

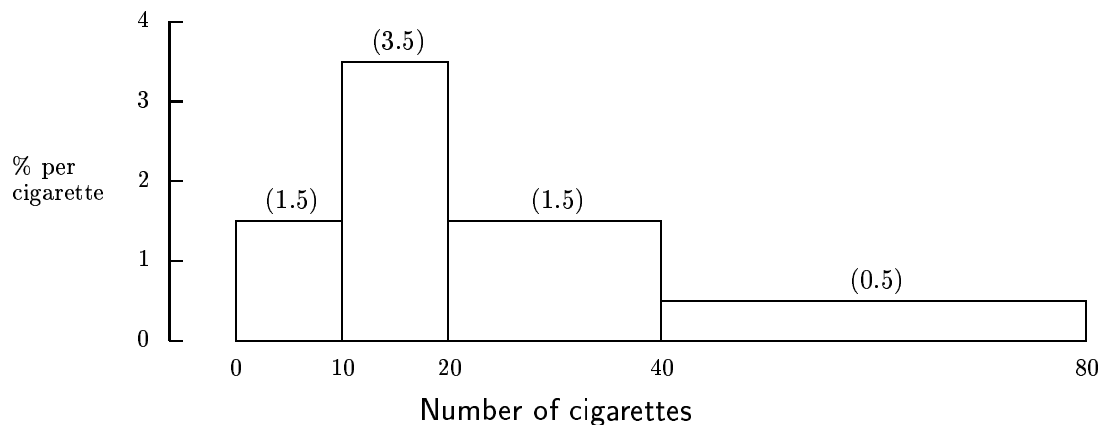
Sample Final Examination

Math 125, Exam Date: May 18, 2012

To get full credit on the final examination you **must show your work**. No work, no credit.

Each question is worth about 9 points.

1. In a Public Health Survey, a histogram was plotted showing the number of cigarettes per day smoked by each subject (current male smokers), as shown below. The density is marked in parentheses. The class intervals include the right endpoint, not the left.
 - (a) Is the percentage who smoked between 10 and 80 cigarettes or less per day around 5.5%, 55%, 85%, or 98.5%?
 - (b) In which interval are there more smokers: 0–10 cigarettes or 40–80 cigarettes?
 - (c) Which interval is more crowded: 0–10 cigarettes or 40–80 cigarettes?
 - (d) On the interval 20–40 cigarettes, the height of the histogram is about 1.5% per cigarette. What percentage of the men had daily cigarette use in this class interval?



2. Among all applicants to Podunk University one year, the Math SAT scores averaged 535, the SD was 100, and the scores followed the normal curve. Fill in the blanks; explain briefly.
 - (a) A student who scored 725 on the Math SAT was at about the _____th percentile of the score distribution.
 - (b) To be at the 80th percentile of the distribution, a student needed a score of about _____ points on the Math SAT.
3. Find the correlation coefficient for each of the three data sets shown below.

x	y
1	5
1	3
1	5
1	7
2	3
2	3
2	1
3	1
3	1
4	1

x	y
1	1
1	2
1	1
1	3
2	1
2	4
2	1
3	2
3	2
4	3

x	y
1	2
1	2
1	2
1	2
2	4
2	4
2	4
3	6
3	6
4	8

4. A statistical analysis of the heights of fathers and sons can be summarized as follows:

average height of fathers \approx 68 inches, SD \approx 2.7 inches

average height of sons \approx 69 inches, SD \approx 2.7 inches, $r \approx 0.5$

The scatter diagram was football-shaped. For each son, his height was predicted from the father's height using the regression line.

- (a) If a father is 72 inches tall, predict his son's height.
 - (b) This prediction is likely to be off by _____ inches or so. If more information is needed, say what it is, and why.
 - (c) For about what percent of the fathers will the prediction of the son's height be off by the answer to part (b) or less?
5. The chance of event A is 0.5; the chance of event B is 0.1.
- (a) Provided they are _____, the chance of both is _____%, obtained by the _____ rule.
 - (b) Provided they are _____, the chance of at least one is _____%, obtained by the _____ rule.
6. Five cards are dealt from a well-shuffled deck without replacement.
- (a) Find the chance that all of the cards are numbered.
 - (b) Find the chance that none of the cards are numbered (all of them are aces or picture cards).
 - (c) Find the chance that the cards are not all numbered.
7. One hundred draws are made at random with replacement from the box
- | | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
- The sum of the draws is 431. The expected value for the sum of the draws is _____, the observed value is _____, the chance error is _____, and the standard error is _____.
- Fill in the blanks, and explain briefly.
8. Two hundred and sixty draws will be made from a standard deck of cards, with replacement.
- (a) The number of picture cards drawn should end up around _____, give or take _____ or so.
 - (b) The percentage of picture cards drawn should end up around _____%, give or take _____% or so.
 - (c) Half the time, the percentage of picture cards in 260 draws will be bigger than _____.
9. A utility company serves 50,000 households. As part of a survey of customer attitudes, they take a simple random sample of 750 of these households. The average number of television sets in the sample households turns out to be 1.86, and the SD is 0.80. The distribution of television sets in the households does not follow a normal curve.
- Does this mean that it is not possible to find a 95%-confidence interval for the average number of television sets in all 50,000 households? Answer yes or no, and explain. If yes, find the interval.
10. A box of tickets averages out to 75, and the SD is 10. One hundred draws are made at random with replacement from this box.
- (a) Find the chance (approximately) that the average of the draws will be in the range 65 to 85.
 - (b) Repeat, for the range 74 to 76.
11. A coin is tossed 10,000 times, and it lands heads 5,167 times. Is the chance of heads equal to 50%? Or are there too many heads for that?
- (a) Formulate the null and alternative hypotheses in terms of a box model.
 - (b) Compute z and P .
 - (c) What do you conclude?