

Regents Review Session 3

Name: _____

Date: _____

1. Christopher looked at his quiz scores shown below for the first and second semester of his Algebra class.

Semester 1: 78, 91, 88, 83, 94

Semester 2: 91, 96, 80, 77, 88, 85, 92

Which statement about Christopher's performance is correct?

- (1) The interquartile range for semester 1 is greater than the interquartile range for semester 2.
- (2) The median score for semester 1 is greater than the median score for semester 2.
- (3) The mean score for semester 2 is greater than the mean score for semester 1.
- (4) The third quartile for semester 2 is greater than the third quartile for semester 1.

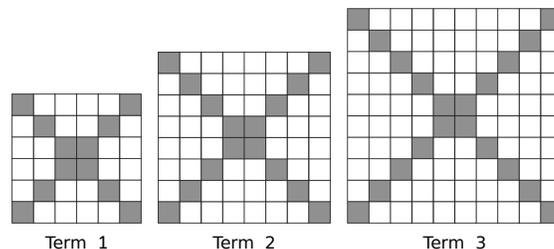
2. A sunflower is 3 inches tall at week 0 and grows 2 inches each week.

Which function(s) shown below can be used to determine the height, $f(n)$, of the sunflower in n weeks?

- I. $f(n) = 2n + 3$
- II. $f(n) = 2n + 3(n - 1)$
- III. $f(n) = f(n - 1) + 2$ where $f(0) = 3$

- (1) I and II
- (2) II, only
- (3) III, only
- (4) I and III

3. The diagrams below represent the first three terms of a sequence.



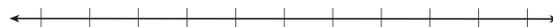
Assuming the pattern continues, which formula determines a_n , the number of shaded squares in the n th term?

- (1) $a_n = 4n + 12$
- (2) $a_n = 4n + 8$
- (3) $a_n = 4n + 4$
- (4) $a_n = 4n + 2$

4. Robin collected data on the number of hours she watched television on Sunday through Thursday nights for a period of 3 weeks. The data are shown in the table below.

	Sun	Mon	Tues	Wed	Thurs
Week 1	4	3	3.5	2	2
Week 2	4.5	5	2.5	3	1.5
Week 3	4	3	1	1.5	2.5

Using an appropriate scale on the number line below, construct a box plot for the 15 values.



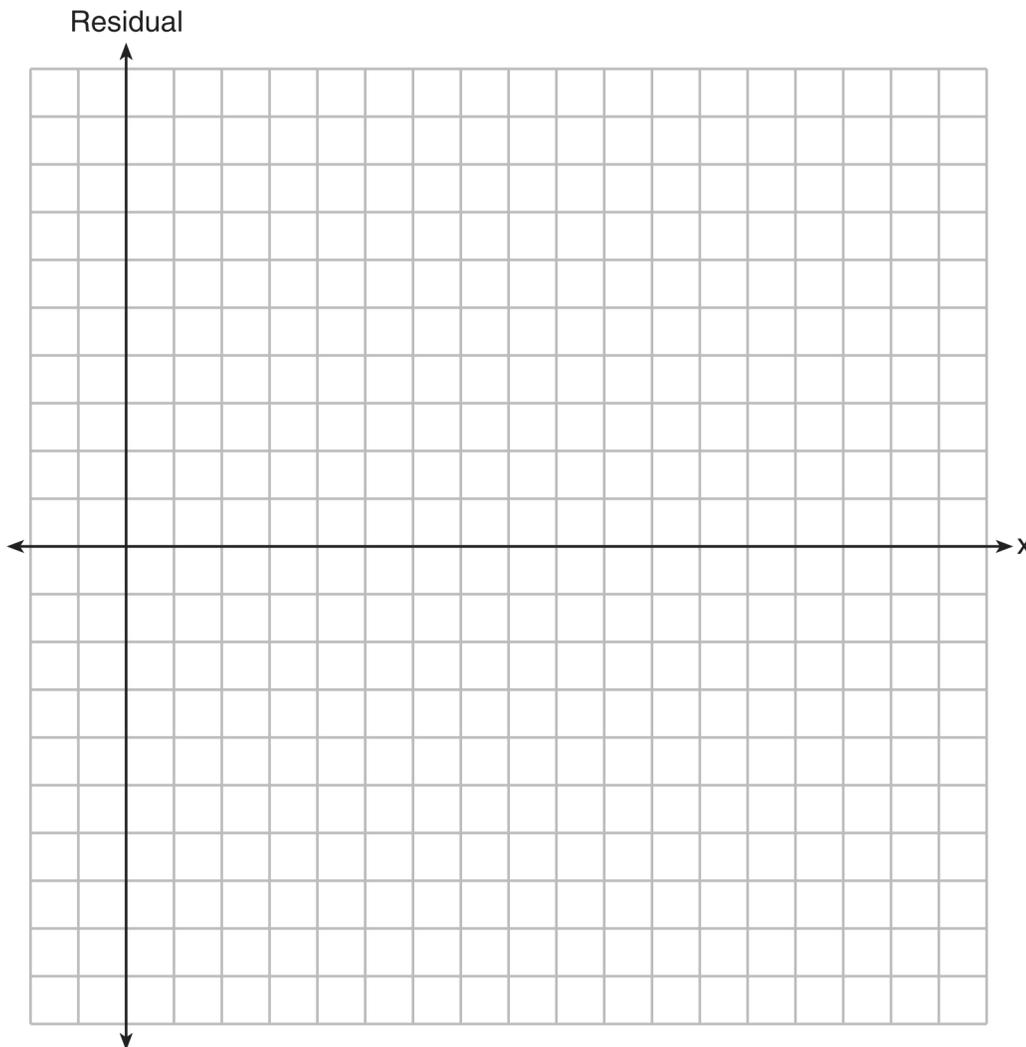
5. If a sequence is defined recursively by $f(0) = 2$ and $f(n + 1) = -2f(n) + 3$ for $n \geq 0$, then $f(2)$ is equal to

