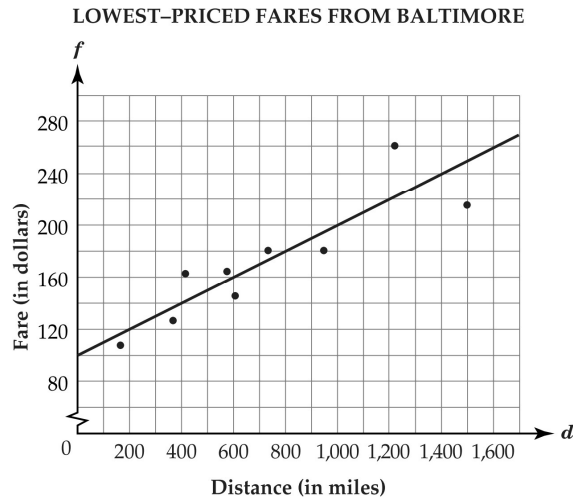


Line of Best Fit/Residuals

Name: _____

Date: _____

1. The scatter plot below shows the lowest-priced fares for flights from Baltimore to various destinations. A line of best fit has been graphed.



The equation for this line of best fit is shown below, where d is the distance in miles and f is the fare in dollars.

$$f = 0.1d + 100$$

Which of these is a correct interpretation of the slope of this line?

- A. The fare increases \$100 for every additional 0.1 mile.
- B. The fare increases \$10 for every additional mile.
- C. The fare increases \$0.10 for every additional 100 miles.
- D. The fare increases \$0.10 for every additional mile.

2. The table below shows the cost of health care, in millions of dollars, from 1996 to 2001.

Cost Of Health Care

Year	Cost (in millions)
1996	\$482
1997	\$504
1998	\$522
1999	\$560
2000	\$591
2001	\$630

The equation of a line of best fit for this data is $y = 30x + 474$, where x represents the number of years since 1996 and y represents the cost of health care, in millions of dollars. Which statement *best* describes the meaning of the slope of this equation?

- A. The cost of health care increased by \$30 per year since 1996.
- B. The cost of health care increased by \$474 per year since 1996.
- C. The cost of health care increased by \$30,000,000 per year since 1996.
- D. The cost of health care increased by \$474,000,000 per year since 1996.

3. The table below shows the age and the value of a computer.

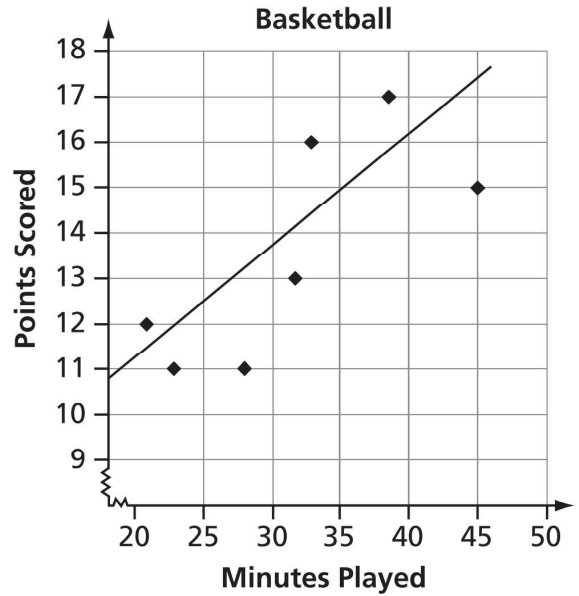
VALUE OF A COMPUTER

Age (in Years) (x)	Value (y)
0	\$800
1	\$620
2	\$410
3	\$200

Which of these is the meaning of the slope of an equation for a line of best fit for these data?

- A. the value of the computer when it was bought
- B. the amount that the value of the computer decreases per year
- C. the age of the computer depends on the value of the computer

4. Use the graph below to answer the following question.



A basketball player made a graph of the number of minutes he played versus the number of points he scored. He drew a line of best fit. Based on the line of best fit, at what rate did the player score?

- A. He scored 4 points every 15 minutes.
- B. He scored 4 points per minute.
- C. He scored 15 points per minute.
- D. He scored 15 points every 4 minutes.

5. A spring stretches linearly as weight is added. The table shows data collected for a certain spring.

Weight in lb (x)	Stretch in cm (y)
100	0.5
500	2.5
800	4.0
900	4.5
1,200	6.0

What is the slope of the line that fits these data?

