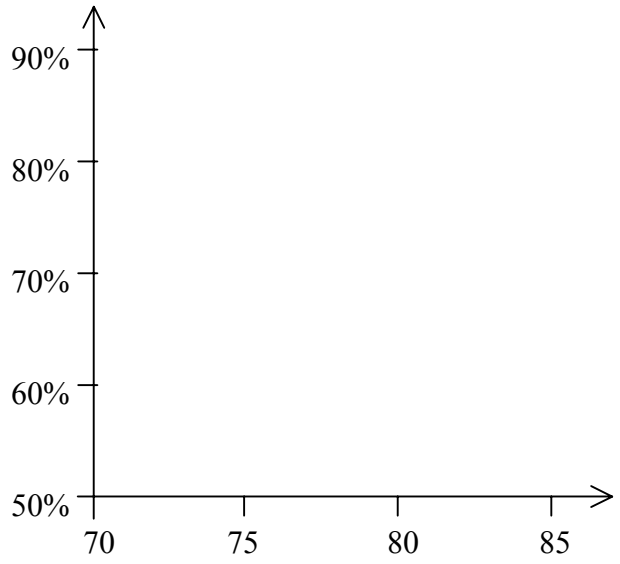
MATH 140 **PRACTICE PROBLEMS FOR TEST #2**

1. The table below gives the heights in inches and free throw percentages of each member of the 2003-2004 Los Angeles Lakers:

Player	Ht.	FT%
bryant,kobe	79	85%
cook,brian	81	75%
fisher,derek	73	80%
fox,rick	79	83%
george,devean	80	77%
grant,horace	82	72%
malone,karl	82	74%
medvedenko,stan	82	75%
o'neal,shaquille	85	50%
payton,gary	76	68%
rush,kareem	78	58%
russell,bryon	79	78%
sampson,jamal	83	58%
walton,luke	80	71%

(a) Make a scatterplot of the data below:



(b) Use the plot to circle below the most likely value of the correlation coefficient r:

$-.85$ $-.50$ $-.10$ $.10$ $.50$ $.85$

(c) Circle a point that is an outlier in each variable and identify the player that point represents.

(d) The least squares line for predicting FT% from Ht. is $FT\% = 194 - 1.52 \times Ht$. If the free throw percentage of the player you found in (b) were changed to the team average, the l.s. line would become $FT\% = 120 - 0.59 \times Ht$. Based on these facts, what is the point called?

2. A glue manufacturer wanted to determine the optimal amount of the chemical toluene to add to a new type of glue. Several samples were tested using different levels of toluene, and the holding strength of the glue was measured in each case. The correlation between holding strength and amount of toluene turned out to be close to zero. Can you conclude that there is no significant relationship between holding strength and amount of toluene? Give a one-sentence explanation of your answer.

3. A linear regression that predicts blood pressure (y) from body mass index (x) (this measures the extent to which a person may be overweight) resulted in an r^2 value of 38%. Write a sentence that states exactly what this r^2 value tells us about the relationship between blood pressure and body mass index.

4. Various studies have shown a positive association between the amount of coffee consumed in different countries and the incidence of heart disease in those countries. Does this show that drinking coffee tends to increase the risk of heart disease? Answer in one to two sentences.

5. The New York State Board of Health plans to compare smoking rates in large and small urban areas. A simple random sample of 500 residents is taken from various cities and towns within the state. The accuracy of the results is primarily dependent upon the sampling variability. How will the sampling variability in New York City, which has a population of approximately eight million people, compare to that of Middletown, where only 23,000 people reside?

6. The table below gives statistics for the GPA's of students at a certain college and the number of hours per week spent studying:

	GPA	**Study Hrs.**
Mean:	2.50	16.5
S.D.:	.70	5.5
Correlation:	0.80	

(a) Use either the formula $\hat{y} = \bar{y} + r\left(\frac{s_y}{s_x}\right)(x - \bar{x})$ or the equation $\hat{y}=a+bx$, where $b = r\left(\frac{s_y}{s_x}\right)$ and $a = \bar{y} - b\bar{x}$, to find the regression line that predicts GPA from study hours.

(b) Predict the GPA of a student who studies 5 hours per week.

(c) Leslie studies 5 hours per week and has a GPA of 1.80. Find Leslie's residual and explain clearly what it tells us.

Multiple Choice: For each problem below, circle all correct answers:

7. The correlation coefficient provides:

a. a measure of the extent to which changes in one variable cause changes in another variable.

b. a measure of the strength of the linear association between two categorical variables.

c. a measure of the strength of the association (not necessarily linear) between two categorical variables.

d. a measure of the strength of the linear association between two quantitative variables.

e. a measure of the strength of the linear association between a quantitative variable and a categorical variable.

8. If the correlation between body weight and annual income were high and positive, we could conclude that:

a. high incomes cause people to eat more food.

b. low incomes cause people to eat less food.

c. heavy individuals tend to have higher incomes than lighter people.

d. high income people tend to be heavier than low income people, on average.

e. high incomes cause people to gain weight.

9. A study conducted as part of a student project found a correlation of $r = -0.61$ between the sex of a worker and his or her income. We can conclude that:

a. women earn more than men on average.

b. women earn less than men on average.

c. an arithmetic mistake was made; this is not a possible value of r.

d. this is nonsense because r makes no sense here.

e. the correlation of -0.61 is not meaningful here because the relationship between sex and income is likely nonlinear.

10. A telecommunications firm wants to estimate the proportion p of a town's residents that own cell phones. A simple random sample of 200 of the town's 3120 inhabitants is taken. Fifty-six of those surveyed own a cell phone.

(a) Explain in words what the parameter and statistic are here:

Parameter:

Statistic:

11. The duration of human pregnancies is approximately normal with mean $\mu = 270$ days and standard deviation $\sigma = 15$ days.

(a) Determine the fraction of pregnancies that last less than 250 days.

(b) How long must a pregnancy last in order to be among the longest 5% of all pregnancies?