

# MATH 141 LECTURE 1, FALL 2001

## MIDTERM 2

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Date of Exam : 9 November, 2001

Time allotted : 50 minutes

Name :

Student Identification Number :

Section number :

### Instructions

- Problem 1 is multiple-choice. If you are sure of the answer, you need not provide explanations. If you are unsure or feel that the question is open to interpretation, please give justification for your thoughts in the space provided. Explanation should be in the form of complete English sentences. Wrong answers without explanation will receive no credit.
- Please show your work for problems 2 and 3. No work means no credit, even if you have the correct answer.
- You may use the reverse side of each sheet for your work.
- Books, notes and calculators are NOT allowed in the exam.

<b>Problem</b>	<b>Max. score</b>	<b>Assigned score</b>
1	$10 \times 2 = 20$	
2	10	
3	10	
<b>Total</b>	40	

1. For each of the following questions, check the correct answer.

(10 × 2 = 20 points)

(a) A normal distribution has mean 10 and standard deviation 2. The point of symmetry is

- i. 2
- ii. 10
- iii. 12
- iv. 8.

(b) A normal distribution has first quartile 20 and third quartile 30. The mean of the distribution is

- i. 50
- ii. 10
- iii. 25
- iv. 35.

(c) For a normal distribution with mean  $\mu$  and standard deviation  $\sigma$ , what is the range of values between which the middle half of the observations lie?

- i.  $(\mu - \sigma, \mu + \sigma)$
- ii.  $(\mu - 2\sigma, \mu + 2\sigma)$
- iii.  $(\mu - 3\sigma, \mu + 3\sigma)$
- iv.  $(\mu - 0.67\sigma, \mu + 0.67\sigma)$ .

(d) For a normal distribution with mean  $\mu$  and standard deviation  $\sigma$ , what is the range of values between which the top half of the observations lie?

- i.  $(\mu - 0.67\sigma, \mu + 0.67\sigma)$
- ii.  $(-\infty, \mu)$
- iii.  $(\mu, \infty)$
- iv.  $(\mu - 2\sigma, \mu + 2\sigma)$ .

- (e) A random sample of 400 female college students has a mean height of 65 inches, which is greater than the 63 inch mean height of all adult American women. Here 65 is the value of the
- i. parameter
  - ii. statistic
  - iii. sampling distribution.

- (f) In a town, half of the households throw a party at Halloween. About 400 households are interviewed and the people are asked the question "Did you throw a Halloween party this year"? The median of the sampling distribution of the percentage who answered "Yes" is
- i. 400
  - ii.  $5/2$
  - iii. 50
  - iv. 450

(g) An attaché has a three-digit code lock. How many possible codes are there?

- i. 30
- ii. 729
- iii. 1000

(h) To determine the interest in a new park, 300 residents are polled; 135 are in favor of a park. What is the sample proportion  $\hat{p}$ ?

- i. 0.45%
- ii. 40.5 %
- iii. 45 %

- (i) A simple random sample of 400 residents of a town is asked about a new fire station; 144 are in favor. What is the approximate standard deviation of sample proportion  $\hat{p}$  in this setting?
- i. 6 %
  - ii. 2.4 %
  - iii. about 1%

- (j) A sample space contains 3 outcomes : A, B, C. Which of the following is a legitimate assignment of probabilities to the outcomes ?
- i.  $P(A) = .3, P(B) = .6, P(C) = .1$
  - ii.  $P(A) = .5, P(B) = .4, P(C) = .4$
  - iii.  $P(A) = .7, P(B) = -.2, P(C) = .5$

2. Consider the random experiment of tossing a fair coin 9 times. It is known that the probability model for the number of heads obtained in this random experiment has mean  $9/2$  and standard deviation  $3/2$ . Using this information find the value  $r$  such that the probability of obtaining more than  $r$  heads in 225 tosses of a fair coin is 0.84.

(10 points)

3. Four cards are drawn at random from a standard deck. Find the probability that there is exactly one king and one queen. (There are four kings and four queens in a standard deck. )  
(Please do not try to simplify your answer!)

(10 points)