

Algebra 2 Summer Assignment

The attached packet is to be completed by all students who will be taking IB Algebra 2 during the 2018-19 school year.

In order to receive credit for completion of the packet, you are to show all work for each problem in an organized and legible manner on separate paper. For problems that do not require work to be shown, explain how you got your answer.

Examples:

$$\begin{aligned} (8) \quad & (2x-1)(3x+1) \\ & 6x^2 + 2x - 3x - 1 \\ & 6x^2 - x - 1 \end{aligned}$$

$$\begin{aligned} (50) \quad & (x-3)^2 + 8 = 12 \\ & (x-3)^2 = 4 \\ & \sqrt{(x-3)^2} = \sqrt{4} \\ & x-3 = \pm 2 \\ & x-3 = -2 \quad \text{or} \quad x-3 = 2 \\ & x = 1 \quad \text{or} \quad x = 5 \end{aligned}$$

The internet sites, algebrahelp.com, wolframalpha.com, [cymath](http://cymath.com), and Khan Academy, may be helpful if you are having difficulty in completing the problems.

A basic 4-function calculator may be used on the summer assignment.

The answers to the problems are attached to the back of the packet.

The packet is due the first day of school. You will be tested on the material in this packet within the first two weeks of school.



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- Which measurement is the most precise?

A 5.52 m	C 5.516 m
B 552 cm	D 550 cm
- Solve the inequality $-\frac{3}{4} < \frac{y}{8} + 1\frac{1}{4}$.

A $y < -16$	C $y < 16$
B $y > -16$	D $y > 16$
- Duncan's dog weighs 25.5 pounds. Approximately how many kilograms does the dog weigh?

A 11.6 kg	C 25.5 kg
B 12.8 kg	D 56.1 kg
- For which sequence is the common difference equal to 2?

A $f(n) = 2n - 4$	<input type="radio"/> Yes	<input type="radio"/> No
B $f(n) = 4n - 2$	<input type="radio"/> Yes	<input type="radio"/> No
C $f(n) = \frac{n}{2}$	<input type="radio"/> Yes	<input type="radio"/> No
D $f(n) = 2n$	<input type="radio"/> Yes	<input type="radio"/> No
- Which expression is equivalent to $x^{\frac{2}{7}}$?

A $\sqrt[2]{x^7}$	C $\sqrt[7]{x^2}$
B $\frac{x^2}{x^7}$	D x^{-5}
- What is the range of the relation $\{(-1, 2), (2, 4), (3, -5), (-4, -3)\}$?

A $\{2\}$	C $\{-4, -1, 2, 3\}$
B $\{-5, -3, 2, 4\}$	D $\{-1, 2, 3, -5\}$
- A pole casts a shadow that is 20 feet long. A 6-foot-tall person casts a shadow that is 4 feet long. Can each equation below be used to find the height of the pole?

A $\frac{20}{x} = \frac{4}{6}$	<input type="radio"/> Yes	<input type="radio"/> No
B $\frac{x}{20} = \frac{6}{4}$	<input type="radio"/> Yes	<input type="radio"/> No
C $\frac{4}{20} = \frac{6}{x}$	<input type="radio"/> Yes	<input type="radio"/> No
D $\frac{5}{15} = \frac{x}{6}$	<input type="radio"/> Yes	<input type="radio"/> No
- What is the product of $(2x - 1)$ and $(3x + 1)$?

A $6x^2 - x - 1$	C $6x^2 - x + 1$
B $6x^2 - 5x - 1$	D $6x^2 - 5x + 1$
- Which function situation would have a discrete graph?

A amount of juice in a cup over time
B number of computers sold over time
C area of a garden based on width
D the price of a stock over time
- Franco has x number of quarters, 12 one-dollar bills, and half as many ten-dollar bills as quarters. Which expression represents the amount of money Franco has?

