QUIZ 4 - SOLUTIONS

Particulate matter air pollution is a growing concern in the US, and 1997, the EPA proposed new standards for fine particles. The EPA established monitors in major metropolitanareas to collect additional information on coarse and fine particles to support health effect studies. Phoenix, The scatter plot and output on the back are based on daily airborne particulate matter measurements (24 hour averages) from a central monitor in Phoenix, AZ, an arid desert dust dominated city in the southwestern US. The variable on the vertical axis is fine particulate matter (particles less than 2.5 microns in diameter). the variable on the horizontal axis is coarse particulate matter, which consists of particles between 2.5 and 10 microns in diameter. Both variables are measured in $\mu g/M^3$ (micro grams/cubic meter).

1. What is the correlation between Coarse and Fine particulate matter levels?

   This is the square root of R2, 0.63.

2. What is the physical meaning of the intercept in this problem?

   When there are 0 Coarse particles, we expect 3.59 $\mu g/m^3$ fine particles.

3. What is the physical meaning of the slope in this problem?

   For every 1 $\mu g/m^3$ increase in coarse particles, we expect on average a .30203 $\mu g/m^3$ increase in fine particle levels.

4. What is the predicted level of Fine particulate matter on a day with coarse particulate matter levels of 150 $\mu g/m^3$?

   $3.59762 + 0.30203 * 150 = 48.90 \mu g/m^3$

5. Which of the 7 reasons for relationships between two variables seems the most likely for the relationship between Fine and Coarse Particles?

   That a third variable causes both, i.e. a common source that produces both fine and coarse particles, dust, smoke, exhaust. Also because the measureents vary over time, seasonal factors moderate both levels together.