the points represent the values in thousands of dollars. Describe the shape of the data.



b. What value(s) in the data set are outliers? Explain.

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c. If the outlier(s) from part b are removed, how do the median and interquartile range change? How does the shape of the data change?

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6. The table shows Amanda's scores on her last 15 quizzes.

70	72	75	76	76
77	78	80	80	82
83	84	87	90	90

Suppose on her next quiz, Amanda scores a 96.

a. How does the shape of the data distribution change if 96 is included?

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b. How does the mean of the data set change if 96 is included? the median?

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c. How does the standard deviation change if 96 is included? the interquartile range? Round your answers to the nearest tenth.

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**S.ID.4\***

For items that ask you to use the standard normal distribution, refer to the standard normal table on the next page.

**SELECTED RESPONSE**

Select the correct answer.

1. The scores for the mathematics portion of a standardized test are normally distributed with a mean of 514 points and a standard deviation of 117 points. What is the probability that a randomly selected student has a score of 610 points or less on the test? Use the standard normal distribution to estimate the probability.

(A) 29.4%       (C) 79.4%  
 (B) 20.6%       (D) 68%

2. If the mean of a data set is 20, the standard deviation is 1.5, and the distribution of the data values is approximately normal, about 95% of the data values fall in what interval centered on the mean?

(A) 18.5 to 21.5       (C) 15.5 to 24.5  
 (B) 17 to 23       (D) 14 to 26

Select all correct answers.

3. Which of the following data sets are NOT likely to be normally distributed?

(A) The day of the month on which randomly selected students were born  
 (B) The final exam scores of all students taking the same class and given the same final exam in a large school district  
 (C) The number of wheels on the next 100 vehicles that pass by a point along a highway  
 (D) The heights of tenth-grade male students at a large high school  
 (E) The IQs of the students at a large high school

Use the following information to match each interval of weights with the approximate percent of the data values that fall within that interval.

A data set consisting of the weights of 50 jars of honey has a mean weight of 435 grams with a standard deviation of 2.5 grams. The data distribution is approximately normal.

_____ 4. 432.5 g to 435 g	<b>A</b> 2.5%
_____ 5. 427.5 g to 442.5 g	<b>B</b> 16%
_____ 6. 432.5 g to 437.5 g	<b>C</b> 34%
_____ 7. 430 g to 440 g	<b>D</b> 50%
_____ 8. Greater than 440 g	<b>E</b> 68%
_____ 9. Less than 435 g	<b>F</b> 84%
	<b>G</b> 95%
	<b>H</b> 99.7%

**CONSTRUCTED RESPONSE**

10. The IQ scores of the students at a school are normally distributed with a mean of 100 points and a standard deviation of 15 points. Use the standard normal distribution to estimate each percent.

a. The percent of students with an IQ score below 80 points

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b. The percent of students with an IQ score below 127 points

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11. The wing lengths of houseflies are normally distributed with a mean of 45.5 mm and a standard deviation of 3.92 mm. Use the standard normal distribution to estimate each percent.

a. The percent of houseflies with wing lengths over 35 millimeters

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b. The percent of houseflies with wing lengths over 50 millimeters

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12. The grapefruits harvested at a large orchard have a mean mass of 482 grams with a standard deviation of 31 grams. Assuming that the masses of these grapefruits are approximately normally distributed, Jess uses the 68-95-99.7 rule to estimate the percent of grapefruits that have masses between 451 grams and 544 grams. Jess incorrectly reasons that since 451 grams is 2 standard deviations below the mean and 544 is 2 standard deviations above the mean, 95% of the grapefruits have masses between 451 grams and 544 grams. Identify his error and determine the correct estimate.

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13. The heights of the male students at Bart's school are normally distributed with a mean of 68 inches and a standard deviation of 2 inches.

a. What percent of the male students at Bart's school are more than 68 inches tall? Explain.

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b. What percent of the male students at Bart's school are less than 64 inches tall? Explain. (Hint: Use the 68-95-99.7 rule.)

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14. The scores on a recent district-wide math test are normally distributed with a mean of 82 points and a standard deviation of 5 points. Use the standard normal distribution to answer each question.

a. What percent of students scored between 70 and 75 on the test? Show your work.