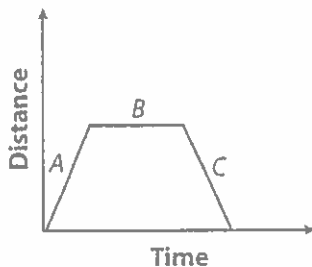
A $20.25x + 12$
B $10.25x + 12$
C $5.25x + 12$
D $0.25x + 10x + 12$

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11. Which is the solution to $9q + 24 = 3(3q - 4)$?

- A $q = -2$
- B $q = 2$
- C no solution
- D q is all real numbers.

12. The graph represents Lea's distance from home over time. What is happening at the part of the graph labeled "B"?



- A Lea is stopped.
- B Lea is walking away from home.
- C Lea is walking toward home.
- D Lea is slowing down.

13. The formula a university uses to charge tuition is $T = \$500h - \275 where h is the number of class hours a student is taking. What is the formula solved for h ?

- A $h = \frac{T + 500}{275}$
- B $h = \frac{T + 275}{500}$
- C $h = \frac{T - 500}{275}$
- D $h = \frac{T - 275}{500}$

14. Which of the following is not a monomial?

- A $-2x^2$
- B 14
- C $\frac{x}{4}$
- D $\frac{5}{x}$

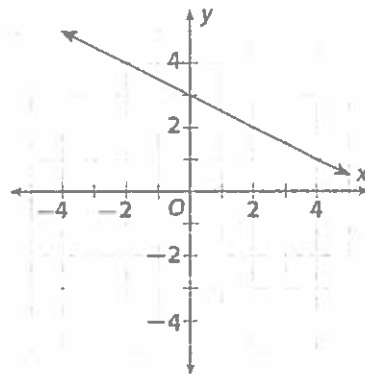
15.

x	-2	-1	0	1
y	-2	3	8	13

Which equation matches the solutions in the table of values above?

- A $y = -4 - x$
- B $4y + 6 = x$
- C $5x = y - 8$
- D $8x + 14 = y$

16. Which equation is graphed below?



- A $y = \frac{1}{2}x + 3$
- B $y = 2x + 3$
- C $y = -\frac{1}{2}x + 3$
- D $y = -2x + 3$

17. What is the fourth term of a sequence with the recursive rule $f(n) = -2f(n - 1)$; $f(1) = -3.5$?

- A -28
- B -2.5
- C 14
- D 28

18. What are the x - and y -intercepts of $7x - \frac{7}{2}y = -49$?

- A x -intercept: -7; y -intercept: -14
- B x -intercept: -7; y -intercept: 14
- C x -intercept: 14; y -intercept: -7
- D x -intercept: 14; y -intercept: 7

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19. A cup contains 75 milliliters of water, from which 3 milliliters of water are poured out every second. Which function shows the amount of water in the cup after t seconds?

A $w(t) = 75 + 3t$

B $w(t) = 75 - 3t$

C $w(t) = 3t - 75$

D $w(t) = \frac{75-t}{3}$

20. What is the slope of a line that contains the points $(-4, -8)$ and $(2, -2)$?

A $-\frac{5}{3}$

C $\frac{5}{3}$

B -1

D 1

21. $f(x) = \frac{1}{3}x + 5$, and $g(x) = \frac{3}{4}x + 5$.

Choose True or False for each statement.

- A $f(x)$ has a steeper slope than $g(x)$.

True False

- B $g(x)$ has a steeper slope than $f(x)$.

True False

- C $f(x)$ has a greater x -intercept than $g(x)$.

True False

- D $g(x)$ has a greater x -intercept than $f(x)$.

