Lab #5- Smoking & Taxes *Franz Helfenstein* Name

The year along with the corresponding average cigarette tax and approximate percentage of adolescents who smoke are shown in the table below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Year** | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 |
| **Tax** | $0.52 | $0.58 | $0.64 | $0.70 | $0.85 | $1.13 |
| **%** **Adolescents** | 28.7% | 26.8% | 24.8% | 23.1% | 19.8% | 14.8% |

1a) Considering Year vs Tax, which should be the independent variable?

1b) Considering Year vs Tax, which should be the dependent variable?

2) Is a linear or a quadratic model most appropriate for the relation between year & tax? Justify your answer.

|  |  |
| --- | --- |
| 3a) Let 2000 correspond with Year = 0.  Plot Tax vs. Year here and with the TI.  Label your axes. |  |

|  |  |
| --- | --- |
| 3b) Run Linear Regression on this data. Enter your result here and in the TI. Plot and compare. | Tax(yr) = 0.112x + 0.46 |

4a) Use your equation to predict the cigarette tax in 2010?

4b) Use your equation to predict when cigarette tax will reach $2.00 per pack?

5a) Consider Cigarette Taxes vs. Teen Smokers. Which should be the independent variable?

5b) Consider Cigarette Taxes vs. Teen Smokers. Which should be the dependent variable?

|  |  |
| --- | --- |
| 6a) Plot % Teen Smokers vs. Tax here and with the TI. Label your axes. |  |

6b) Is a linear or a quadratic equation the best model for this data? Justify your answer.

|  |  |
| --- | --- |
| 7) Run Linear Regression on this data. Enter your result here and in the TI. Plot and compare. | %Teens (Tax) = |

8a) Use your equation to predict the % of teens who will try smoking at $2.00/pack tax.

8b) Use your equation to predict the cigarette tax that will reduce teen smokers to 10%.

9a) Use your equation to predict the cigarette tax that will reduce teen smokers to 0.

9b) Use your equation to predict the % of teens who would smoke if there were no tax.

10) Use your equations to predict the % of teens who will smoke in 2010.

BONUS

Revenues = R = k·(Tax)·(%teens) where k = (avg # of packs smoked)·(total number of teens)

For simplicity, let k = 1. Plot R(tax). From a standpoint of maximizing State tax revenues from smokers, what is the optimum tax on a pack of cigarettes?