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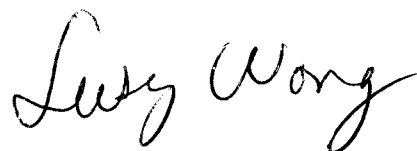
September 21, 2005

To: George Chiu, Jan Allebach, and Edward J. Delp:

Thank you again for your assistance with our project, and the data that you provided. I have included a few student projects, so that you could see what the final product looked like. I am quite pleased with the outcomes, although I have already made changes when we use it next year.

Thanks so much!

Susy Wong

A handwritten signature in cursive script that reads "Susy Wong". The signature is written in black ink and is positioned below the typed name.

Counterfeiting Project for Constitution Day

Name _____

Use as much of the graph below as you can.

Due date: **September 16th**

Date 9-9-05

Period 1

*Period 1: Share of total counterfeit notes passed (%) Period 2: total Plan suppressions

Period 3: Plan suppressions Inkjet Period 4: Total arrests Period 5: Inkjet-related arrests

A) Plot as a scatterplot the years indicated (remember to start at 1, but label also as the year 1995)
Plot the other axis as indicated by your period assignment. (Scatterplot - 3 points, window -2 points)

The window you used: xmin: -1 xmax: 9 x-scl: 1 ymin: -1 ymax: 50 y-scl: 5

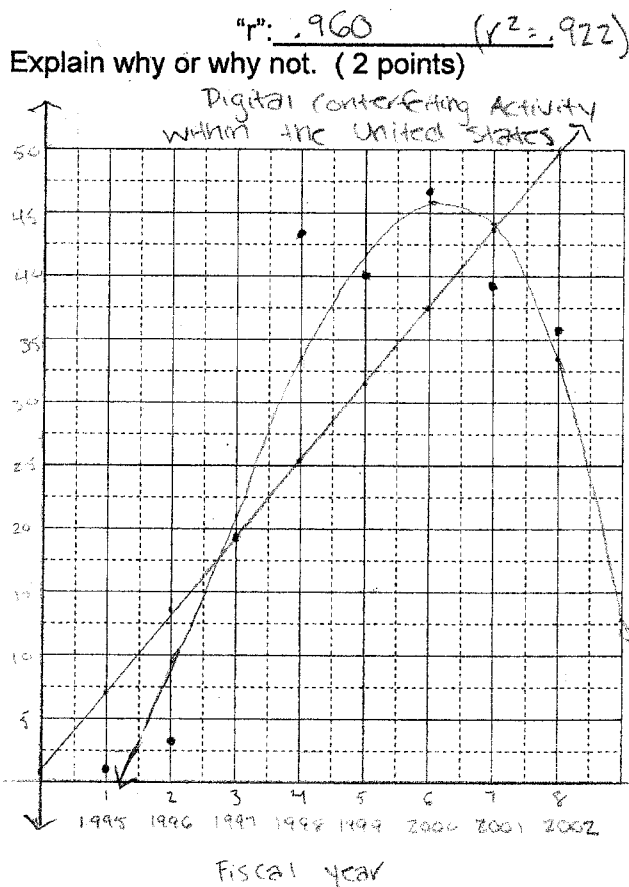
B) Determine the linear regression equation for this data: $6.065x + 1.143$
(Round to nearest thousandths.) Draw in the line for this equation.
(linear regression = 4 points, equation drawn = 2 points) "r" .806

C) Determine another regression equation for this data, one that you believe might have a better "r" value. (Equation = 4 points; drawn = 2 points)

Type: cubic Equation: $5.299x^3 + 2.162x^2 + 7.556x - 12.214$

D) Were you successful in creating a better "r" value? Explain why or why not. (2 points)

I was successful in creating a better "r" value because the share of total counterfeit notes passed had an overall increase until 2000. In 2001, the total began to have an overall decrease which mirrored the curve of the cubic function. The cubic function curved with the points that I plotted and came much closer to the points than the linear equation.



