1. A study of nutrition in developing countries collected data from the Egytian village of Nahya. Here are the mean weights (in kilograms) for 170 infants in Nahya who were weighed each month during the first year of life (n=12 months). A part of the Minitab ouput is below. **Find the 95% confidence interval for the slope.**

Predictor	Coef	SE Coef	T	P
Constant	4.8803	0.2895	16.86	0.000
Age	0.26713	0.03933	6.79	0.000

a) (4.31, 5.45)
b) (4.24, 5.53)
c) (-1.65, 2.27)
d) (0.1795, 0.355)

2. The Leaning Tower of Pisa is an architectural wonder. The tower started to lean during constuction, which started in the year 1176 and continued for about 200 years. Engineers concerned about the tower's stability have done extensive studies of its increasing tilt. Measurements of the lean of the tower represent the difference between where a point on the tower would be if the tower were straight and where it actually is. The data are coded as tenths of a millimeter in excess of 2.9 meters, so a value of 642 on the graph corresponds to a lean of 2.9642 meters. The measurements in this study were taken from 1975 to 1987 (n=13 years), and only the last two digits of the year were entered into the computer. **Find the 99% confidence interval for the slope.**

Predictor	Coef	SE Coef	T	P
Constant	-61.12	25.13	-2.43	0.033
year	9.3187	0.3099	30.07	0.000

a) (-139.17, 16.93)
b) (-110.37, -11.87)
c) (8.36, 10.28)
d) (8.71, 9.93)

3. We want to predict people's height based on the length of their forearm (both measured in inches). We have data on 50 students that give the following summary statistics. Compute the intercept of the Least Squares Regression Line.

	mean	stdev	correlation
height	68.236	3.510	0.719
forearm	10.192	0.796	

a) 35.9
b) 3.17
c) - 0.93
d) 0.163

4. The SAT and ACT are the two major standardized test that colleges in the US use to evaluate candidates. Most students take just one of these tests. Can we predict how a student would perform in the ACT from their SAT performance? We used data on 60 students that took both exams to find the regression equaion: ACT = 1.626 + .02137 SAT. One student made a 24 on the ACT and a 1000 on the SAT. What is the residual?

a) 1.004

b) 22.996

c) 24

d) 976

e) -1.004

5. Archaeopteryx is an extinct beast having feathers like a bird but teeth and a long boney tail like a reptile. Only 6 fossil specimens exist. A least squares regression equation was made to predict the femur lengths based on the length of the humerus(in cm). The regression equation is: femur = 3.701 + .8257humerus

Interpret the y-intercept.

a) The femur is 3.701cm when the humerus is 0cm long.

b) The humerus is 3.7071cm long, when the femur is 0cm long.

c) You can't interpret the y-intercept here because there are no humerus bones that are close to 0cm long.

d) You can't interpret the y-intercept here because there are no femur bones that are close to 0cm long.

6. Same story - Interpret the slope.

a) For every one cm increase in humerus length, the femur is 0.8257cm longer on average.

b) For every one cm increase in femur length, the humerus is 0.8257cm longer on average.

c) For every one cm increase in humerus length, the femur is 3.701cm longer on average.

d) For every one cm increase in femur length, the humerus is 3.701cm longer on average.

7. A study found that, as temperature increases, the number of pieces of clothing worn by people decreases, and computed an R-squared value for the regression of 83%. What is the correlation between the two variables?

a) .83

b) .91

c) 91

d) -.91

e) -83

Questions 8 – 10 You want to test the following hypotheses: Ho: $\beta=0$ vs Ha: $\beta\neq0$ in SLR

8. Find the p-value if the test statistic is t=1.55 and n=25.
a) p-value is between .10 and .20
b) p-value is between .05 and .10
c) p-value is between 0.005 and 0.001
d) p-value is less than 0.001

9. Find the p-value if the test statistic is t=3.56 and n=20.
a) p-value is between .005 and .010
b) p-value is between .002 and .010
c) p-value is between .001 and .005
d) p-value is between .01 and 0.025

10. Find the p-value if the test statistic is t=2.46 and n=15.
a) p-value is between 0.05 and 0.10
b) p-value is between 0.01 and 0.025.
c) p-value is between 0.01 and 0.02
d) p-value is between 0.02 and 0.05

11. To test if x is a good predictor of y in Simple Linear Regression we need to determine whether:
a) the slope is significantly different from zero.
b) the intercept is significantly different from zero.
c) the response variable is significantly different from zero.
d) the predictor variable is significantly different from zero.
e) the error term is significantly different from zero.
f) the F test statistic is significantly different from zero.

12. What do the following equations represent?

_____ $y = \alpha + \beta x + \varepsilon$	a) It is the Least Squares Regression Equation.
_____ y-hat $= \alpha + \beta x$	b) It is the Simple Linear Regression Model.
_____ y-hat $= a + bx$	c) It's nonsense
_____ $\varepsilon \sim$ iid N(0, σ)	d) It states the assumptions for the linear relationship between x and y.

Questions 13 – 20 A doctor was interested in determining how the amount of drug consumed by a patient affected the patient's reaction time. Below is the Minitab output. Match the following terms with their values in the output.

The regression equation is Reaction Time = - 0.100 + 0.700 Amount of Drug

Predictor	Coef	SE Coef	T	p
Constant	-0.100	0.6351	-0.16	0.885
Amount of Drug	0.700	0.1915	3.66	0.035

s = 0.605530	R-sq = 81.7%	R-sq(adj) = 75.6%

Analysis of Variance

Source	DF	SS	MS	F	p
Regression	1	4.9	4.9	13.36	0.035
Residual Error	3	1.1	0.3667		
Total	4	6.0			

Predicted New Values for New Observations

New Obs.	Fit	SE Fit	95% CI	95% PI
1	1.3	0.332	(0.245, 2.355)	(-0.897, 3.497)

New OBS	Amount of Drug
1	2.00

13. Standard Error of b

14. The **t** Test Statistic for Ho: β=0 vs Ha: β≠0

15. P-value for the F test

16. F test Statistic

17. PI when x* = 2

18. CI when x*=2

19. percent of variation of reaction time that is explained by the drug

20. estimate of the standard deviation of the points around the line

Answers:
1. D
2. C
3. ~~D~~ should be A
4. A
5. C
6. A
7. D
8. A
9. B
10. D
11. A
12. B C, A, D
13. 0.1915
14. 3.66
15. 0.035
16. 13.36
17. (-0.897, 3.497)
18. (0.245, 2.355)
19. 81.7
20. 0.605530