True False

22. Which best describes the solutions to $-12x \leq 90$?

A all numbers less than 7.5

B all numbers greater than 7.5

C all numbers less than or equal to 7.5

D all numbers greater than or equal to 7.5

23. Which of the following rules for an arithmetic sequence matches the pay scale represented in the table below?

Hours of Work	1	2	3	4
Pay	\$11	\$20	\$29	\$38

A $f(n) = 9n + 20$

B $f(n) = 9n + 11$

C $f(n) = 9n + 2$

D $f(n) = 9n$

24. What is the domain of $f(x) = \frac{4+x}{12}$?

A all real numbers

C $x < 0$

B $x \geq 0$

D $y \geq 0$

25. Does each linear inequality have the ordered pair $(0, 8)$ as a solution?

A $y < -4x + 32$ Yes No

B $y + 4 \leq \frac{x}{2} + 10$ Yes No

C $y > -2x + 17$ Yes No

D $y + 6 \geq x + 14$ Yes No

26. Which type of correlation best describes the data represented in the table below?

Price of Stock Over Time				
1998	2002	2006	2010	2014
\$21	\$22	\$20	\$17	\$14

A Strong positive

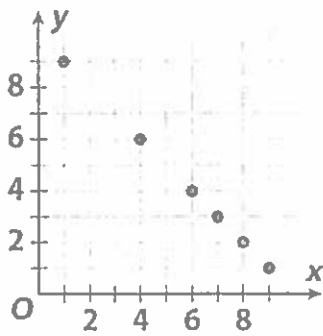
B Negative

C Positive

D None

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27. What is the correlation coefficient based on the scatter plot below?

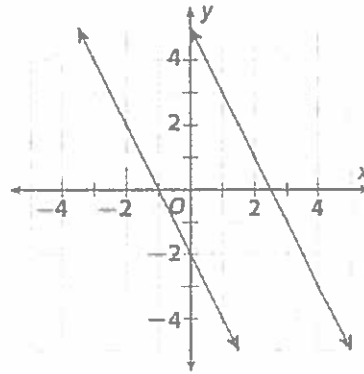


- A -1
B -0.85
C 0
D 1
28. What is the best prediction for the number of runners in 2016?

Year	'12	'13	'14	'15
Number of Runners	61	70	75	82

- A 83
B 89
C 92
D 98
29. The squared residuals of lines of fit **A** and **B** are calculated. Line **A** better fits the data. Which of the following could be true?
- A The sums of the squared residuals of **A** and **B** are both 1.25.
B The sum of the squared residuals of **A** is 1, and the sum of the squared residuals of **B** is 0.25.
C The sum of the squared residuals of **A** is 0.82, and the sum of the squared residuals of **B** is 1.01.
D The sum of the squared residuals of **A** is 4.5, and the sum of the squared residuals of **B** is 2.8.

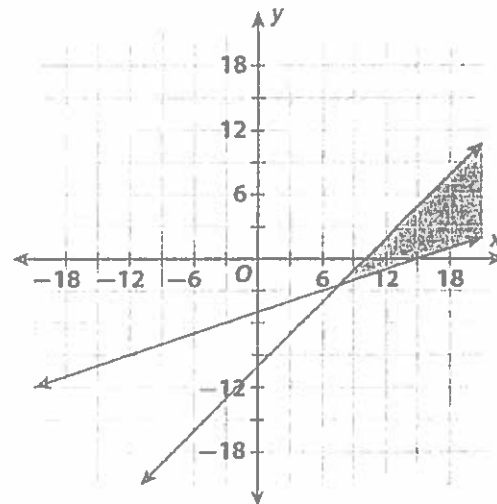
30. How many solutions does the system of equations graphed below have?



- A none
B 1
C 2
D infinitely many
31. Which equation would make this system have an infinite number of solutions?

$$\begin{cases} y = x + 2 \\ \underline{\hspace{2cm}} \end{cases}$$

- A $2y = 2x + 2$
B $y - 2 = x$
C $y = 2x$
D $y = 3x - 1$
32. Which ordered pair is a solution of the system graphed below?



- A (-5, -10)
B (-4, -12)
C (0, -4)
D (12, 0)

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33. Alex is buying drinks and snacks for a party and wants to spend less than \$45. Drinks cost \$2 each, and snacks cost \$4 each. He needs to buy at least 11 drinks and snacks altogether. Which system represents this situation?