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b. What percent of students scored at least 90 on the test? Show your work.

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c. What percent of students scored at most 65 on the test? Show your work.

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**Standard Normal Table**

z	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
-3	.0013	.0010	.0007	.0005	.0003	.0002	.0002	.0001	.0001	.0000+
-2	.0228	.0179	.0139	.0107	.0082	.0062	.0047	.0035	.0026	.0019
-1	.1587	.1357	.1151	.0968	.0808	.0668	.0548	.0446	.0359	.0287
-0	.5000	.4602	.4207	.3821	.3446	.3085	.2743	.2420	.2119	.1841
0	.5000	.5398	.5793	.6179	.6554	.6915	.7257	.7580	.7881	.8159
1	.8413	.8643	.8849	.9032	.9192	.9332	.9452	.9554	.9641	.9713
2	.9772	.9821	.9861	.9893	.9918	.9938	.9953	.9965	.9974	.9981
3	.9987	.9990	.9993	.9995	.9997	.9998	.9998	.9999	.9999	1.000-

(Note: In the table, ".0000+" means slightly more than 0 and "1.000-" means slightly less than 1.)



**S.ID.5\*****SELECTED RESPONSE**

Select the correct answer.

1. Carly surveyed some of her fellow students to determine whether they are more afraid of spiders or snakes, are equally afraid of both, or are afraid of neither. She organized the data into the two-way relative frequency table below. What is the joint relative frequency of the students surveyed who are boys and are equally afraid of both snakes and spiders?

	Spiders	Snakes	Both	Neither	Total
Boys	0.23	0.17	0.06	0.04	0.49
Girls	0.21	0.19	0.09	0.02	0.51
Total	0.43	0.36	0.15	0.06	1

(Note: Rounding may cause the totals to be off by 0.01.)

- (A) 0.06  
 (B) 0.09  
 (C) 0.15  
 (D) 0.40

Select all correct answers.

2. Which of the following statements are supported by the survey data in the two-way frequency table?

	Right-handed	Left-handed	Total
Males	82	23	105
Females	79	16	95
Total	161	39	200

- (A) The joint relative frequency that a person surveyed is female and left-handed is about 0.168, or 16.8%.  
 (B) The conditional relative frequency that a person surveyed is female, given that the person is right-handed, is about 0.4907, or 49.07%.  
 (C) The joint relative frequency that a person surveyed is male and is right-handed is about 0.41, or 41%.  
 (D) The conditional relative frequency that a person surveyed is right-handed, given that the person is male, is about 0.5093, or 50.93%.  
 (E) The marginal relative frequency that a person surveyed is left-handed is about 0.195, or 19.5%.

**Match each situation with the correct value.**

A magazine conducts a survey of a high school graduating class to ask whether the students plan to attend a four-year college, attend a two-year college, enter the military, or get a job. Match the situation with its value, based on the two-way frequency table, rounded to two decimal places as necessary.

	Women	Men	Total
<b>Four-Year College</b>	63	75	138
<b>Two-Year College</b>	12	18	30
<b>Military</b>	8	10	18
<b>Job</b>	15	10	25
<b>Total</b>	98	113	211

- \_\_\_\_\_ 3. The joint relative frequency of students surveyed who are men and plan to attend a four-year college A 0.06  
B 0.07  
C 0.09  
D 0.15  
E 0.36  
F 0.65
- \_\_\_\_\_ 4. The marginal relative frequency of students surveyed who plan to enter the military
- \_\_\_\_\_ 5. The conditional relative frequency that a student plans to get a job, given that the student is a woman
- \_\_\_\_\_ 6. The conditional relative frequency that a student is a woman, given that the student plans to attend a two-year college

**CONSTRUCTED RESPONSE**

7. The manager of a factory tested 50 items produced during each of the three work shifts. The data are summarized in the two-way frequency table below.

	1st shift	2nd shift	3rd shift	Total
<b>Not defective</b>	48	49	41	138
<b>Defective</b>	2	1	9	12
<b>Total</b>	50	50	50	150

- a. What is the conditional relative frequency that a tested item is defective, given that it was produced during the first shift? during the second shift? during the third shift?

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- b. Does one shift seem more likely to produce a defective product than the other two shifts? Explain using the results from part a.

