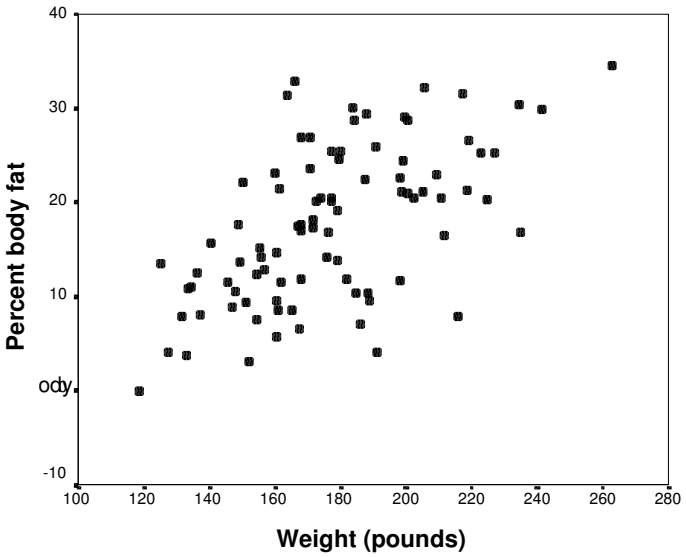
Homework 5 Bios 600-001

Use the following scenario to answer questions 1–6:
The following scatterplot and SPSS output represent data collected on 89 middle-aged people. The relationship between body weight and percent body fat is to be studied:



Descriptive Statistics

	N	Mean	Variance
% body fat	89	17.6371	67.296
Weight in pounds	89	177.0354	844.522

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.5844	.3416	.3340	6.6946

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2022.828	1	2022.828	45.134	.000
	Residual	3899.180	87	44.818		
	Total	5922.008	88			

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-11.570	4.405		-2.627	.0102
	Weight in pounds	.165	.025	.584	6.718	.0000

1. What is the equation of the least squares regression line?

2. What is the value of the correlation between body fat and body weight?

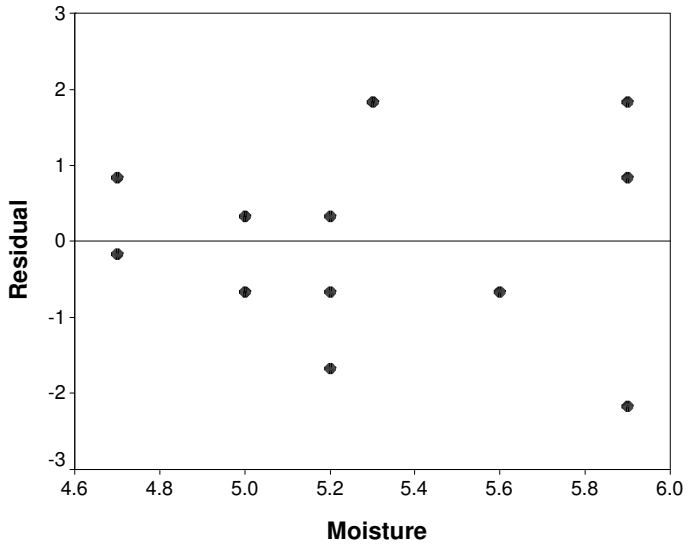
3. Let ρ be the population correlation between body fat and body weight. What is the value of the t statistic for testing the hypotheses H_0: $\rho = 0$ versus H_a: $\rho \neq 0$?

4. Is the slope significantly different from zero? Include the value of the test statistic and the corresponding P-value in your answer with a conclusion in language the investigator can understand.

5. What is the value of the estimate for σ, the standard deviation of the deviations ε_i?

6. What is an (approximate) 95% confidence interval for the average percent body fat for middle-aged people who weigh 180 lbs?

The residuals from this regression analysis are plotted versus the explanatory variable. The graph is provided below:



7. Which of the following interpretations of this residual plot is correct?

A) The fit is not good, because there is no linear relationship shown in this plot.

B) The fit is good, because the residuals form a pattern around the *x*-axis.

C) The fit is good, because the residuals indicate a departure from the linear regression line.

D) The fit is good, because no clear pattern is evident.