- A. $\frac{1}{200}$ B. $\frac{1}{100}$ C. $\frac{1}{50}$ D. $\frac{1}{2}$

6. Mr. Hanson recorded the typing speeds (in words per minute) of 25 students and their weeks of experience. The line of best fit for the data is $y = 4.4x + 18.9$, where x is the number of weeks of experience of a student and y is the student's typing speed. What is the meaning of the y -intercept for this set of data?

- A. the average typing speed of the students
 B. the highest typing speed recorded
 C. the improvement in typing speed per week for the average student
 D. the typing speed of a student with no experience

7. The equation $y = 461.19x + 3,492$ represents the value of a work of art from 1964 to 2005. What does the number 461.19 represent?

- A. value of the work of art in 1964
 B. value of the work of art in 2005
 C. yearly decrease in value
 D. yearly increase in value

8. The table below shows the costs for visits of different lengths by cleaning companies in a town. The length of a visit is represented by x , and the cost of a visit is represented by y . Each cleaning company charges a flat fee for visiting the house or apartment and an hourly rate.

Length of Visit (in hours)	Cost of Visit
2	\$72
2	\$76
3	\$91
3.5	\$103
4	\$105
4.5	\$113
5.5	\$135

The equation of the line of best fit for the data is $y = 16.8x + 40.5$. What does the y -intercept represent?

- A. length of a visit B. cost of a visit
 C. flat fee D. hourly rate

9. The table below shows the distance a car has traveled.

Minutes	25	50	75	100	125
Distance Traveled (in miles)	20	40	60	80	100

What is the meaning of the slope of the linear model for the data?

- A. The car travels 5 miles every minute.
- B. The car travels 4 miles every minute.
- C. The car travels 4 miles every 5 minutes.
- D. The car travels 5 miles every 4 minutes.

10. The table below shows the cost of a season ticket to an amusement park for various years.

Years Since 1990 (x)	Ticket Price (in dollars) (y)
9	25.00
14	46.25
16	54.75
20	71.75

What is represented by the y -intercept of the line of best fit for this data set?

- A. the predicted average change in ticket price per year
- B. the predicted number of years per \$1 increase in ticket price
- C. the predicted price of a ticket in 1990

11. This table shows the work experience and salaries of 4 accountants.

Number of Years Experience (y)	Annual Salary (S)
1	\$53,000
4	\$61,000
10	\$75,000
12	\$85,000

Based on the information in the table, which linear equation *best* predicts salary, S , based on years of experience, y ?

- A. $S = 2,429y + 50,857$
- B. $S = 2,667y + 50,333$
- C. $S = 2,762y + 49,857$
- D. $S = 2,909y + 50,091$

12. The table below shows the number of words a student typed during five timed sessions.

STUDENT'S TYPING

Time (m) (in minutes)	2	3	4	6	9
Number of Words Typed (w)	122	182	240	368	538

Which equation *best* models a line of best fit for these data?

- A. $w = 3m + 60$
- B. $w = 60m + 3$
- C. $w = 102m - 117$
- D. $w = -117m + 102$

13. The table below shows the age and the value of a computer.

VALUE OF A COMPUTER

Age (in Years) (x)	Value (y)
0	\$800
1	\$620
2	\$410
3	\$200

Which is an equation for a line of best fit for this data?

- A. $y = -201x + 809$ B. $y = 201x - 809$
 C. $y = -201 + 809x$

14. The table below shows the approximate melting points and the approximate boiling points, in degrees Celsius, for eight precious metals.

Boiling and Melting Point
of Precious Metals

Precious Metal	Melting Point (°C)	Boiling Point (°C)
Platinum	1786	3827
Rhodium	1963	3727
Gold	1064	2800
Palladium	1555	3167
Ruthenium	2250	3900
Silver	962	2210
Iridium	2446	4527
Osmium	2700	5500

Which equation is closest to the line-of-best fit for this data?

- A. $y = x + 1000$ B. $y = 1.5x + 840$
 C. $y = 2x + 800$ D. $y = 2.5x + 1000$

15. The amount of fat and the percent of calories from fat for several hamburgers is shown in the table below.

Fat in Fast-Food Hamburgers

Fat	Percent of Calories From Fat
39	52
32	49
33	53
34	52
21	44
19	42
32	53
23	52

Which equation is closest to the line-of-best fit for this data?

- A. $y = 0.5x + 36$ B. $y = 0.5x - 36$
 C. $y = 5x + 42$ D. $y = 5x - 42$

16. The table below represents the high and low temperatures for one day for selected locations in Mississippi.

Mississippi Locations

Location	High Temperature (°F)	Low Temperature (°F)
Gulfport	64	58
Jackson	78	59
Hattiesburg	70	59
Meridian	74	61
Pascagoula	66	54
Kessler AFB	62	58

Which is closest to the equation for the line-of-best fit for the data in this table?