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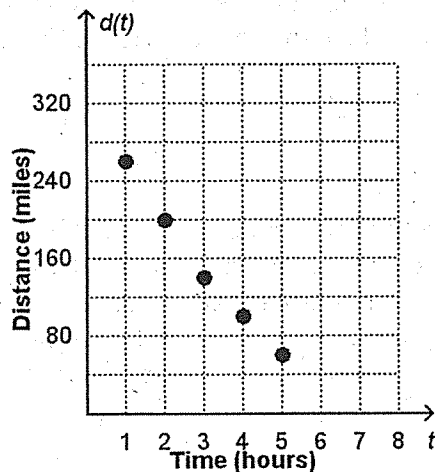


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**S.ID.6a\*****SELECTED RESPONSE**

Select the correct answer.

1. The data for the distance  $d$ , in miles, remaining for a train to travel to its destination  $t$  hours after it departs a station are shown in the scatter plot. Which of the following functions best fits the data?

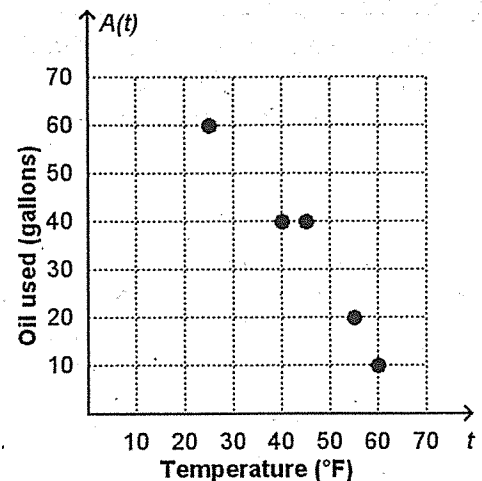


- (A)  $d(t) = 50t + 300$   
 (B)  $d(t) = 50t$   
 (C)  $d(t) = -50t + 300$   
 (D)  $d(t) = -50t$
2. Darnell is tracking the number of touchdowns  $t$  and the number of points  $p$  his favorite football team scores each game this season. He made a scatter plot to display the data. Which of the following functions for the relationship between the number of points scored per game and the number of touchdowns scored per game could be the line of best fit passing through the points  $(1, 10)$ ,  $(3, 24)$ , and  $(5, 38)$  on the scatter plot?

- (A)  $p(t) = 7$   
 (B)  $p(t) = 7t + 3$   
 (C)  $p(t) = -7t + 3$   
 (D)  $p(t) = 7t - 3$

Select all correct answers.

3. Emile collects data about the amount of oil  $A$ , in gallons, used to heat his house per month for 5 months and the average monthly temperature  $t$ , in degrees Fahrenheit, for those months. The scatter plot shows the data. The function  $A(t) = -1.4t + 96$  best fits these data. Use  $A(t)$  to determine which of the following statements are true.



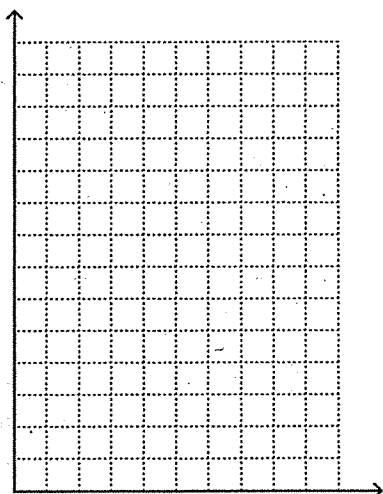
- (A) Emile would use about 82 gallons of oil to heat his house for a month with average temperature  $10^\circ\text{F}$ .  
 (B) Emile would use about 85 gallons of oil to heat his house for a month with average temperature  $15^\circ\text{F}$ .  
 (C) Emile would use 0 gallons of oil to heat his house for a month with average temperature  $70^\circ\text{F}$ .  
 (D) Emile would use about 5 gallons of oil to heat his house for a month with average temperature  $55^\circ\text{F}$ .  
 (E) Emile would use 96 gallons of oil to heat his house for a month with average temperature  $0^\circ\text{F}$ .

### CONSTRUCTED RESPONSE

4. The data for the height  $h$ , in meters, a hot air balloon is above the ground in terms of time  $t$ , in minutes, after it starts descending are shown in the table.