- (1) 1
- (2) -11
- (3) 5
- (4) 17

6. The table below represents the residuals for a line of best fit.

x	2	3	3	4	6	7	8	9	9	10
Residual	2	1	-1	-2	-3	-2	-1	2	0	3

Plot these residuals on the set of axes below.



Using the plot, assess the fit of the line for these residuals and justify your answer.

7. Which statement is *not* always true?

- (1) The product of two irrational numbers is irrational.
- (2) The product of two rational numbers is rational.
- (3) The sum of two rational numbers is rational.
- (4) The sum of a rational number and an irrational number is irrational.

8. The third term in an arithmetic sequence is 10 and the fifth term is 26. If the first term is a_1 , which is an equation for the n th term of this sequence?

- (1) $a_n = 8n + 10$ (2) $a_n = 8n - 14$
- (3) $a_n = 16n + 10$ (4) $a_n = 16n - 38$

9. Peyton is a sprinter who can run the 40-yard dash in 4.5 seconds. He converts his speed into miles per hour, as shown below.

$$\frac{40 \text{ yd}}{4.5 \text{ sec}} \cdot \frac{3 \text{ ft}}{1 \text{ yd}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} \cdot \frac{60 \text{ sec}}{1 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}}$$

Which ratio is *incorrectly* written to convert his speed?

(1) $\frac{3 \text{ ft}}{1 \text{ yd}}$ (2) $\frac{5280 \text{ ft}}{1 \text{ mi}}$

(3) $\frac{60 \text{ sec}}{1 \text{ min}}$ (4) $\frac{60 \text{ min}}{1 \text{ hr}}$

10. A statistics class surveyed some students during one lunch period to obtain opinions about television programming preferences. The results of the survey are summarized in the table below.

Programming Preferences

	Comedy	Drama
Male	70	35
Female	48	42

Based on the sample, predict how many of the school's 351 males would prefer comedy. Justify your answer.

