

# DAY 6 REVIEW WS CALCULATOR & LINEAR REGRESSION REVIEW

Name: \_\_\_\_\_

Date: \_\_\_\_\_ Period: \_\_\_\_\_

The table below shows the high school boy's national record in the 2-mile run.

Year	Athlete	HS Boys 2mile	List1	List2
1965	Mike Ryan	8:57.8	5	537.8
1969	Steve Prefontaine	8:41.5	9	521.5
1973	Craig Virgin	8:40.9	13	520.9
2008	German Fernandez	8:34.23	48	514.23
2011	Lukas Verzbicas	8:29.46	51	509.46

Let  $x = 0$  represent 1960.

- 1.) Define your variables and write down the first ordered pair that you have entered in the calculator. Get this checked!

$x = \# \text{ of yrs after 1960}$      $y = \text{record time in seconds}$      $(5, 537.8)$

- 2.) Write the linear regression model with variables defined. (Round each value to 4 decimal places)

$y = -.3982x + 530.8128$      $a = \text{slope}$      $b = y\text{-int.}$

- 3.) What is the slope and write a sentence describing the slope of the line in terms of the data.

$m = \underline{-.3982}$     Every year, the record time drops by .3982 seconds.

- 4.) Use the linear model to predict the 2-mile record time in the year 2010.

$2010 \rightarrow x = 50$     In 2010 the record will be 8:30.9

$(50, 510.9)$      $\swarrow$  convert back to mins

- 5.) Using the model, predict the year when the record time will be 7 minutes. Round your answer to the nearest whole year.

$7 \text{ mins} = 420 \text{ secs}$      $y = 420$     During the year 2238, the record will be 7 minutes.

$(278.27, 420)$      $\swarrow$  Add to 1960

- 6.) What is the vertical intercept and what does it represent in the real world. Include a quantitative description.

$(0, 530.8138)$     In 1960, the record time was 8 mins, 50.8 sec. (But not according to our data)

- 7.) What is the horizontal-intercept and what does it represent in the real world, if at all applicable.

$(1333, 0)$     In the year 3293, the record will be 0 seconds. No real world meaning. This is impossible!

$\swarrow$  Add to 1960

- 8.) What does the correlation coefficient tell you about the data?

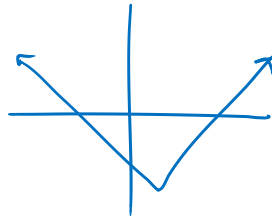
$r = -.83$     relatively strong, negative linear correlation

Graph the following functions in your calculator. SKETCH THE GRAPH. Find an appropriate window to see all relevant information in your graph. Write down the window and find the domain, range, and intercepts of the graph. Find the vertex if applicable.

9.  $y = \frac{1}{2}|x - 64| - 99$

Xmin = -200  
 Xmax = 300  
 Xscl = 1  
 Ymin = -200  
 Ymax = 100  
 Yscl = 1  
 Xres = 1

SKETCH:



D:  $\mathbb{R}$       R:  $y \geq -99$

x-intercept(s): (-134, 0)  
 (262, 0)

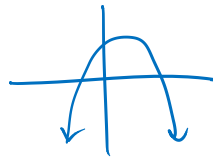
y-intercept: (0, -67)

vertex (if applicable): (64, -99)

10.  $y = -3x^2 + 20x + 111$

Xmin = -20  
 Xmax = 20  
 Xscl = 1  
 Ymin = -200  
 Ymax = 150  
 Yscl = 1  
 Xres = 1

SKETCH:



D:  $\mathbb{R}$       R:  $y \leq 144.3$

x-intercept(s): (-3.602, 0)  
 (10.27, 0)

y-intercept: (0, 111)

11. Find the missing coordinate using the function in #14.

a) (-12, y)

(-12, -561)

b) (x, 21)

(-3.078, 21) (9.745, 21)

vertex (if applicable): (3.33, 143.33)

**ALGEBRA REVIEW QUESTIONS:** Solve the following equations with respect to all real numbers.

12.  $\frac{x-4}{5} = \frac{2}{x-1}$        $(x-4)(x-1) = 10$        $x^2 - 5x + 4 = 10$        $x^2 - 5x - 6 = 0$        $x = 6, -1$   
 $(x-6)(x+1) = 0$

13.  $\frac{-1}{2}|x-9| + 10 = -2$        $-\frac{1}{2}|x-9| = -12$        $|x-9| = 24$        $x-9 = 24$        $x = 33$   
 $x-9 = -24$        $x = -15$

14.  $x(x-1)(3x+5) = 0$        $x = 0, 1, -5/3$

15.  $5x^2 = 45x$        $5x^2 - 45x = 0$        $5x(x-9) = 0$        $x = 0, 9$

16.  $x^2 = 24 - 2x$        $x^2 + 2x - 24 = 0$        $(x+6)(x-4) = 0$        $x = -6, 4$

17.  $3x^2 - 20 = 7x$        $3x^2 - 7x - 20 = 0$        $(3x+5)(x-4) = 0$   
 $3x^2 - 12x + 5x - 20 = 0$   
 $3x(x-4) + 5(x-4) = 0$        $x = -5/3, 4$