Time, $t$ (minutes)	Height, $h$ (meters)
10	1100
15	900
20	800
25	700
30	500

a. Construct a scatter plot of the data and use the data points at  $t = 10$  and  $t = 30$  to draw a line of best fit.



b. Use the results from part a to write a linear function that represents the line of best fit. Show your work.

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c. Use the linear function from part b to predict the height of the hot air balloon when it started to descend. Explain.

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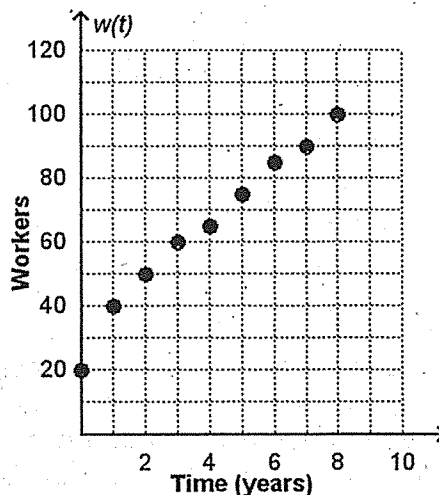
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d. Use the linear function from part b to predict how long, to the nearest minute, it takes for the hot air balloon to descend to the ground. Explain.

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5. A company moved to a new office building 8 years ago. The relationship between the number of workers  $w$  and the time  $t$ , in years, after the company moved is shown in the scatter plot.



Suppose a linear function that fits the data is  $w(t) = \frac{25}{3}t + \frac{95}{3}$ . Using that result and the point corresponding to  $t = 8$ , predict the number of new workers the company will have two years from now. Explain.

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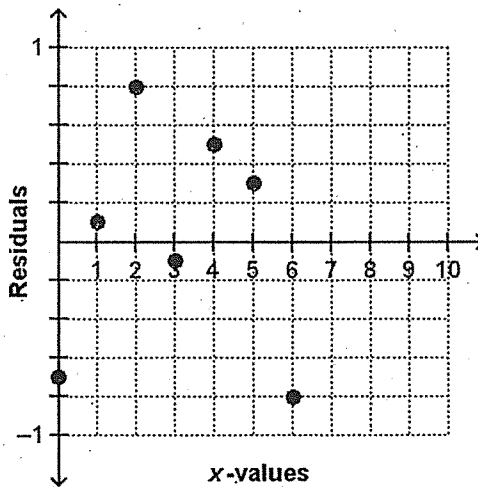
**S.ID.6b\***

**SELECTED RESPONSE**

Select all correct answers.

1. The table shows the median weight, in pounds, of babies born at a particular hospital for the first 6 months after they are born. The line  $y = 1.7x + 8.1$  is fit to the data in the table, resulting in the residual plot below. Which of the following are true?

Age (months)	Median weight (pounds)
0	7.4
1	9.9
2	12.3
3	13.1
4	15.4
5	16.9
6	17.5

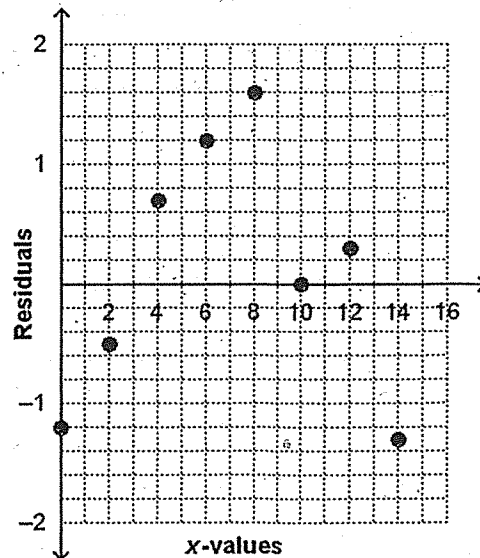


- (A) The residuals do not appear to follow a pattern.
- (B) The residuals are mostly below the x-axis.
- (C) The residuals are relatively small compared to the data values.
- (D) The residuals are relatively large compared to the data values.
- (E) The line is a good fit to the data.

Select the correct answer.

2. The plot shows the residuals when a line is fit to a set of data. Based on the residual plot, which statement *best* describes how well the line fits the data?