A $\begin{cases} 6ds < 45 \\ d + s \geq 11 \end{cases}$ C $\begin{cases} 2d + 4s \leq 45 \\ d + s < 11 \end{cases}$

B $\begin{cases} 2d + 4s < 45 \\ d + s \leq 11 \end{cases}$ D $\begin{cases} 2d + 4s < 45 \\ d + s \geq 11 \end{cases}$

34. A scientist is observing a dish of cells that each split into two every minute. The dish starts with six cells. Which function best represents the number of cells in the dish at time x ?

A $f(x) = 6 \times 2^x$ C $f(x) = 2 \times 6^x$

B $f(x) = 6^x$ D $f(x) = 2^x$

35. The ordered pairs $\left(-3, \frac{1}{2}\right)$ and $(2, 16)$ are solutions to an exponential equation. What is the equation?

A $y = \frac{8^x}{4}$ C $y = 4(2)^x$

B $y = 4^x$ D $y = 32(4)^x$

36. A motorcycle with an initial value of \$14,000 is decreasing in value at a rate of 3% each year. At this rate, approximately what will the value of the motorcycle be in 9 years?

A \$14,000 C \$9800

B \$10,650 D \$550

37. What is the common ratio of the sequence $-8, 12, -18, 27, \dots$?

A $-\frac{3}{2}$ C $\frac{1}{2}$

B $-\frac{1}{2}$ D $\frac{3}{2}$

38. Which regression equation best fits the data shown on the table?

x	0	2	4	6
y	5	2.3	1.3	0.63

A $y \approx 5.2 \times \frac{1}{4}^x$

B $y \approx 5.1 \times 2^x$

C $y \approx 5 \times \frac{3}{2}^x$

D $y \approx 4.8 \times 0.7^x$

39. The regression equation for a set of data is $y = \frac{3^x}{4}$. The observed value of y when $x = 3$ is 6.7. What is the residual?

A -0.05 C 0.05

B -0.5 D 0.5

40. Would each of the following data sets be better described by an exponential model than by a linear or quadratic model?

A $\{(2, 4), (3, 9), (4, 16), (5, 25)\}$

Yes No

B $\{(-2, -1), (-3, 0), (-4, 1), (-5, 0)\}$

Yes No

C $\{(2, 64), (3, 16), (4, 4), (5, 1)\}$

Yes No

41. Is each of the following polynomials a trinomial with a degree of 6?

A $3x^4y^2 - 5x^2$ Yes No

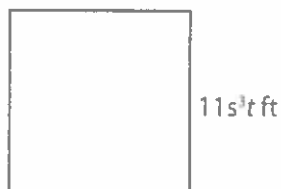
B $-x^6 + 5x^2 - 3$ Yes No

C $10x^3y^2 - 7x - 9y$ Yes No

D $-7xy^5 + 15x - 11$ Yes No

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42. What is the area of the square modeled below?



- A $11s^3t$ ft² C $44s^3t$ ft²
 B $22s^3t$ ft² D $121s^6t^2$ ft²

43. What is the product of $2x - 15$ and $2x + 15$?

- A $2x^2 - 225$
 B $4x^2 - 225$
 C $4x^2 + 225$
 D $4x^2 - 30x + 225$

44. In the expression $2x - 3y + z + 10$, which value is **not** a coefficient?

- A -3 C 1
 B 2 D 10

45. What is the sum of $(-x^2 - 5x - 6)$ and $(2x^2 - 7x + 8)$?

- A $-3x^2 + 2x - 14$
 B $x^2 - 12x + 2$
 C $x^2 + 2x + 2$
 D $3x^2 - 2x + 2$

46. Which is equal to $9x^2 - 60x + 100$?

- A $(3x - 10)(3x + 10)$
 B $(3x - 10)^2$
 C $(3x + 10)^2$
 D $(9x - 10)(x - 10)$

47. Jorge obtained the graph of $g(x) = \sqrt[3]{x-1} + 3$ by transforming the graph of $f(x) = \sqrt[3]{x}$. Which describes the transformation?