11. The table below shows the attendance at a museum in select years from 2007 to 2013.

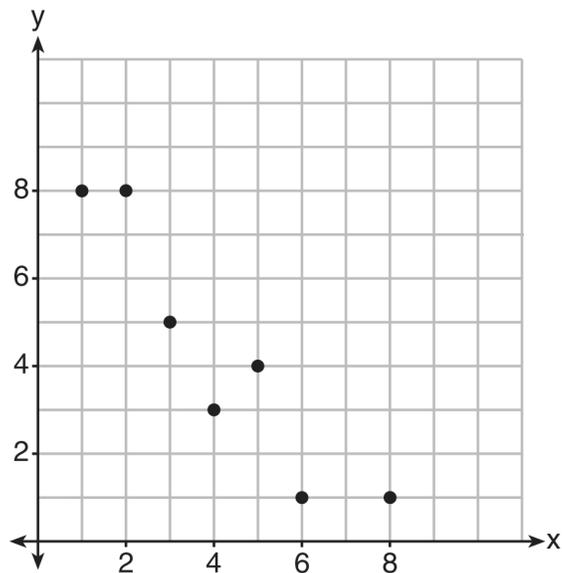
Attendance at Museum

Year	2007	2008	2009	2011	2013
Attendance (millions)	8.3	8.5	8.5	8.8	9.3

State the linear regression equation represented by the data table when $x = 0$ is used to represent the year 2007 and y is used to represent the attendance. Round all values to the nearest hundredth.

State the correlation coefficient to the nearest hundredth and determine whether the data suggest a strong or weak association.

12. What is the correlation coefficient of the linear fit of the data shown below, to the nearest hundredth?



- (1) 1.00 (2) 0.93
 (3) -0.93 (4) -1.00

13. Given:

$$L = \sqrt{2}$$

$$M = 3\sqrt{3}$$

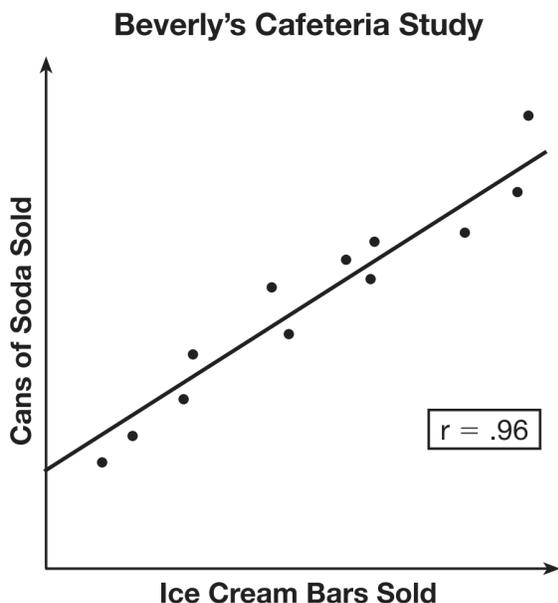
$$N = \sqrt{16}$$

$$P = \sqrt{9}$$

Which expression results in a rational number?

- (1) $L + M$ (2) $M + N$
 (3) $N + P$ (4) $P + L$

14. Beverly did a study this past spring using data she collected from a cafeteria. She recorded data weekly for ice cream sales and soda sales. Beverly found the line of best fit and the correlation coefficient, as shown in the diagram below.



Given this information, which statement(s) can correctly be concluded?

- I. Eating more ice cream causes a person to become thirsty.
- II. Drinking more soda causes a person to become hungry.
- III. There is a strong correlation between ice cream sales and soda sales.

- (1) I, only (2) III, only
- (3) I and III (4) II and III

15. A nutritionist collected information about different brands of beef hot dogs. She made a table showing the number of Calories and the amount of sodium in each hot dog.

Calories per Beef Hot Dog	Milligrams of Sodium per Beef Hot Dog
186	495
181	477
176	425
149	322
184	482
190	587
158	370
139	322

- a) Write the correlation coefficient for the line of best fit. Round your answer to the *nearest hundredth*.
- b) Explain what the correlation coefficient suggests in the context of this problem.

16. Caitlin has a movie rental card worth \$175. After she rents the first movie, the card's value is \$172.25. After she rents the second movie, its value is \$169.50. After she rents the third movie, the card is worth \$166.75.

Assuming the pattern continues, write an equation to define $A(n)$, the amount of money on the rental card after n rentals.

Caitlin rents a movie every Friday night. How many weeks in a row can she afford to rent a movie, using her rental card only? Explain how you arrived at your answer.

17. Isaiah collects data from two different companies, each with four employees. The results of the study, based on each worker's age and salary, are listed in the tables below.

Company 1		Company 2	
Worker's Age in Years	Salary in Dollars	Worker's Age in Years	Salary in Dollars
25	30,000	25	29,000
27	32,000	28	35,500
28	35,000	29	37,000
33	38,000	31	65,000

Which statement is true about these data?