- A. $y = 0.2x + 45$ B. $y = 0.2x + 35$
 C. $y = 2x + 30$ D. $y = 2x + 40$

17. The table below shows the average daily temperature, in degrees Fahrenheit, for select days in April for Townsville.

Townsville's Average Daily Temperature

Day (x)	Temperature (y)
1	72
5	73
10	74
12	75
20	76
25	78
30	79

Which of the following is closest to the line-of-best fit for the data?

- A. $y = \frac{1}{5}x + 68$ B. $y = \frac{1}{4}x + 72$
 C. $y = \frac{13}{3}x + 72$ D. $y = 4x + 68$

18. The table shows the number of times different documents were reviewed and the total number of errors that were found on each document.

Document Review

Number of Reviews (x)	Number of Errors (y)
5	2
4	2
2	6
2	8
1	8
4	4
3	4
3	6

Which equation best represents the line-of-best fit for the data in the table?

- A. $y = -\frac{5}{3}x + 10$ B. $y = -2x + 12$
 C. $y = -\frac{3}{2}x + 8$ D. $y = -3x + 14$

19. The table shows the relationship between x , the number of employees hired for a construction project, and y , the cost of the project.

Construction Project

Number of Employees	Cost of Project (dollars)
32	6000
25	5200
28	8000
35	10,000
20	8400
22	5400
45	14,250

Which equation is closest to the line-of-best fit for this data?

- A. $y = 290x - 500$ B. $y = 295x - 520$
 C. $y = 600x + 7000$ D. $y = 600x + 5200$

20. The number of steps per second that a runner takes is called the stride rate. The table below compares the speed of several top female runners with their average stride rates.

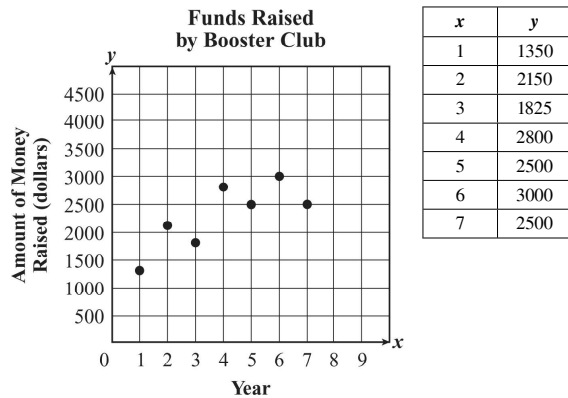
Stride Rate Versus Speed

Stride Rate, x (steps per second)	Speed, y (feet per second)
3.05	15.86
3.12	16.88
3.17	17.50
3.25	18.62
3.36	19.97
3.46	21.06
3.55	22.11

Which of the following equations best represents the line-of-best fit for this set of data?

- A. $y = 5.7x$ B. $y = 0.5x - 6.25$
 C. $y = 3x + 19$ D. $y = 12x - 22$

21. The scatter plot below shows the amount of money the Football Booster Club raised for the last seven years.



Which of the following best represents the line-of-best fit for the data shown?

- A. $y = 500x + 1500$ B. $y = 250x + 750$
 C. $y = 210x + 1470$ D. $y = 200x + 1000$

22. The table below shows the number of doctors in Bingham City from 1960 to 1986.

Year(x)	1960	1967	1970	1975	1982	1985	1986
Number of Doctors (y)	2,937	3,511	3,754	4,173	4,741	5,019	5,102

If a linear regression model is fit to this data, which equation would *best* represent the data? (let x = the number of years after 1960)

- A. $y = 1.01x - 3,500$ B. $y = 82x + 2,937$
 C. $y = 83x + 2,929$ D. $y = 83x + 2,944$

23. The following list shows the number of people (in millions) in the United States whose only means of getting to work was walking.

Year (x)	Number (y)
1940	7.6
1950	7.0
1960	6.4
1970	5.7
1980	5.4
1990	4.5

If $x = 0$ for the year 1940, which equation is the best-fit linear model for the data?

- A. $y = -16.5x + 125$ B. $y = -0.06x + 7.6$
 C. $y = 0.06x + 10$ D. $y = 7.6x - 0.06$

24. The table below shows the average weights for men 20–24 years of age.

Height (in inches)	Weight (in pounds)
62	130
64	138
66	148
68	156
70	167
72	176
74	186
76	197

If x represents height, and y represents weight, which linear equation *best* models these data?