- A Shift the graph of $f(x)$ up 3 units and to the left 1 unit.
 B Shift the graph of $f(x)$ up 3 units and to the right 1 unit.
 C Shift the graph of $f(x)$ down 3 units and to the left 1 unit.
 D Shift the graph of $f(x)$ down 3 units and to the right 1 unit.

48. What are the coordinates of the vertex of the graph of $y = -3x^2 - 6$?

- A $(0, -6)$ C $(0, 3)$
 B $(0, -3)$ D $(0, 6)$

49. Does $f(x) = x^2 + 4x$ have a maximum or minimum value, and what is the value?

- A Maximum: -4
 B Minimum: -4
 C Maximum: 0
 D Minimum: 0

50. What are the solutions to $(x - 3)^2 + 8 = 12$?

- A $x = -5$ and $x = -1$
 B $x = -5$ and $x = 1$
 C $x = 5$ and $x = -1$
 D $x = 5$ and $x = 1$

51. The perimeter of a rectangle is 160 feet. The width is 20 feet less than the length. What are the dimensions of the rectangle?

- A 30 feet by 50 feet
 B 20 feet by 60 feet
 C 70 feet by 90 feet
 D 60 feet by 100 feet

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52. Solve $x^2 + 14x = -48$. What are the solutions?

- A $x = -8$ or $x = -6$
- B $x = -4$ or $x = -12$
- C $x = 0$ or $x = -14$
- D $x = 6$ or $x = 8$

53. Based on the discriminant, how many real solutions does $y = -13x^2 - 10x - 2$ have?

- A 3 real solutions
- B 2 real solutions
- C 1 real solution
- D 0 real solutions

54. Which of the following best describes the end behavior of $f(x) = -x^2 + 2x - 8$?

- A As $x \rightarrow \infty$, $f(x) \rightarrow -\infty$;
As $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$
- B As $x \rightarrow \infty$, $f(x) \rightarrow -\infty$;
As $x \rightarrow -\infty$, $f(x) \rightarrow \infty$
- C As $x \rightarrow \infty$, $f(x) \rightarrow \infty$;
As $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$
- D As $x \rightarrow \infty$, $f(x) \rightarrow \infty$;
As $x \rightarrow -\infty$, $f(x) \rightarrow \infty$

55. Do each of these polynomials represent a difference of squares?

- A $25x - 16$ Yes No
- B $25x^2 - 16$ Yes No
- C $25x^2 - 16x$ Yes No
- D $25x^4 - 16x^2$ Yes No

56.

x	6	22	7	9
$f(x)$	9	-5	14	-1

What is the range of the relation shown in the table?

- A {6, 7, 9, 22}
- B {-5, -1, 9, 14}
- C {9}
- D {-5, -1, 6, 7, 9, 14, 22}

57. Which is equivalent to the expression

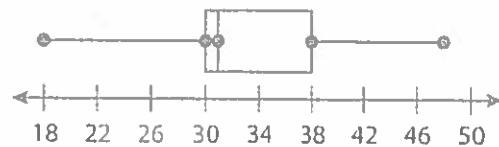
$$8^2 - 27^{\frac{2}{3}}?$$

- A -19 C 1
- B -1 D 55

58. The variables in data set A have a strong negative correlation. Could each of the following values be the correlation coefficient that matches set A?

- A -4.9 Yes No
- B -0.02 Yes No
- C -0.1 Yes No
- D -0.88 Yes No

59.



What is the interquartile range of the data shown above?

- A 8 C 30
- B 18 D 40

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60. Let $f(x) = \begin{cases} 2x + 3, & x \geq 2 \\ -x + 5, & x < 2 \end{cases}$

What is the value of $f(5)$?