- (A) The line is a good fit because the residuals are all close to the x-axis and are randomly distributed about the x-axis.
- (B) The line is not a good fit because the residuals are not all close to the x-axis.
- (C) The line is not a good fit because the residuals are not randomly distributed about the x-axis.
- (D) The line is not a good fit because the residuals are not all close to the x-axis and are not randomly distributed about the x-axis.

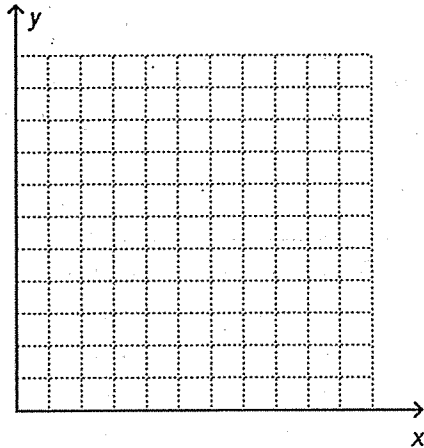


### CONSTRUCTED RESPONSE

3. The table shows the time, in seconds, of the men's gold-medal-winning 400 m runner at the Olympics from 1948 to 1968.

Year	1948	1952	1956	1960	1964	1968
Time (sec)	46.30	46.09	46.85	45.07	45.15	43.86

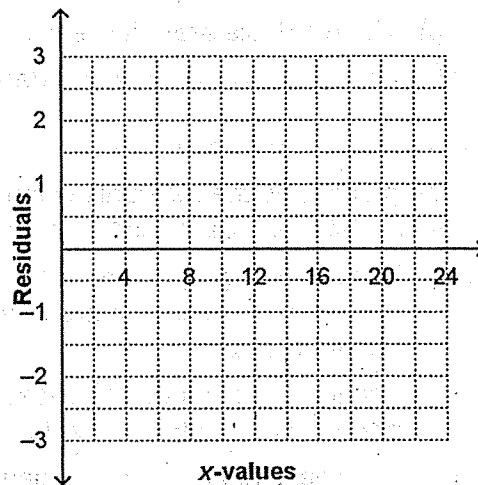
a. Draw a scatter plot of the data.



b. The line  $y = -0.14x + 46.65$ , where  $x$  is the number of years after 1948 and  $y$  is the winning time in seconds, is fit to the data. Draw the line on the scatter plot.

c. Complete the table with the values predicted by the function in part b, and then plot the residuals on the graph below.

Year	Actual time (sec)	Predicted time (sec)	Residual (sec)
1948	46.30		
1952	46.09		
1956	46.85		
1960	45.07		
1964	45.15		
1968	43.86		



d. Use your results from part c to describe the fit of the line.

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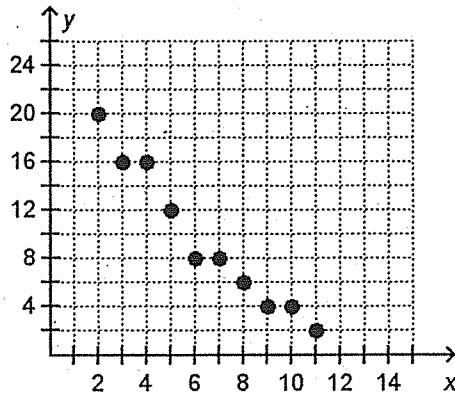
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### S.ID.6c\*

#### SELECTED RESPONSE

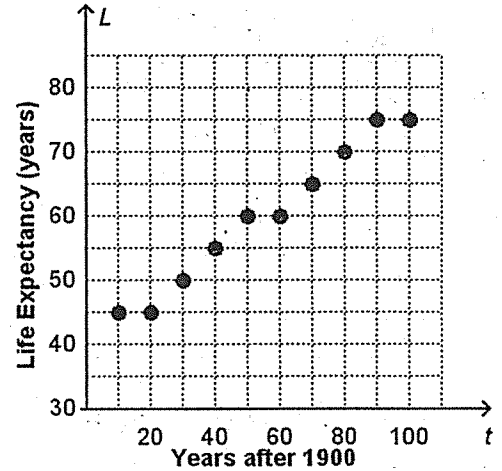
Select the correct answer.

