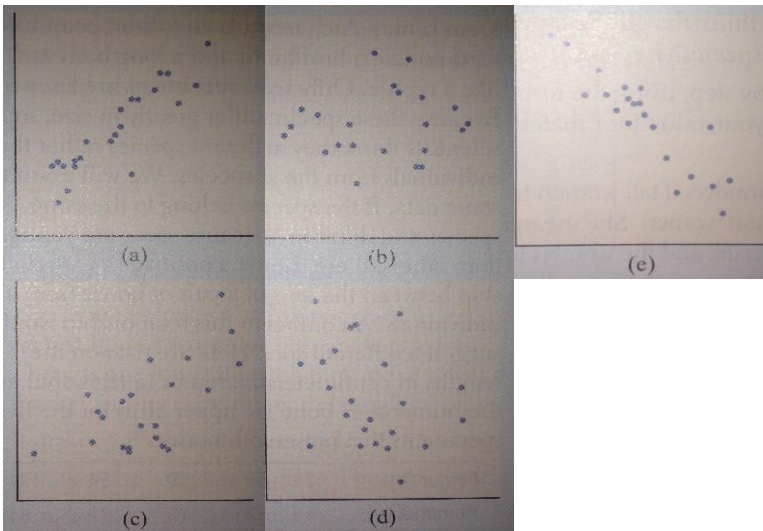


## Section 1.5 Worksheet – Linear Regression Using Technology

MDM4U

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**1)** Match each of the following scatterplots to the  $r$  below that describes it. Then describe the direction and strength of the correlation. (Some  $r$ 's will be left over)



$$r = -0.9 \quad r = -0.7 \quad r = -0.3$$

$$r = 0 \quad r = 0.3 \quad r = 0.7$$

$$r = 0.9$$

**2)** Researchers studying acid rain measured the acidity of precipitation in a Colorado wilderness area for 150 consecutive weeks. Acidity is measured by pH. Lower pH values show higher acidity. The researchers observed a linear pattern over time. They reported that the regression line  $\widehat{pH} = 5.43 - 0.0053(\text{weeks})$  fit the data well.

- Identify the slope of the line and explain what it means in this setting.
- Identify the y-intercept of the line and explain what it means in this setting.
- According to the regression line, what was the pH at the end of this study?

**3)** Market research has provided the following data on the monthly sales of a licensed T-shirt for a popular rock band.

Price (\$)	Number of Shirts Sold
10	2500
12	2200
15	1600
18	1200
20	800
24	250

- Make a scatterplot of the data.
- Find the equation of the regression line and interpret the slope and y-intercept in context.
- Find and interpret correlation coefficient,  $r$ .
- Find the coefficient of determination,  $r^2$ . Interpret it in the context of this data.
- Predict the sales if the shirts are priced at \$19.
- Calculate the residual values, record them and analyze them using the residual plot to help. Is a linear model a good fit?

4) Average home attendance and number of home wins for the 2009 – 2010 NBA Pacific Division teams were as follows:

	Lakers	Suns	Clippers	Warriors	Kings
Home Wins, $x$	34	32	21	18	18
Average Attendance, $y$	18 997	17 648	16 343	18 027	13 254

- Make a scatterplot of the data.
- Find the equation of the regression line and interpret the slope and y-intercept in context.
- Find and interpret correlation coefficient,  $r$ .
- Find the coefficient of determination,  $r^2$ . Interpret it in the context of this data.
- Predict the average attendance for a team with 25 home wins.
- Calculate the residual values, record them and analyze them using the residual plot to help. Is a linear model a good fit?

5) Suppose the drying time of a paint product varies depending on the amount of a certain additive it contains.

Additive (oz), $x$	1	2	3	4	5	6	7	8	9	10
Drying Time (hr), $y$	4	2.1	1.5	1	1.2	1.7	2.5	3.6	4.9	6.1

- Make a scatterplot of the data.
- Find the equation of the regression line and interpret the slope and y-intercept in context.
- Find and interpret correlation coefficient,  $r$ .
- Find the coefficient of determination,  $r^2$ . Interpret it in the context of this data.
- Calculate the residual values, record them and analyze them using the residual plot to help.

6) Sketch the residual plot for the following scatterplot. Explain what it shows about the linear model.