- (1) The median salaries in both companies are greater than \$37,000.
- (2) The mean salary in company 1 is greater than the mean salary in company 2.
- (3) The salary range in company 2 is greater than the salary range in company 1.
- (4) The mean age of workers at company 1 is greater than the mean age of workers at company 2.
18. If $f(1) = 3$ and $f(n) = -2f(n - 1) + 1$, then $f(5) =$

- (1) -5 (2) 11 (3) 21 (4) 43

19. Ms. Fox asked her class "Is the sum of 4.2 and $\sqrt{2}$ rational or irrational?" Patrick answered that the sum would be irrational.

State whether Patrick is correct or incorrect. Justify your reasoning.

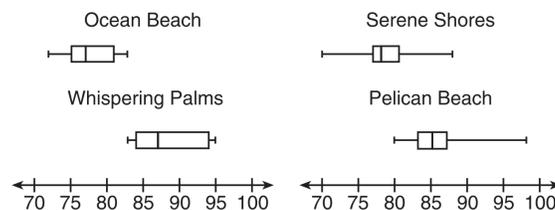
20. The table below shows the number of grams of carbohydrates, x , and the number of Calories, y , of six different foods.

Carbohydrates (x)	Calories (y)
8	120
9.5	138
10	147
6	88
7	108
4	62

Which equation best represents the line of best fit for this set of data?

- (1) $y = 15x$
- (2) $y = 0.07x$
- (3) $y = 0.1x - 0.4$
- (4) $y = 14.1x + 5.8$

21. Corinne is planning a beach vacation in July and is analyzing the daily high temperatures for her potential destination. She would like to choose a destination with a high median temperature and a small interquartile range. She constructed box plots shown in the diagram below.



Which destination has a median temperature above 80 degrees and the smallest interquartile range?

- (1) Ocean Beach
- (2) Whispering Palms
- (3) Serene Shores
- (4) Pelican Beach

22. Which statement is *not* always true?

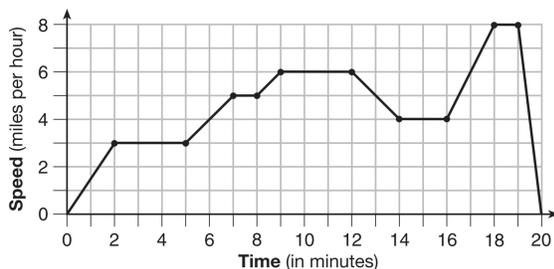
- (1) The sum of two rational numbers is rational.
- (2) The product of two irrational numbers is rational.
- (3) The sum of a rational number and an irrational number is irrational.
- (4) The product of a nonzero rational number and an irrational number is irrational.

23. The school newspaper surveyed the student body for an article about club membership. The table below shows the number of students in each grade level who belong to one or more clubs.

	1 Club	2 Clubs	3 or More Clubs
9th	90	33	12
10th	125	12	15
11th	87	22	18
12th	75	27	23

If there are 180 students in ninth grade, what percentage of the ninth grade students belong to more than one club?

24. The graph below represents a jogger's speed during her 20-minute jog around her neighborhood.



Which statement best describes what the jogger was doing during the 9–12 minute interval of her jog?

- (1) She was standing still.
- (2) She was increasing her speed.
- (3) She was decreasing her speed.
- (4) She was jogging at a constant rate.

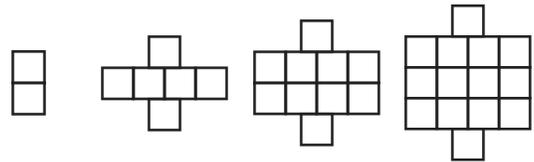
25. The table below shows the annual salaries for the 24 members of a professional sports team in terms of millions of dollars.

0.5	0.5	0.6	0.7	0.75	0.8
1.0	1.0	1.1	1.25	1.3	1.4
1.4	1.8	2.5	3.7	3.8	4
4.2	4.6	5.1	6	6.3	7.2

The team signs an additional player to a contract worth 10 million dollars per year. Which statement about the median and mean is true?

- (1) Both will increase.
- (2) Only the median will increase.
- (3) Only the mean will increase.
- (4) Neither will change.