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E) Explain why the writers of the Constitution had valid mathematical or financial reason for instituting this article in the document. (3 points)

The writers had valid reason to put this article in the document because if people were able to print their own money, we would experience inflation, and the value of money would go down. As the graph shows, counterfeiting was continuing to increase in the late 1990s which could create serious problems →

(2)

for the economy. Luckily, technology and financial security has
tightened which has helped decrease the counterfeiting problem.

Counterfeiting Project for Constitution Day

Name _____

Use as much of the graph below as you can.

Date due: **September 16th**

Date Sept 9, 2005

Period 4

Period 1: Share of total counterfeit notes passed (%)

Period 2: total Plan suppressions

Period 3: Plan suppressions Inkjet

Period 4: Total arrests

Period 5: Inkjet-related arrests

A) Plot as a scatterplot the years indicated (remember to start at 1, but label also as the year 1995)

Plot the other axis as indicated by your period assignment. (Scatterplot - 3 points, window -2 points)

The window you used: xmin: -1 xmax: 10 x-scl: 1 ymin: -1 ymax: 5500 y-scl: 550

B) Determine the linear regression equation for this data: $y = 453.333x + 1227.25$

(Round to nearest thousandths.) Draw in the line for this equation.

(linear regression = 4 points, equation drawn = 2 points)

"r" 0.916

C) Determine another regression equation for this data, one that you believe might have a better "r" value. (Equation = 4 points; drawn = 2 points)

Type: Quadratic Equation: $y = -14x^2 + 579.333x + 1017.25$

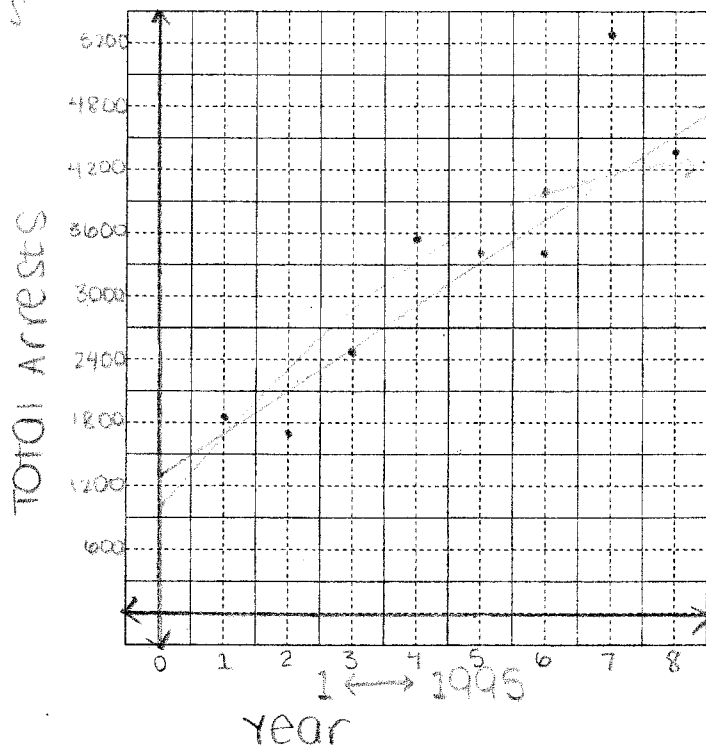
Regression

"r": 0.917

D) Were you successful in creating a better "r" value? Explain why or why not. (2 points)

Yes, the "r" value in the quadratic regression was approximately 0.001 closer to 1 than the linear regression. This was because the graph of the scatter plot was actually more accurately aligned with the quadratic equation than with the linear. Although the difference in "r" values was not great in quantity, its significance still is portrayed through the graph.

Counterfeit Notes



E) Explain why the writers of the Constitution had valid mathematical or financial reason for instituting this article in the document. (3 points)

"Congress can coin money and punish counterfeiters." Had this article not been published in the constitution, it can be seen from the data table that thousands of dollars each year would be manufactured by illegal means. Not only would the value of money decrease with each —>

produced bill, but people engaging in these acts would be indirectly stealing and taking away from American economy. As shown in the data table, since 1995, the number of total arrests for counterfeiting has risen.

