Algebra 1: 3.1 & 3.2 Quiz Review   Name _____ Period _____

Choose the term that best completes each sentence.

| Linear Regression | Correlation Coefficient | Line of Best Fit |

1. The line that best approximates the linear relationship between two variables in a data set is the
   ___Line of best fit___.

2. ___Linear regression___ models the relationship between two variables in a data set by producing a line of best fit.

3. ___Correlation coefficient___ indicates how closely data points form a straight line (also known as the r-value).
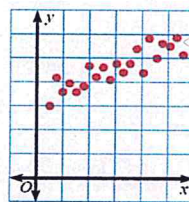
4. For each graph, if the correlation is positive write a "1" beside it. If the correlation is negative, write a "−1" beside the graph. If there is no correlation, write a "0" beside the graph.
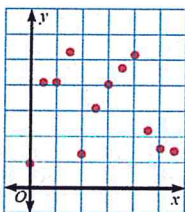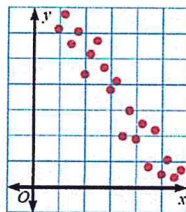
    0   −1   1

5. The table and graph show the attendance for an annual spring concert at Eva's high school for 6 years starting in 2007 with attendance of 789 people.

   A. What is the linear regression equation for concert attendance? Round the slope and y-intercept to a whole number.
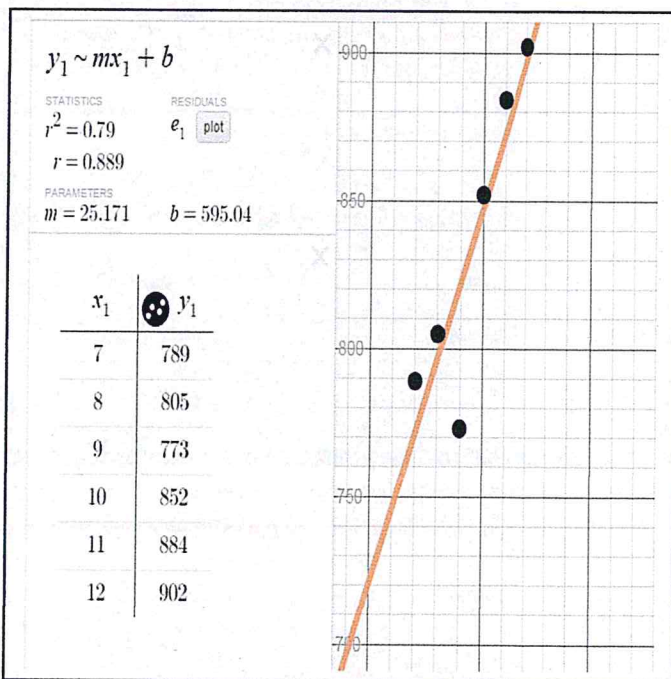
   $$y = 25x + 595$$

   B. What is the correlation coefficient?

   $$r = 0.889$$

   C. What does this r-value tell you about the line of best fit?

   The line of best is a good representation of the data, because the r-value is close to 1.

   $y_1 \sim mx_1 + b$

   STATISTICS   RESIDUALS
   $r^2 = 0.79$ e_1 [plot]
   $r = 0.889$

   PARAMETERS
   $m = 25.171$ $b = 595.04$

x_1	y_1
7	789
8	805
9	773
10	852
11	884
12	902

D. Use the linear regression equation to predict the attendance for 2016. Hint: the table begins at 7 which represents 2007.

$x = 16$ $y = 25(16) + 595$

$y = 995$

2016 attendance = 995

E. Use the linear regression equation to predict what year attendance would be about 1400. Round to a whole number and add 2000 to find the year.

$y = 1400$ $1400 = 25x + 595$ $x \approx 32$

$805 = 25x$ attendance is

$32.5 = x$ 1400 in 2032.

6. The table and graph show the shows monthly record sales of a recording artist over 6 months. The table starts in January for month 1 with record sales of $24,980.

$y_1 \sim mx_1 + b$

STATISTICS
$r^2 = 0.869$

RESIDUALS
e_1 plot

$r = -0.932$

PARAMETERS
$m = -1696.6$ $b = 24857$

x_1	y_1
1	24980
2	20345
3	18204
4	17899
5	16783
6	15302

A. What is the linear regression equation for record sales? Round the slope and y-intercept to a whole number.

$y = -1697x + 24857$
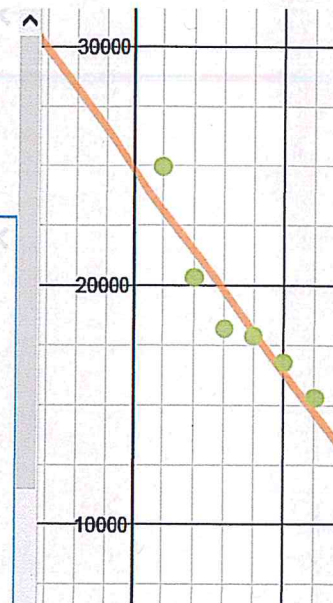
B. What is the correlation coefficient?

$r = -0.932$

C. What does this r-value tell you about the line of best fit? The line of best fit is a good representation of the data because it is close to -1.

D. Use the linear regression equation to predict the record sales for October. Hint: use 10 for October.

$x = 10$

$y = -1697(10) + 24857$

$= \$7887$

record sales for October = $7887

E. Use the linear regression equation to predict what month will have record sales around 10,000.

$y = 10000$

$10000 = -1697x + 24857$

$x \approx 9$

$-14857 = -1697x$

$8.75 = x$

$9 \approx x$

record sales around 10,000 in September

found your answer

7. The Marshall High School Athletic Association sells tickets for the weekly football games. Students pay $5 and adults pay $10 for a ticket.