26. A pattern of blocks is shown below.



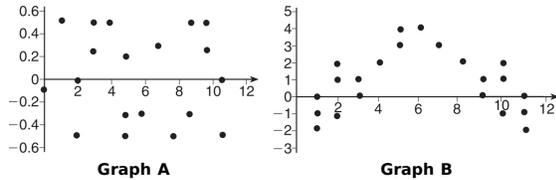
Term 1 Term 2 Term 3 Term 4

If the pattern of blocks continues, which formula(s) could be used to determine the number of blocks in the n th term?

I	II	III
$a_n = n + 4$	$a_1 = 2$ $a_n = a_{n-1} + 4$	$a_n = 4n - 2$

- (1) I and II
- (2) I and III
- (3) II and III
- (4) III, only

27. The residual plots from two different sets of bivariate data are graphed below.



Explain, using evidence from graph A and graph B, which graph indicates that the model for the data is a good fit.

28. The cost of a pack of chewing gum in a vending machine is \$0.75. The cost of a bottle of juice in the same machine is \$1.25. Julia has \$22.00 to spend on chewing gum and bottles of juice for her team and she must buy seven packs of chewing gum. If b represents the number of bottles of juice, which inequality represents the maximum number of bottles she can buy?

- (1) $0.75b + 1.25(7) \geq 22$
 (2) $0.75b + 1.25(7) \leq 22$
 (3) $0.75(7) + 1.25b \geq 22$
 (4) $0.75(7) + 1.25b \leq 22$

29. Which recursively defined function has a first term equal to 10 and a common difference of 4?

- (1) $f(1) = 10$
 $f(x) = f(x - 1) + 4$
 (2) $f(1) = 4$
 $f(x) = f(x - 1) + 10$
 (3) $f(1) = 10$
 $f(x) = 4f(x - 1)$
 (4) $f(1) = 4$
 $f(x) = 10f(x - 1)$

30. The two sets of data below represent the number of runs scored by two different youth baseball teams over the course of a season.

Team A: 4, 8, 5, 12, 3, 9, 5, 2
 Team B: 5, 9, 11, 4, 6, 11, 2, 7

Which set of statements about the mean and standard deviation is true?

- (1) mean A < mean B
 standard deviation A > standard deviation B
 (2) mean A > mean B
 standard deviation A < standard deviation B
 (3) mean A < mean B
 standard deviation A < standard deviation B
 (4) mean A > mean B
 standard deviation A > standard deviation B

31. For which value of P and W is $P + W$ a rational number?

- (1) $P = \frac{1}{\sqrt{3}}$ and $W = \frac{1}{\sqrt{6}}$
 (2) $P = \frac{1}{\sqrt{4}}$ and $W = \frac{1}{\sqrt{9}}$
 (3) $P = \frac{1}{\sqrt{6}}$ and $W = \frac{1}{\sqrt{10}}$
 (4) $P = \frac{1}{\sqrt{25}}$ and $W = \frac{1}{\sqrt{2}}$

32. The volume of a large can of tuna fish can be calculated using the formula $V = \pi r^2 h$.

Write an equation to find the radius, r , in terms of V and h .

Determine the diameter, to the *nearest inch*, of a large can of tuna fish that has a volume of 66 cubic inches and a height of 3.3 inches.

33. Given the following expressions:

- I. $-\frac{5}{8} + \frac{3}{5}$ III. $(\sqrt{5}) \cdot (\sqrt{5})$
 II. $\frac{1}{2} + \sqrt{2}$ IV. $3 \cdot (\sqrt{49})$

Which expression(s) result in an irrational number?

- (1) II, only (2) III, only
 (3) I, III, IV (4) II, III, IV

34. Which recursively defined function represents the sequence 3, 7, 15, 31, ...?

- (1) $f(1) = 3, f(n + 1) = 2^{f(n)} + 3$
 (2) $f(1) = 3, f(n + 1) = 2^{f(n)} - 1$
 (3) $f(1) = 3, f(n + 1) = 2f(n) + 1$
 (4) $f(1) = 3, f(n + 1) = 3f(n) - 2$