Until the year 2001, the numbers had only kept increasing steadily. But after only seven years of enforcing this law, in year 2002, the value of counterfeit money produced steadily began to decrease. Congress was justified in adding this article in the constitution, for without punishment, the rate of illegal activity would only grow exponentially.

Counterfeiting Project for Constitution Day

Name _____

Use as much of the graph below as you can.

Due date: **September 16th** (Friday) Date 9/9/05

Period 3

Period 1: Share of total counterfeit notes passed (%) Period 2: total Plan suppressions

Period 3: Plan suppressions Inkjet Period 4: Total arrests Period 5: Inkjet-related arrests

A) Plot as a scatterplot the years indicated (remember to start at 1, but label also as the year 1995)
Plot the other axis as indicated by your period assignment. (Scatterplot - 3 points, window -2 points)

The window you used: xmin: -1 xmax: 10 x-scl: 1 ymin: -1 ymax: 700 y-scl: 50

B) Determine the linear regression equation for this data: $y = 80.357x + 52.393$

(Round to nearest thousandths.) Draw in the line for this equation.

(linear regression = 4 points, equation drawn = 2 points)

"r": .983

$r^2 = .967$

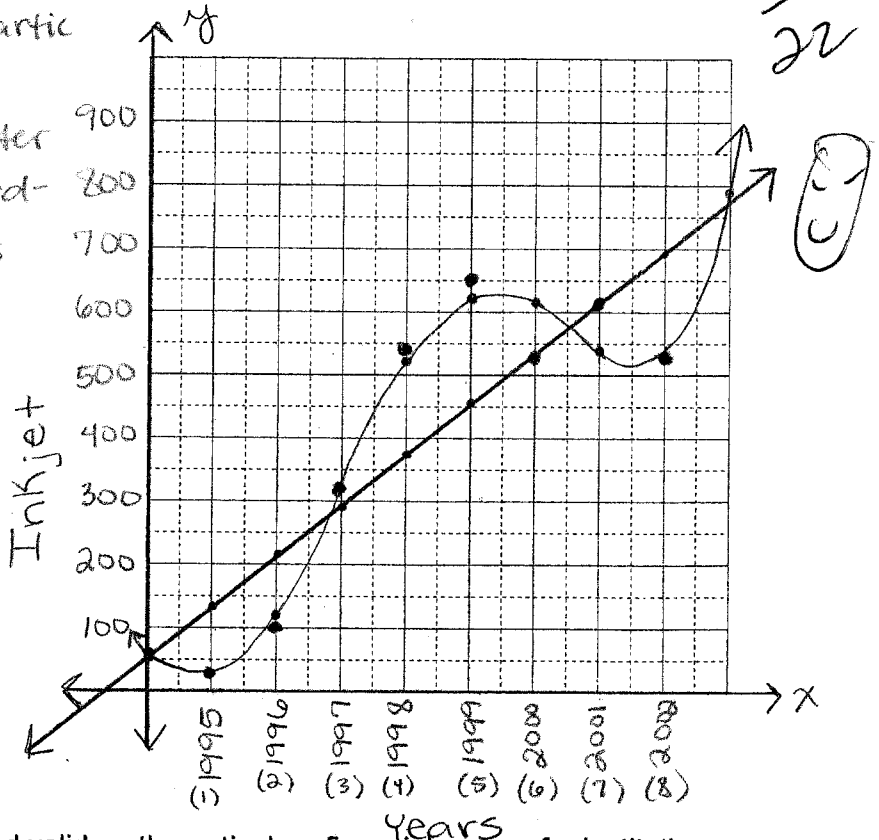
C) Determine another regression equation for this data, one that you believe might have a better "r" value. (Equation = 4 points; drawn = 2 points)

Type: quartic Equation: $y = 2.765x^4 - 51.783x^3 + 304.379x^2 - 502.549x + 270.643$

D) Were you successful in creating a better "r" value? Explain why or why not. (2 points)

"r": .983

Yes, the "r" value in the quartic equation is closer to 1. The quartic equation is a better representation of the coordinates. It is closer and goes through more points than the linear equation.