1. The scatter plot shown suggests the association between the values of  $x$  with the values of  $y$  is linear. What is the  $y$ -intercept, rounded to two decimal places, of the linear function that represents the line of best fit?



- (A) -1.96
- (B) 11.15
- (C) 11.41
- (D) 22.36

2. The scatter plot shows the relationship between the time  $t$ , in years after 1900, and the life expectancy  $L$ , in years, at birth for a certain country. Do the data on the scatter plot suggest a linear association? If so, what is a function that represents the line of best fit?

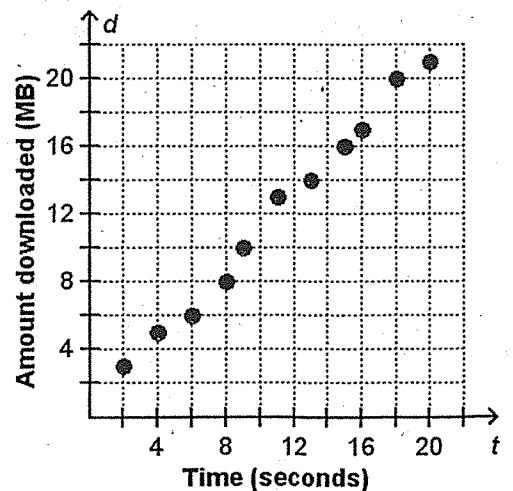


- (A) Yes;  $L(t) = 39.67t + 0.37$
- (B) Yes;  $L(t) = -0.24t + 74.33$
- (C) Yes;  $L(t) = 0.37t + 39.67$
- (D) No; the data on the scatter plot do not suggest a linear association.

Select all correct answers.

3. The relationship between the amount of data downloaded  $d$ , in megabytes, and the time  $t$ , in seconds, after the download started is shown. The data points on the scatter plot suggest a linear association. Which of the following statements are true?

- (A) The data points on the scatter plot suggest a negative correlation.
- (B) The data points on the scatter plot suggest a positive correlation.
- (C) For every second that passes, about 1 additional megabyte is downloaded.
- (D) For every second that passes, about 0.5 additional megabyte is downloaded.
- (E) The function that represents the line of best fit is approximately  $d(t) = 0.51t - 1.04$ .
- (F) The function that represents the line of best fit is approximately  $d(t) = 1.04t + 0.51$ .



### CONSTRUCTED RESPONSE

4. The table shows the relationship between the average price for a gallon of milk  $p$ , in dollars, in terms of time  $t$ , in years after 1995. When the data is plotted on a scatter plot, the data suggest a linear association.

Time, $t$ (years after 1995)	Price, $p$ (dollars)
1	2.62
3	2.70
5	2.78
6	2.88
9	3.15
12	3.40
14	3.30
16	3.57

a. Find a linear function that represents the line of best fit. Round the slope and  $p$ -intercept to two decimal places.

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b. Use the results from part a to estimate the average price for a gallon of milk in 2006 to the nearest cent. Explain.

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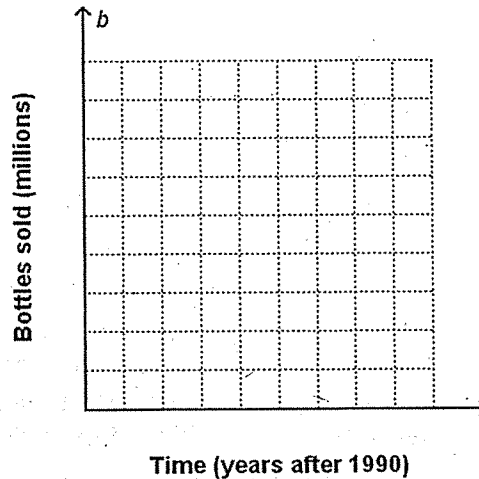
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5. A bottled water company is examining the sales of its product. The executives are analyzing the number of bottles sold per year  $b$ , in millions, as a function of time  $t$ , in years since 1990. The data are shown in the table.