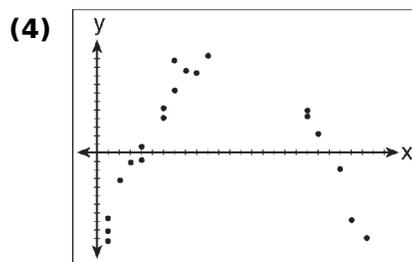
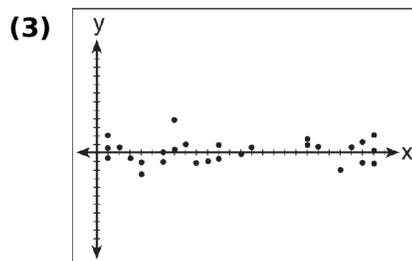
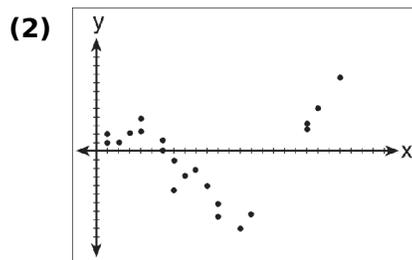
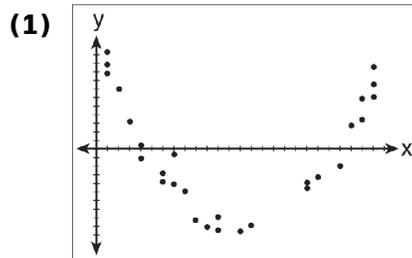
35. The acidity in a swimming pool is considered normal if the average of three pH readings, p , is defined such that $7.0 < p < 7.8$. If the first two readings are 7.2 and 7.6, which value for the third reading will result in an overall rating of normal?

- (1) 6.2 (2) 7.3 (3) 8.6 (4) 8.8

36. Dan took 12.5 seconds to run the 100-meter dash. He calculated the time to be approximately

- (1) 0.2083 minute (2) 750 minutes
 (3) 0.2083 hour (4) 0.52083 hour

37. After performing analyses on a set of data, Jackie examined the scatter plot of the residual values for each analysis. Which scatter plot indicates the best linear fit for the data?



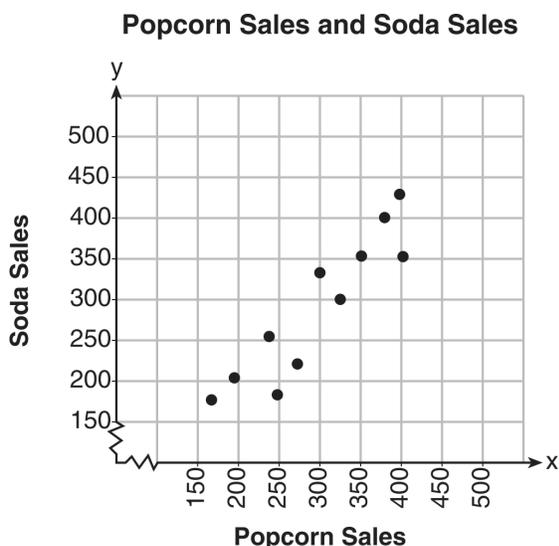
38. Erica, the manager at Stellarbeans, collected data on the daily high temperature and revenue from coffee sales. Data from nine days this past fall are shown in the table below.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9
High Temperature, t	54	50	62	67	70	58	52	46	48
Coffee Sales, $f(t)$	\$2900	\$3080	\$2500	\$2380	\$2200	\$2700	\$3000	\$3620	\$3720

State the linear regression function, $f(t)$, that estimates the day's coffee sales with a high temperature of t . Round all values to the *nearest integer*.

State the correlation coefficient, r , of the data to the *nearest hundredth*. Does r indicate a strong linear relationship between the variables? Explain your reasoning.

39. The scatterplot below compares the number of bags of popcorn and the number of sodas sold at each performance of the circus over one week.



Which conclusion can be drawn from the scatterplot?

- (1) There is a negative correlation between popcorn sales and soda sales.
- (2) There is a positive correlation between popcorn sales and soda sales.
- (3) There is no correlation between popcorn sales and soda sales.
- (4) Buying popcorn causes people to buy soda.

40. In a sequence, the first term is 4 and the common difference is 3. The fifth term of this sequence is

(1) -11 (2) -8 (3) 16 (4) 19

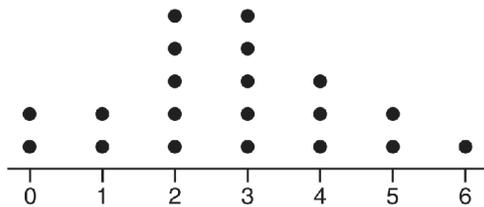
41. A public opinion poll was taken to explore the relationship between age and support for a candidate in an election. The results of the poll are summarized in the table below.

