

Math 142

Part One Exam

June 7, 2015

Figure 1 is a scatter plot of midterm vs. final exam test scores for a class.

Questions 1-3 refer to Figure 1.

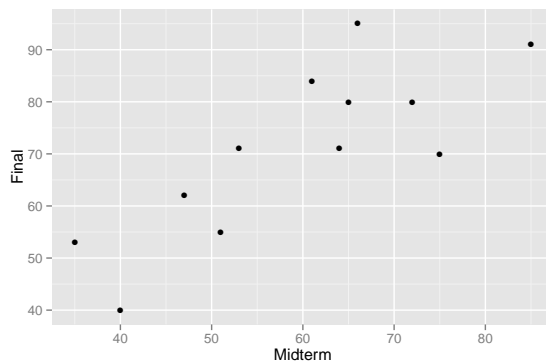


Figure 1: Questions 1-3

1. (3 points) Estimate the mean score on the final for people who scored more than 60 on the midterm:
 - (a) about 70
 - (b) about 80
 - (c) about 90
2. (3 points) Estimate the correlation coefficient:
 - (a) about 0.5
 - (b) about 0.8
 - (c) about 0.99
3. (a) (8 points) Draw box plots for the midterm and final
(b) (2 points) Compared to the midterm, was the final exam
 - (a) harder
 - (b) easier
 - (c) about the same difficulty

4. Here are the average points per game for some NBA starting players:

Player	Points	Player	Points
Trey Burke	12.3	LeBron James	27.2
Kentavious Caldwell-Pope	6.0	Michael Kidd-Gilchrist	7.4
Tyson Chandler	9.3	Robin Lopez	10.8
Glen Davis	12.1	Kevin Martin	19.2
Jared Dudley	7.3	Ben McLemore	7.6
Kevin Durant	31.8	Chandler Parsons	16.6
Raymond Felton	10.0	Kendrick Perkins	3.4
Randy Foye	12.6	Zach Randolph	17.1
Marc Gasol	13.7	Terrence Ross	10.7
Paul George	22.2	Jared Sullinger	12.9
Spencer Hawes	13.0	P.J. Tucker	9.3
Dwight Howard	18.9	Evan Turner	16.6

Table 1: Points per game

- (a) (10 points) Draw a histogram with a bin width of 5 points for these players.
- (b) (2 points) Is the distribution symmetrical, left-skewed, or right-skewed?
- (c) (3 points) Is the mean larger or smaller than the median? Explain how you can know the answer without calculating the actual values.
- (d) (3 points) Is the median or mean a better measure of the center of this distribution? Why?
5. There is heated debate this year about whether Kevin Durant or LeBron James should be the MVP. Here is a representative selection of the number of points they scored in selected games this season:
- Durant { 13, 17, 19, 24, 26, 28, 29, 31, 32, 32, 32, 37, 41, 42, 42 }
- James { 13, 15, 17, 19, 25, 25, 25, 26, 29, 30, 32, 33, 35, 36, 36 }
- (a) (8 points) Find the 5-number summary for both players
- (b) (6 points) Draw a box plot for both players
- (c) (3 points) Which player seems to be the MVP, based solely on points scored in these games?
6. Three point shooting accuracy in 2013 is a roughly Normal distribution with a mean of 0.36 and a standard deviation of 0.05.
- (a) (5 points) Carmelo Anthony's three point shooting accuracy is 0.42 this year. What is the z-score for this value?
- (b) (5 points) What percentage of the three point shooters in the NBA are less accurate than Melo?
- (c) (5 points) What is the three point shooting accuracy for someone who is better than 20% of the three point shooters?

Table 2 shows the shots made and missed by position for NBA players in the 2013–14 season.

Use Table 2 to answer questions 7-9.

position	made	missed
Center	11372	11105
Power Forward	17601	18972
Small Forward	15087	20791
Shooting Guard	15090	19583
Point Guard	15617	20721

Table 2: Shots by position

7. (5 points) Make a bar plot showing shots made for each position. Order the bars by number of shots made, with the most productive position first.
8. (5 points) Fill in the table showing the marginal distributions of shots taken by position, shots missed, shots made, and total number of shots taken.

position	made	missed	total
Center	11372	11105	
Power Forward	17601	18972	
Small Forward	15087	20791	
Shooting Guard	15090	19583	
Point Guard	15617	20721	
total			

Table 3: Marginal distributions

9. (a) (5 points) Make a table showing the conditional distributions of percentage of shots made and missed for each position.
- (b) (2 points) Which position seems to contain the most accurate shooters? Is this is because they are the best shooters or is there a lurking variable that explains the shooting percentage differences?

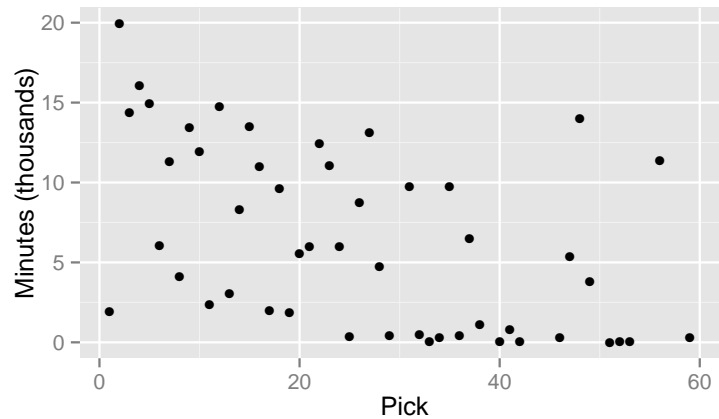


Figure 5: 2008 NBA draft order vs. minutes played

	mean	s
Pick	30.5	17.5
Minutes (thousands)	5219	5698

Table 5: 2008 NBA Draft

10. Figure 5 shows the total number of minutes played vs. draft order for the 2008 draft. The better players are generally drafted first and also usually play more, so there is a negative correlation of $r = -0.6020$ between draft order and minutes played.

The first two selections in the 2008 draft were Greg Oden (bottom left corner) and Kevin Durant (top left corner). As you can see in the chart, Greg Oden has had an injury plagued career and has only played 1940 minutes while Kevin Durant has had a successful and so far mostly injury free career and has played nearly 20,000 minutes

Many of the players after pick 30 never played in the NBA at all. Any of them that were underclassmen declaring for the draft early should have stayed in school.

- (7 points) Find the equation for the regression line using the draft pick as the explanatory variable and minutes played as the response variable.
- (5 points) Graph the regression line.
- (2 points) What percentage of the variation in the minutes played is accounted for by the linear regression line?
- (3 points) Mark Gasol and Ramon Sessions (top right corner) are outliers because they were late round draft picks (pick 48 and 56) who have had a successful NBA careers with over 11,000 minutes each so far.

Would removing these data points from the graph have a significant effect on the regression line? Why or why not?