- A -3 C 3
B 0 D 13

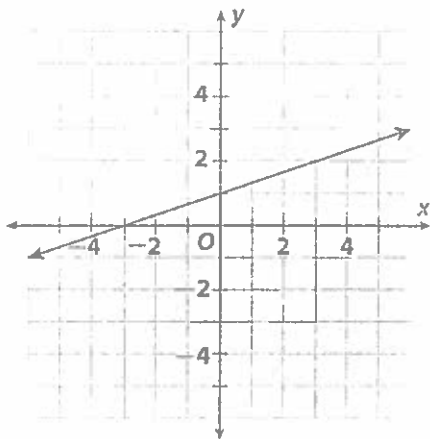
61. Solve $|2x - 1| = 11$. What are the solutions?

- A $x = -5$ only
B $x = -5$ and $x = 6$
C $x = 6$ only
D $x = 5$ and $x = -6$

62. Which is a recursive rule for the arithmetic sequence 22, 15, 8, 1...?

- A $f(1) = 22; f(n) = f(n - 1) - 7$
B $f(1) = 22; f(n) = f(n - 1) + 7$
C $f(1) = 1; f(n) = f(n - 1) + 7$
D $f(1) = 7; f(n) = f(n - 1) - 7$

63. Which inequality is shown on the graph?



- A $y \leq \frac{1}{3}x + 1$ C $y \leq 3x + 1$
B $y \geq \frac{1}{3}x + 1$ D $y \leq x + \frac{1}{3}$

64. What is an equation for a line with a y-intercept of $(0, -1)$ that contains the point $(-4, -18)$?

- A $y = -\frac{17}{4}x - 1$ C $y = \frac{17}{4}x - 1$
B $y = -\frac{17}{4}x + 1$ D $y = \frac{17}{4}x + 1$

65. Monday, Meghan earned \$16 per hour for m hours of work. Tuesday, she earned \$20 per hour for t hours of work. She also received a \$75 bonus. Which expression shows how much Meghan earned in total?

- A $(16 + 20)(m + t) + 75$
B $16t + 20m + 75$
C $16m + 20t + 75$
D $16m(20t)(75)$

66. Which functions have a rate of change **greater than** the function represented in the table?

x	1	2	3	4
$f(x)$	-2	3	8	13

- A $y = \frac{11}{2}x + 5$ Yes No
B $-3x + \frac{1}{2}y = 3$ Yes No
C $\frac{1}{9}y = \frac{2}{3}x$ Yes No
D $y = 4.5x - 10$ Yes No

67. Which is equivalent to $8x^2 + 14x + 5$?

- A $(2x + 1)(4x + 5)$
B $(2x + 5)(4x + 1)$
C $(x + 1)(8x + 5)$
D $(x + 5)(8x + 1)$

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68. A van is traveling at a speed of 1.5 kilometers per minute. Approximately how fast is the van traveling in miles per hour?

69. What is the slope of a line that contains the points $(-4, -8)$ and $(-2, -8)$?

70. The table shows some of the solutions of the equation $y = \frac{-3x}{10}$. What is the missing entry?

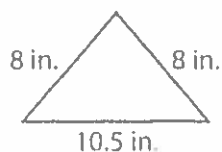
x	0	2	4	6
y	0	$-\frac{3}{5}$?	$-\frac{9}{5}$

71. The functions $h(x) = -x + 1$ and $g(x) = 2x - 5$ are graphed. What is the x -value of the point of intersection of $h(x)$ and $g(x)$?

72. What is $f(x) = -x^2 - 5x$ evaluated for $x = -0.6$?

73. Solve $3(x + 2) + 5(x + 2) = 64$ for x .

74. Find the approximate perimeter of the triangle modeled below in centimeters.



75. What is the x -value of the solution of the system $\begin{cases} 2y = 3x + 4 \\ 3y - 2x = -4 \end{cases}$?

76. $f(x) = \frac{x-1}{4}$. What is the value of $f^{-1}(-10)$?

77. What is the maximum value of the function $y = -2(x - 4)^2 + 11$?

78. The sum of the measures of two angles is 180° . The difference between the angle measures is 70° . What is the measure of the smaller angle?

79. Ben wants to get a 94 in math class. His grade will be the average of two test scores. He scored an 89 on the first test. What grade does Ben need to get on his second test to meet his goal?