Age	For	Against	No Opinion
21-40	30	12	8
41-60	20	40	15
Over 60	25	35	15

What percent of the 21-40 age group was for the candidate?

(1) 15 (2) 25 (3) 40 (4) 60

42. The dot plot shown below represents the number of pets owned by students in a class.



Which statement about the data is *not* true?

- (1) The median is 3.
 (2) The interquartile range is 2.
 (3) The mean is 3.
 (4) The data contain no outliers.
43. Determine if the product of $3\sqrt{2}$ and $8\sqrt{18}$ is rational or irrational. Explain your answer.
44. An airplane leaves New York City and heads toward Los Angeles. As it climbs, the plane gradually increases its speed until it reaches cruising altitude, at which time it maintains a constant speed for several hours as long as it stays at cruising altitude. After flying for 32 minutes, the plane reaches cruising altitude and has flown 192 miles. After flying for a total of 92 minutes, the plane has flown a total of 762 miles.

Determine the speed of the plane, at cruising altitude, in miles per minute.

Write an equation to represent the number of miles the plane has flown, y , during x minutes at cruising altitude, only.

Assuming that the plane maintains its speed at cruising altitude, determine the total number of miles the plane has flown 2 hours into the flight.

45. Which statistic can *not* be determined from a box plot representing the scores on a math test in Mrs. DeRidder's algebra class?

- (1) the lowest score
 (2) the median score
 (3) the highest score
 (4) the score that occurs most frequently

46. The table below shows 6 students' overall averages and their averages in their math class.

Overall Student Average	92	98	84	80	75	82
Math Class Average	91	95	85	85	75	78

If a linear model is applied to these data, which statement best describes the correlation coefficient?

- (1) It is close to -1 .
 (2) It is close to 1.
 (3) It is close to 0.
 (4) It is close to 0.5.
47. Patricia is trying to compare the average rainfall of New York to that of Arizona. A comparison between these two states for the months of July through September would be best measured in
- (1) feet per hour
 (2) inches per hour
 (3) inches per month
 (4) feet per month

48. Which function defines the sequence $-6, -10, -14, -18, \dots$, where $f(6) = -26$?

(1) $f(x) = -4x - 2$ (2) $f(x) = 4x - 2$

(3) $f(x) = -x + 32$ (4) $f(x) = x - 26$

49. Consider the pattern of squares shown below:



Which type of model, linear or exponential, should be used to determine how many squares are in the n th pattern? Explain your answer.

50. Is the sum of $3\sqrt{2}$ and $4\sqrt{2}$ rational or irrational? Explain your answer.

51. The data table below shows the median diameter of grains of sand and the slope of the beach for 9 naturally occurring ocean beaches.

Median Diameter of Grains of Sand, in Millimeters (x)	0.17	0.19	0.22	0.235	0.235	0.3	0.35	0.42	0.85
Slope of Beach, in Degrees (y)	0.63	0.7	0.82	0.88	1.15	1.5	4.4	7.3	11.3

Write the linear regression equation for this set of data, rounding all values to the *nearest thousandth*.

Using this equation, predict the slope of a beach, to the *nearest tenth of a degree*, on a beach with grains of sand having a median diameter of 0.65 mm.

52. Analysis of data from a statistical study shows a linear relationship in the data with a correlation coefficient of -0.524 . Which statement best summarizes this result?

(1) There is a strong positive correlation between the variables.

(2) There is a strong negative correlation between the variables.

(3) There is a moderate positive correlation between the variables.

(4) There is a moderate negative correlation between the variables.

53. A radio station did a survey to determine what kind of music to play by taking a sample of middle school, high school, and college students. They were asked which of three different types of music they prefer on the radio: hip-hop, alternative, or classic rock. The results are summarized in the table below.

	Hip-Hop	Alternative	Classic Rock
Middle School	28	18	4
High School	22	22	6
College	16	20	14

What percentage of college students prefer classic rock?

(1) 14%

(2) 28%

(3) 33%

(4) 58%

54. In 2014, the cost to mail a letter was 49¢ for up to one ounce. Every additional ounce cost 21¢. Which recursive function could be used to determine the cost of a 3-ounce letter, in cents?