E) Explain why the writers of the Constitution had valid mathematical or financial reason for instituting this article in the document. (3 points)

The writers had valid reasons because if the paper currency was easily duplicated, then people would produce it and it would become worthless. By having currency very difficult to duplicate, people won't be able to make realistic duplicates. Financially this is beneficial because if it were easily duplicated the government would constantly have to come up with more of currency.



Counterfeiting Project for Constitution Day

Name _____

Use as much of the graph below as you can.

Date due: **September 16th**

Date 9/12/05

Period 5

Period 1: Share of total counterfeit notes passed (%) Period 2: total Plan suppressions

Period 3: Plan suppressions Inkjet Period 4: Total arrests Period 5: Inkjet-related arrests

A) Plot as a scatterplot the years indicated (remember to start at 1, but label also as the year 1995)

Plot the other axis as indicated by your period assignment. (Scatterplot - 3 points, window -2 points)

The window you used: xmin: -1 xmax: 9 x-scl: 1 ymin: -1 ymax: 5000 y-scl: 500

B) Determine the linear regression equation for this data: $y_x = 638.107x - 615.857$

(Round to nearest thousandths.) Draw in the line for this equation.

(linear regression = 4 points, equation drawn = 2 points)

"r" 0.949

C) Determine another regression equation for this data, one that you believe might have a better "r" value.

(Equation = 4 points; drawn = 2 points)

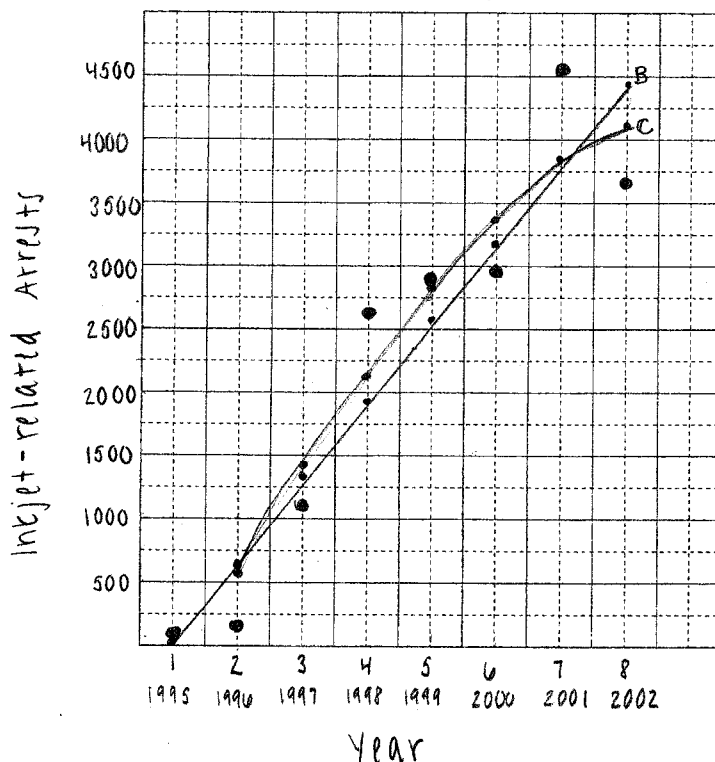
Type: quadratic Equation: $y_x = -50.625x^2 + 1093.732x - 1375.232$

"r": 0.961

D) Were you successful in creating a better "r" value? Explain why or why not. (2 points)

Yes, the "r" value was closer to 1 in part C because the number of inkjet-related arrests increased more quadratically than linearly.

Counterfeiting



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E) Explain why the writers of the Constitution had valid mathematical or financial reason for instituting this article in the document. (3 points) Clauses 5 + 6 in Article 1, Section 8 of the Constitution were instituted so that the currency of the United States would be stable. If individual states, counties, cities, or even people were permitted to produce money, the value of the dollar would be miniscule. It's the law of supply and demand: the rarer something is, the greater its value.