A. Define your variables and write an expression to represent the situation.

s = # of student tickets
a = # of adult tickets $5s + 10a$

B. How much money would the athletic association collect if 100 students and 50 adults buy tickets to the game?

$s = 100$ and $a = 50$

$5(100) + 10(50)$
$500 + 500$
$\$1000$

C. They want to make $10,000 at Friday night's game. Write an equation to represent the situation.

$5s + 10a = 10000$

D. If 825 students attend, how many adult tickets need to be sold to reach their goal?

$s = 825$ $5(825) + 10a = 10000$
$4125 + 10a = 10000$
$10a = 5875$
$a = 587.5 \approx 588$ adult tickets

E. If 580 adults attend, how many student tickets will need to be sold to reach their goal?

$a = 580$ $5s + 10(580) = 10000$
$5s + 5800 = 10000$
$5s = 4200$
$s = 840$ student tickets

Find the x-intercept and y-intercepts for each equation.

8. $15x + 20y = 300$

$y = 0$
$15x + 20(0) = 300$
$15x = 300$
$x = 20$
$(20, 0)$

$x = 0$
$15(0) + 20y = 300$
$20y = 300$
$y = 15$
$(0, 15)$

9. $3x + 2y = -8$

$y = 0$
$3x + 2(0) = -8$
$3x = -8$
$x = -8/3$
$(-8/3, 0)$

$x = 0$
$3(0) + 2y = -8$
$2y = -8$
$y = -4$
$(0, -4)$

10. $3x - y = -3$

$y = 0$
$3x - 0 = -3$
$3x = -3$
$x = -1$
$(-1, 0)$

$x = 0$
$3(0) - y = -3$
$-y = -3$
$y = 3$
$(0, 3)$

11. $x + 4y = 12$

$y = 0$
$x + 4(0) = 12$
$x = 12$
$(12, 0)$

$x = 0$
$0 + 4y = 12$
$4y = 12$
$y = 3$
$(0, 3)$

Find the x-intercept and y-intercept for each equation. Then, graph each equation.

12. $5x - 4y = 20$
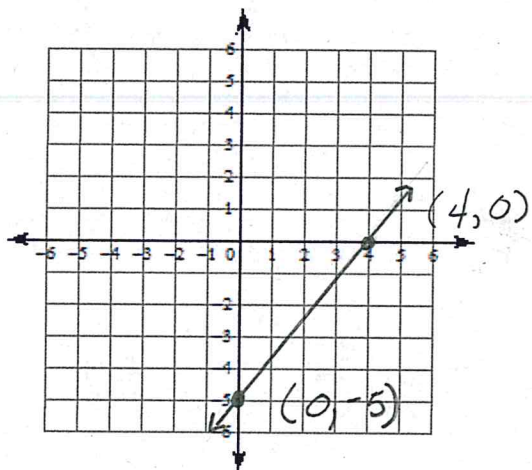
$y = 0$
$5x - 4(0) = 20$
$5x = 20$
$x = 4$
$(4, 0)$

$x = 0$
$5(0) - 4y = 20$
$-4y = 20$
$y = -5$
$(0, -5)$

$(4, 0)$
$(0, -5)$

13. $5x + 4y = 20$
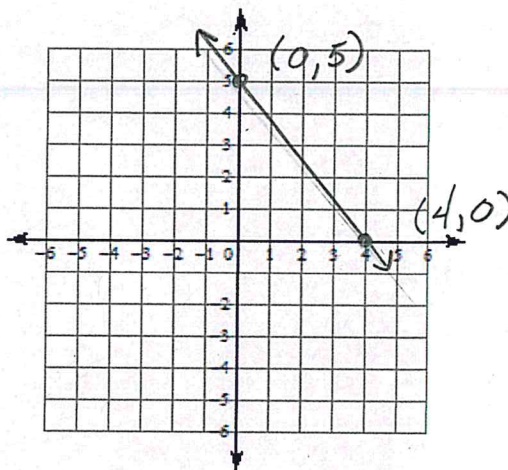
$y = 0$
$5x + 4(0) = 20$
$5x = 20$
$x = 4$
$(4, 0)$

$x = 0$
$5(0) + 4y = 20$
$4y = 20$
$y = 5$
$(0, 5)$

$(0, 5)$
$(4, 0)$

14. $9x + 5y = -25$

$y = 0$
$9x + 5(0) = -25$
$9x = -25$
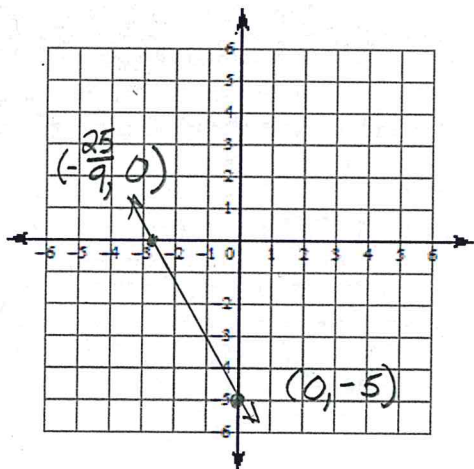$x = \frac{-25}{9}$
$\left(-\frac{25}{9}, 0\right)$

$x = 0$
$9(0) + 5y = -25$
$5y = -25$
$y = -5$
$(0, -5)$

$\left(-\frac{25}{9}, 0\right)$
$(0, -5)$

15. $2x = y - 4$

$y = 0$
$2x = 0 - 4$
$2x = -4$
$x = -2$
$(-2, 0)$

$x = 0$
$2(0) = y - 4$
$0 = y - 4$
$4 = y$
$(0, 4)$

$(0, 4)$
$(-2, 0)$