(1) $a_1 = 49; a_n = a_{n-1} + 21$

(2) $a_1 = 0; a_n = 49a_{n-1} + 21$

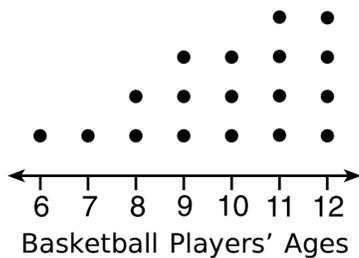
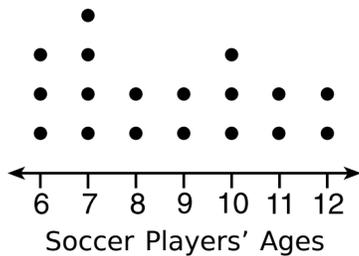
(3) $a_1 = 21; a_n = a_{n-1} + 49$

(4) $a_1 = 0; a_n = 21a_{n-1} + 49$

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

- (1) positive correlation, but not causal
- (2) positive correlation, and causal
- (3) negative correlation, but not causal
- (4) negative correlation, and causal

56. Noah conducted a survey on sports participation. He created the following two dot plots to represent the number of students participating, by age, in soccer and basketball.



Which statement about the given data sets is correct?

- (1) The data for soccer players are skewed right.
- (2) The data for soccer players have less spread than the data for basketball players.
- (3) The data for basketball players have the same median as the data for soccer players.
- (4) The data for basketball players have a greater mean than the data for soccer players.

57. A typical marathon is 26.2 miles. Allan averages 12 kilometers per hour when running in marathons.

Determine how long it would take Allan to complete a marathon, to the *nearest tenth of an hour*. Justify your answer.

58. Jakob is working on his math homework. He decides that the sum of the expression $\frac{1}{3} + \frac{6\sqrt{5}}{7}$ must be rational because it is a fraction. Is Jakob correct? Explain your reasoning.

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Regents Review Session 3 XXXX-XX-XX

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|--|--|
| 1.
Answer: 3 | 19.
Answer: Patrick is correct |
| 2.
Answer: 4 | 20.
Answer: 4 |
| 3.
Answer: 2 | 21.
Answer: 4 |
| 4.
Answer: A correct box plot with Min = 1, $Q_1 = 2$, $Q_2 = 3$, $Q_3 = 4$, Max = 5 is drawn. | 22.
Answer: 2 |
| 5.
Answer: 3 | 23.
Answer: 25 |
| 6.
Answer: A correct plot is drawn, poor fit is stated, and a correct justification is written, such as stating that a pattern is formed. | 24.
Answer: 4 |
| 7.
Answer: 1 | 25.
Answer: 3 |
| 8.
Answer: 2 | 26.
Answer: 3 |
| 9.
Answer: 2 | 27.
Answer: [answers vary] Graph A, explanation |
| 10.
Answer: 234 | 28.
Answer: 4 |
| 11.
Answer: $y = 0.16x + 8.27$; 0.97 | 29.
Answer: 1 |
| 12.
Answer: 3 | 30.
Answer: 1 |
| 13.
Answer: 3 | 31.
Answer: 2 |
| 14.
Answer: 2 | 32.
Answer: $r = \sqrt{\frac{V}{\pi h}}$; 5 |
| 15.
Answer: 0.94 | 33.
Answer: 1 |
| 16.
Answer: $A(n) = 175 - 2.75n$; 63 | 34.
Answer: 3 |
| 17.
Answer: 3 | 35.
Answer: 2 |
| 18.
Answer: 4 | 36.
Answer: 1 |

37.
Answer: 3
38.
Answer: $f(t) = -58t + 6182$; -0.94 , This shows a strong linear relationship because the number is very close -1 .
39.
Answer: 2
40.
Answer: 3
41.
Answer: 4
42.
Answer: 3
43.
Answer: Rational, [explanation]
44.
Answer: 9.5, $y = 9.5x$ and 1028
45.
Answer: 4
46.
Answer: 2
47.
Answer: 3
48.
Answer: 1
49.
Answer: Exponential, [explanation]
50.
Answer: Irrational, [explanation]
51.
Answer: $y = 17.159x - 2.476$; 8.7
52.
Answer: 4
53.
Answer: 2
54.
Answer: 1
55.
Answer: 2
56.
Answer: 4
57.
Answer: 3.5
58.
Answer: No