- A. $y = 5.01x - 181$ B. $y = 4.79x - 168$
 C. $y = 0.21x + 35.2$ D. $y = 0.17x + 40.2$

25. The table below displays the number of DVDs sold and rented at a store for 5 weeks.

Week	DVDs Sold	DVDs Rented
1	25	50
2	45	79
3	40	70
4	22	48
5	5	28

Which describes the association between the number of DVDs sold and the number of DVDs rented?

- A. no association
- B. weak association
- C. negative association
- D. positive association

26. During an experiment, a marine biologist recorded the length and mass of a sample of one type of fish. The measures for four of the fish in her sample are shown in the table below.

Length and Mass of Fish

Length (in centimeters)	Mass (in grams)
10	148
15	223
20	295
25	368

The marine biologist found that the relationship between the length and mass of this type of fish could best be represented by a linear model.

Based on the linear model for the data in the table, which of the following is closest to the mass of a fish with a length of 50 centimeters?

- A. 75 grams
- B. 438 grams
- C. 739 grams
- D. 1465 grams

27. Use the table below to answer the following question(s)

This table shows the worldwide computers per 1,000 people for 1991 through 1995.

**COMPUTERS PER
1,000 PEOPLE**

YEAR	NUMBER
1991	245.4
1992	266.9
1993	296.6
1994	329.2
1995	364.7

Based on the trend shown in the table, which of these would be the best prediction of the number of worldwide computers per 1,000 people in 1996?

- A. 364.8 B. 404.9 C. 431.7 D. 450.2

28. Mrs. Johnson asked her students to list the number of minutes they spent studying and the scores they made on their Algebra test. She then told them to create a scatter plot with the data they collected. Based on the information below, approximately how many minutes should they have studied if they wanted to score 100 on her test?

Time Spent Studying	15	12	20	30	25	40	60	50	55	45
Score on Test	65	68	75	80	79	85	97	80	88	73

- A. 50 minutes B. 60 minutes
C. 70 minutes D. 80 minutes

29. The table shows the relationship between calories and fat grams contained in orders of fried chicken from various restaurants.

Calories	305	410	320	500	510	440
Fat Grams	28	34	28	41	42	38

Assuming the data can best be described by a linear model, how many fat grams would be expected to be contained in a 275-calorie order of fried chicken?

- A. 28 B. 27 C. 25 D. 22

30. Five students in Miss Brown's algebra class reported the number of hours that they studied for a test. The number of hours and their test scores are in the table below.

Hours of Study	Test Score
2	86
2.5	80
3	85
4.5	90
5	96

According to a line of best fit for the data, what is the predicted test score of a student who studied 1 hour for the test?

- A. 75 B. 78 C. 81 D. 84

31. The Smiths' average monthly electric bills in the years 1998 to 2005 are displayed in the table below.

Year	1998	1999	2000	2001	2002	2003	2004	2005
Average Monthly Bill	\$102	\$102	\$104	\$108	\$116	\$116	\$121	\$129

According to a line of best fit for the data, *approximately* how much per month would the Smiths pay in 2007?

- A. \$134 B. \$137 C. \$142 D. \$145

32. The table below shows monthly pet expenses based on the number of pets owned.

Number of pets owned (x)	0	1	2	4	6
Monthly pet expenses (y)	\$0	\$22	\$43	\$100	\$160

Using the line of best fit for the data in the table, what is the *approximate* predicted monthly expense for owning 3 pets?

- A. \$66 B. \$76 C. \$80

33. The table below shows the average number of fish Jamal caught in an hour based on the water temperature, in degrees Fahrenheit ($^{\circ}\text{F}$).

Jamal's Fishing

Water Temperature ($^{\circ}\text{F}$)	Fish Caught
51	5
72	1
45	6
64	2
70	1

Based on a linear model of the information in the table, how many fish should Jamal expect to catch in an hour when the water temperature is 55°F ?

- A. 3 B. 4 C. 5 D. 6

34. The residuals for a set of data represent the _____.

- A. differences between consecutive x -values
 B. vertical differences between data points and the line of best fit
 C. data points that lie below the line of best fit
 D. data points that do not lie on the line of best fit

35. The outliers for a data set represent the _____.

- A. data points that are numerically distant from the bulk of the data set
- B. data points that are excluded when calculating the line of best fit
- C. vertical differences between data points and the line of best fit
- D. data points that lie the furthest distance from the line of best fit

36. If a data point lies below the line of best fit, the residual value is _____.

- A. negative
- B. positive
- C. very small
- D. -1

37. If a set of data has a very strong correlation, the residual values will be _____.

- A. very large
- B. positive
- C. very small
- D. -1

38. Three months ago, Sam broke his leg. As part of his rehabilitation, Sam is jogging slowly on a football field. He records his position at various times in the table below.