Counterfeiting Project for Constitution Day

Name _____

Use as much of the graph below as you can.

Due date: **September 16th**

Date 9/9-05

Period 2

Period 1: Share of total counterfeit notes passed (%) Period 2: total Plan suppressions

Period 3: Plan suppressions Inkjet Period 4: Total arrests Period 5: Inkjet-related arrests

A) Plot as a scatterplot the years indicated (remember to start at 1, but label also as the year 1995)

Plot the other axis as indicated by your period assignment. (Scatterplot - 3 points, window -2 points)

The window you used: xmin: 0 xmax: 9 x-scl: 1 ymin: 0 ymax: 1000 y-scl: 50

B) Determine the linear regression equation for this data: $y = 65.333x + 185.5$

(Round to nearest thousandths.) Draw in the line for this equation.

(linear regression = 4 points, equation drawn = 2 points)

"r" 0.792

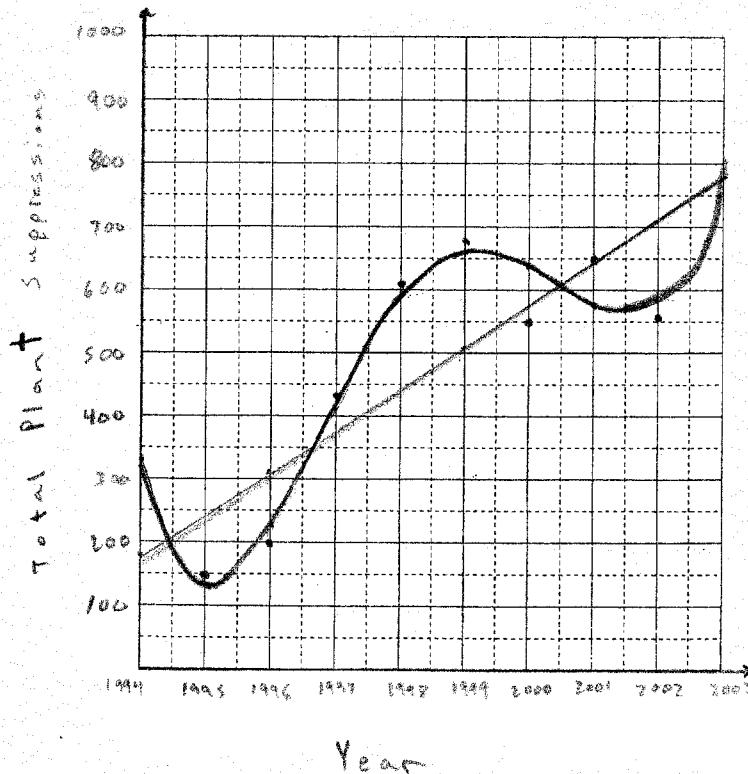
C) Determine another regression equation for this data, one that you believe might have a better "r" value. (Equation = 4 points; drawn = 2 points)

Type: quartic Equation: $y = 2.460x^4 - 45.410x^3 + 261.131x^2 - 412.499x + 335.75$

"r": 0.941

D) Were you successful in creating a better "r" value? Explain why or why not. (2 points)

I was successful in creating a better "r" value. The closer r is to one (1), the better the equation fits the points. For the linear equation the "r" value was 0.792 while for the quartic equation the "r" value was 0.941. 0.941 (quartic equation "r" value) is closer to one (1) than 0.792 (linear equation "r" value). Therefore, the quartic equation fits the points better.



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E) Explain why the writers of the Constitution had valid mathematical or financial reason for instituting this article in the document. (3 points)

The writers of the Constitution wrote this article to be able to coin a standard currency and punish those who try to copy it. Counterfeiters, as we know from this project, will make millions of dollars of fake money. Having this extra money in circulation can create an imbalance in the economy, which hurts honest workers. The punishment of the counterfeiters will deter more people from printing counterfeit bills.