80. What is the y -value of the solution of the system $\begin{cases} 6y = 6x - 40 \\ 4y = 12x + 48 \end{cases}$?

81. How many significant digits does the measurement 1020 millimeters have?

82. What is the third term of the sequence defined by the recursive rule $f(1) = 2$; $f(n) = f(n - 1) + 3$?

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83. High temperatures for five days in New York were 70°F, 80°F, 77°F, 66°F, and 59°F. What was the range of temperatures?

84. Jenna opened a bank account with \$1000. She deposits \$40 per week. After how many weeks will Jenna have \$1280 in her bank account?

85. Scores on a chemistry test are normally distributed. The mean score is 80 and the standard deviation is 8. 1,200 students took the test. About how many students scored less than 72?

86. $81^4 = 3^{-y+7}$. What is the value of y ?

87. Bayshore High School has 900 students, and Ocean High School has 1140 students. The number of Bayshore students is increasing at a rate of 20 students per year, while the number of Ocean High students is decreasing by 10 students per year. In about how many years will the two schools have the same number of students?

88.

x	-5	2	3	4
y	1	3	8	13

Raj graphed the line of best fit for the data above. What is the slope of the line?

89. The graph of a quadratic function has a vertex at $(-3, 5)$ and contains the point $(2, -10)$. What is the y -intercept of the graph of the function?

90. Kyle invested a total of \$1500 in two simple interest accounts. Account A earns 3% interest, and Account B earns 5% interest. Kyle earned a total of \$50 interest after 1 year. How much did Kyle invest in Account A?

91. At what x -value does the graph of $f(x) = x^2 - 16x + 64$ touch the x -axis?

92. Use the quadratic formula to solve $0 = 8x^2 + 10x - 2$. What is the positive root, rounded to the nearest hundredth?

93. What is the x -value of the solution to the system $\begin{cases} y = 2x \\ y = \frac{1}{2}x + 6 \end{cases}$?

94. What is the median of the data set $\{-8, 15, 9, -41, 72, 14, 22, 108\}$?

95. A pond has 200 fish, and the population is decreasing by 6% each week. Find the population after 3 weeks.

96. What is the y -value of the vertex of the graph of $y = -3x^2 - 6$?

Answer Key

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- | | |
|-----------------------------------|---------------------------|
| 1. C | 26. B |
| 2. B | 27. A |
| 3. A | 28. B |
| 4. A Yes B No C No D Yes | 29. C |
| 5. C | 30. A |
| 6. B | 31. B |
| 7. A Yes B Yes C Yes D No | 32. C |
| 8. A | 33. D |
| 9. B | 34. A |
| 10. C | 35. C |
| 11. C | 36. B |
| 12. A | 37. A |
| 13. B | 38. D |
| 14. D | 39. A |
| 15. C | 40. A No B No C Yes |
| 16. C | 41. A No B Yes C No D Yes |
| 17. D | 42. D |
| 18. B | 43. B |
| 19. B | 44. D |
| 20. D | 45. B |
| 21. A False B True C False D True | 46. B |
| 22. D | 47. B |
| 23. C | 48. A |
| 24. A | 49. B |
| 25. A Yes B No C No D Yes | 50. D |

51. A	77. 11
52. A	78. 55°
53. D	79. 99
54. A	80. -16
55. A No B Yes C No D Yes	81. 3
56. B	82. 8
57. D	83. 21°F
58. A No B No C No D Yes	84. 7 weeks
59. A	85. 192 students
60. D	86. -9
61. B	87. 8 years
62. A	88. 1.04
63. A	89. -0.4
64. C	90. \$1250
65. C	91. 8
66. A Yes B Yes C Yes D No	92. 0.18
67. A	93. 4
68. ≈ 56	94. 14.5
69. 0	95. 166
70. -1.2	96. -6
71. 2	
72. 2.64	
73. 6	
74. ≈ 67 cm	
75. -4	
76. -39	