Time, $t$ (years)	Bottles sold, $b$ (millions)
1	1.6
3	2.3
5	3.1
6	3.5
8	4.2
9	4.4
11	5.1
14	5.9
16	6.4
18	7.1

a. Sketch points on the scatter plot using the data from the table.



b. The function  $b(t) = 0.32t + 1.47$  represents the line of best fit for the data. About how many more bottles were sold in 2007 than in 1992? Explain.

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**S.ID.7\*****SELECTED RESPONSE**

Select the correct answer.

1. The linear equation  $c = 0.1998s + 76.4520$  models the number of calories  $c$  in a beef hot dog as a function of the amount of sodium  $s$ , in milligrams, in the hot dog. What is the slope, and what does it mean in this context?
- (A) The slope is 0.1998. The number of calories is increased by 0.1998 for each 1 milligram increase in sodium.
- (B) The slope is 0.1998. The amount of sodium, in milligrams, is increased by 0.1699 for each increase of 1 calorie.
- (C) The slope is 76.4520. This is the number of calories in a beef hot dog with no sodium.
- (D) The slope is 76.4520. This is the amount of sodium, in milligrams, in a beef hot dog with no calories.
2. The linear equation  $c = 6.5n + 1500$  models cost  $c$ , in dollars, to produce  $n$  toys at a toy factory. What is the  $c$ -intercept, and what does it mean in this context?
- (A) The  $c$ -intercept is 6.5. The cost increases by \$6.50 for each toy produced.
- (B) The  $c$ -intercept is 6.5. The number of toys produced increases by about 6.5 for each \$1 increase in cost.
- (C) The  $c$ -intercept is 1500. It costs \$1500 to run the factory if no toys are produced.
- (D) The  $c$ -intercept is 1500. The factory can produce 1500 toys at no cost.

Select the correct answer for each lettered part.

3. The linear equation  $p = 2376t + 73,219$  estimates the number of college seniors  $p$  who graduated with a bachelor's degree in psychology  $t$  years after 2000. The linear equation  $b = 2,376t + 56,545$  models the number of college seniors  $b$  who graduated with a bachelor's degree in biology  $t$  years after 2000. Classify each statement.
- a. The number of psychology degrees increases by about 73,219 each year.  True  False
- b. The number of biology degrees increases by about 2376 each year.  True  False
- c. About 73,000 students graduated with degrees in psychology in 2000.  True  False
- d. About 57 students graduated with degrees in biology in 2000.  True  False
- e. In 2000, more students graduated with psychology degrees than biology degrees.  True  False

**CONSTRUCTED RESPONSE**

4. The function  $d(t) = 2.05t + 1.27$  models the depth of the water  $d$ , in centimeters, of a filling bathtub at time  $t$ , in minutes. What does the slope of the function represent in the context of the problem? What does the  $d$ -intercept represent in the context of the problem? Include any units in your answers.

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5. The function  $c(r) = 2r + 12.5$  represents the cost  $c$ , in dollars, of riding  $r$  rides at a carnival.
- a. How much does it cost to get into the carnival? Explain.

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- b. How much does each ride cost? Explain.

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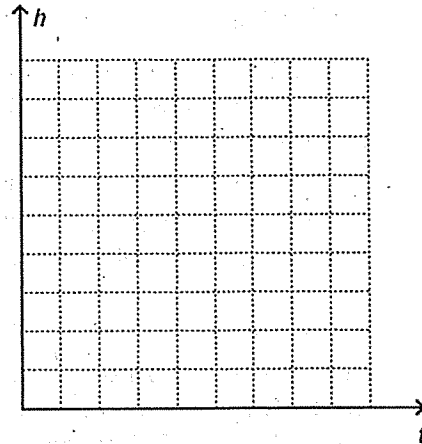


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6. The table below shows the height  $h$ , in meters, of a tree that is  $t$  years old.

Age (in years)	Height (in meters)
1	0.7
2	1.3
3	1.8
4	2.5
5	3.1
6	3.8
7	4.2
8	4.9
9	5.5
10	6.2

- a. Make a scatter plot of the data from the table.



- b. Find a line of best fit.

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- c. Identify and interpret the slope of the line from part b.

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- d. Identify and interpret the  $h$ -intercept of the line from part b.

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**S.ID.8\***

**SELECTED RESPONSE**

Select all correct answers.