Time measured in seconds	Position measured in yards
0.2	48
1.1	41
1.9	37
2.5	33
3.6	27
4.4	19
5.2	13

If x represents the time in seconds and y is Sam's position in yards, use the data to create a linear regression and interpret the meaning of the y -intercept.

- A. y -intercept is 48.36 and represents the total number of yards Sam must jog
- B. y -intercept is 6.83 and represents the rate at which Sam jogs
- C. y -intercept is 56.08 and represents the time it takes Sam to jog the entire length of the field
- D. y -intercept is 49.57 and represents Sam's position on the field when he began to record his times

39. Which of the following is the symbol used for the correlation coefficient?

- A. c B. t C. r D. μ

40. Which of the following is the symbol used for the coefficient of determination?

- A. r^2 B. r C. s D. μ

41. Two variables have a correlation coefficient of $r = 0.9$. This indicates:

- A. a strong positive correlation
B. a weak positive correlation
C. a weak negative correlation
D. no correlation

42. Two variables have a correlation coefficient of $r = -0.9$. This indicates:

- A. a strong positive correlation
B. a strong negative correlation
C. a weak negative correlation
D. no correlation

43. The following data was collected regarding the scores on several exams.

I.

Test A	55	74	72	58	73	62	59
Test B	71	70	56	74	58	57	63

II.

Test A	55	74	72	58	73	62	59
Test C	55	58	59	62	72	73	74

III.

Test C	55	58	59	62	72	73	74
Test D	74	71	70	63	58	57	56

IV.

Test C	55	58	59	62	72	73	74
Test E	56	57	58	63	70	71	74

V.

Test B	71	70	56	74	58	57	63
Test C	55	58	59	62	72	73	74

Which set of data shows a strong negative correlation?

- A. I only B. II only C. III only D. V only

44. The following data was collected regarding the scores on several exams.

I.

Test A	55	74	72	58	73	62	59
Test B	71	70	56	74	58	57	63

II.

Test A	55	74	72	58	73	62	59
Test C	55	58	59	62	72	73	74

III.

Test C	55	58	59	62	72	73	74
Test D	74	71	70	63	58	57	56

IV.

Test C	55	58	59	62	72	73	74
Test E	56	57	58	63	70	71	74

V.

Test B	71	70	56	74	58	57	63
Test C	55	58	59	62	72	73	74

Which set of data shows a strong positive correlation?

- A. II only B. III only C. IV only D. V only

45. What is the linear correlation coefficient for the values shown in the table?

X	1	3	4	6	8	9	11	14
Y	1	2	4	4	5	7	8	9

- A. 0.977 B. -0.907
 C. 0.779 D. -0.779

46. The table shows Service Expenditures (per Person), Personal Income (in thousands of dollars), and Goods Produced per Person for a 5-year period.

Service Expenditures	Per. Income	Goods Produced per Person (liters)
\$875	25	2.3
\$895	31	2.1
\$972	36	3.9
\$1099	50	4.2
\$1200	65	4.0

To 2 decimal places, what is the correlation coefficient for the Service Expenditures (per person) and the Personal Income?

- A. 0.99 B. 0.97 C. 0.93 D. -0.97

47. The table shows Service Expenditures (per Person), Personal Income (in thousands of dollars), and Goods Produced per Person for a 5-year period.

Service Expenditures	Per. Income	Goods Produced per Person (liters)
\$875	25	2.3
\$895	31	2.1
\$972	36	3.9
\$1099	50	4.2
\$1200	65	4.0

To 2 decimal places, what is the correlation coefficient for the Personal Income and the Goods Produced per Person?

- A. 0.77 B. 0.87 C. 0.91 D. -0.73

48. Edna owns seven lots in a small development community. An outbreak of lawn-eating insects called chinch bugs forces her to spread insecticide granules. Deciding to conduct an experiment, Edna spreads different amounts of insecticide on each lot, and records the results after 2 weeks in the table as shown.

Amount of insecticide (in pounds)	Damage inflicted by chinch bugs (in sq ft)
8	1350
20	1100
60	375
42	700
35	850
70	200
47	650

What is the correlation coefficient for the linear regression that best models this data?

- A. 0.9971 B. 0.9992
 C. -0.9971 D. -0.9992

49. Using an ammeter, Stewart measured the current for several different appliances of various power ratings. He recorded the data in the table, as shown.

Current (measured in amps)	Power (measured in Watts)
0	0
5.5	650
3.1	350
0.4	60
7.1	850
1.8	200
14.0	1750

If the current is the independent variable, what is the correlation coefficient for this data?

- A. $-.9994$ B. $-.9920$
C. $.9920$ D. $.9994$