

This exam. consists of 9 questions. Be sure to show your work. Partial credit may be given if the answer is not correct, and full credit may not be given for a correct answer which is not supported by correct work.

Work in the space beside the questions, and mark your answers there. The numbered spaces below are for scoring, not for answers.

Do not use your calculator.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

1. How many ways are there to assign 6 people to 6 places around a table ?

- (a)  $\binom{6}{6}$       (b) 6      (c)  $\binom{12}{6}$       (d) 6!      (e) 6! 6!

2. How many ways are there to assign 6 people--3 men and 3 women--to 6 places around a table so that the men and women alternate ?

- (a) 70      (b) 71 (c) 72      (d) 73 (e) 74

3. How many bridge hands are there with 4 spades, 4 hearts, 2 diamonds, and 3 clubs ?

- (a)  $\binom{13}{4} \binom{13}{4} \binom{13}{2} \binom{13}{3}$  (b)  $4!4!2!3!$  (c)  $\binom{52}{13}$  (d)  $\binom{52}{4} \binom{48}{4} \binom{44}{2} \binom{42}{3}$  (e)  $4 \cdot 4 \cdot 2 \cdot 3$

4. If 3 people each choose an integer between 1 and 10 (inclusive), what is the probability of a match ?

- (a) .25 (b) .26 (c) .27 (d) .28 (e) .29

5. A manufacturer produces two models of computers. If half of the orders are for model X, as opposed to model Y, what is the probability that among the next 4 orders, at most 1 is for model X ?

- (a)  $1/16$       (b)  $1/8$ (c)  $3/16$       (d)  $1/4$ (e)  $5/16$

6. Of the 10 computers in a lab., half are model X and the other half are model Y. If four people come to the lab. and choose computers at random, what is the probability that at most one will be using a model X ?

- (a)  $5/21$       (b)  $11/42$       (c)  $3/7$ (d)  $13/42$       (e)  $1/3$

7. Suppose  $X$  is a random variable with possible values 1, 2, 3, 4, all equally likely. What is  $F_X(2.6)$  ?

- (a) 0   (b)  $1/4$  (c)  $1/2$  (d)  $3/4$  (e) 1

8. Let  $X$  be a random variable with c.d.f.  $F_X(x) = 1 - e^{-x}$ . What is  $P(X > 2)$  ?

- (a)  $e^{-2}$    (b)  $e^{-1}$  (c) 1   (d)  $e$    (e)  $e^2$

9. Let  $X$  be a random variable with p.d.f.  $f_X(k) = c \cdot k$  for  $k = 1, 2, 3$ , for  $c$  a constant. What is  $E(X)$  ?

- (a)  $5/3$       (b)  $2$       (c)  $7/3$  (d)  $8/3$  (e)  $3$

10. Let  $X$  be a random variable with p.d.f.  $f_X(x) = 2(1 - x)$  for  $0 < x < 1$ . What is  $E(X)$  ?

- (a)  $1/4$       (b)  $1/3$  (c)  $1/2$  (d)  $2/3$  (e)  $3/4$