1. Which of the following correlation coefficients indicate a strong linear correlation?

- (A) -0.872691
- (B) -0.658799
- (C) -0.125866
- (D) 0.568962
- (E) 0.798264
- (F) 0.989862

Select the correct answer.

2. What is the correlation coefficient of linear fit for the following data set? Use technology to find the correlation coefficient. Assume  $x$  is the independent variable.

$x$	$y$
1.4	4.7
2.3	5.0
4.5	7.4
5.8	8.6
3.2	6.7
1.9	4.2
8.7	11.4
5.5	8.0
6.7	10.4

- (A) -0.982478
- (B) -0.328699
- (C) 0.328699
- (D) 0.982478

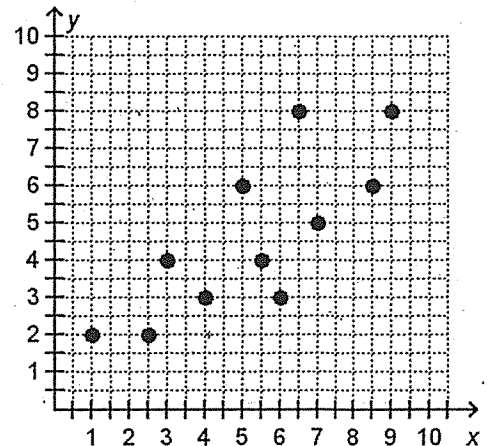
3. What is the type and strength of the linear correlation in the following data, using  $x$  as the dependent variable? Use technology if necessary.

$x$	$y$
1.2	5.3
3.2	6.7
3.3	3.3
4.5	4.3
6.1	5.5
6.3	2.1
7.1	0.5
9.6	0.75
9	4.1

- (A) Strong negative correlation
- (B) Weak negative correlation
- (C) Weak positive correlation
- (D) Strong positive correlation

**CONSTRUCTED RESPONSE**

4. Consider the following scatter plot. Use technology to find the line of best fit, using  $x$  as the independent variable and  $y$  as the dependent variable. What happens to  $y$  as  $x$  increases? Find the correlation coefficient. How strong a fit is the line? Explain.




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**S.ID.9\***

**SELECTED RESPONSE**

Select the correct answer.

1. Susan measures her son Jeremy's height at various ages. The results are shown below. Which of the following is a statement of causation?

Age (years)	Height (inches)
8	44
9	48
10	52
11	55
12	58
13	62

- (A) When Jeremy was 13 years old, he was 62 inches tall.
- (B) There appears to be a relationship between Jeremy's age and height.
- (C) As Jeremy's age increases, his height also increases.
- (D) Jeremy's age affects his height.

Select all correct answers.

2. Jewelers consider weight, cut grade, color, and clarity when pricing diamonds. In researching jewelry prices, Yvonne makes the following statements based on her observations. Which of the statements are statements of causation?
- (A) Heavier diamonds tend to be sold at higher prices.
  - (B) A particular diamond costs \$264.
  - (C) Higher clarity drives up the price of a diamond.
  - (D) There appears to be a relationship between color and price.
  - (E) A darker color decreases a diamond's clarity.
  - (F) Diamonds with lower cut grades seem to sell at lower prices.

Select the correct answer for each lettered part.

3. Identify each of the following statements as a statement of correlation, a statement of causation, or neither.
1. Taller people tend to have bigger hands.
  2. Being tall makes your hands bigger.
  3. Shorter people tend to have smaller hands.
  4. Being short makes your hands smaller.
  5. I'm 6'8" and I have bigger hands than anyone else in my family.

- |                |                                   |                                 |                               |
|----------------|-----------------------------------|---------------------------------|-------------------------------|
| a. Statement 1 | <input type="radio"/> Correlation | <input type="radio"/> Causation | <input type="radio"/> Neither |
| b. Statement 2 | <input type="radio"/> Correlation | <input type="radio"/> Causation | <input type="radio"/> Neither |
| c. Statement 3 | <input type="radio"/> Correlation | <input type="radio"/> Causation | <input type="radio"/> Neither |
| d. Statement 4 | <input type="radio"/> Correlation | <input type="radio"/> Causation | <input type="radio"/> Neither |
| e. Statement 5 | <input type="radio"/> Correlation | <input type="radio"/> Causation | <input type="radio"/> Neither |

