No notes, no books, no calculators, no cell phones, no pagers, no electronic devices of any kind.

Name_____

Circle your Discussion Section:

DIS 301	9:55	T	B305 VAN VLECK
DIS 302	9:55	R	115 INGRAHAM
DIS 305	1:20p	T	B105 VAN VLECK
DIS 306	1:20p	R	B333 VAN VLECK

Problem	Points	Score
1	20	
2	20	
3	20	
4	20	
5	20	
Total	100	

Solutions will be posted shortly after the exam:
www.math.wisc.edu/∼miller/m240

1. (20 pts) Define f inductively as follows:

$$f(x,0) = x^2 \qquad f(x,n+1) = (f(x,n)+x)^2$$

(a) Give a recursive algorithm for computing f.

(b) Give an iterative algorithm for computing f.

2. (20 pts) Seventeen people on a basketball team show up to play.

(a) How many ways are there to choose a team of five players? (i.e., with no assigned positions).

(b) Three who showed up are Seniors and five are Freshman. How many ways are there to choose a team of five (as in part (a)) if at least one player must be a Senior but no player is a Freshman?

3. (20 pts)

(a) What is the coefficient of x^3 in the expansion of $(2x-1)^8$?

(b) A fair die is rolled 8 times. What is the probability that it comes up 6 exactly 3 times?

4. (20 pts) A snack food company is planning to introduce a new product, crunchyballsofsaltfatandsugar. The company commissions a marketing report for each new product which predicts its success. Of all new products produced by the company 30% have been a success. Furthermore 70% of their successful products were predicted beforehand to be a success while only 40% of the failed new products were predicted to be successful. What is the probability that their new snack food will be a success given that the marketing report has predicted it will be successful?

5. (20 pts) The final exam in M240 consists of 20 True-False problems and 10 Multiple-Choice problems. Suppose that Max has a probability of 75% of getting a True-False question right and 60% of getting multiple choice problem correct. If T-F questions are 3 points each and M-C are 4 points each, what is the expected value of Max's score on the final?

Answers

1.
(a)
function $f(x, n)$
    if $n = 0$, output x^2
    else ouput $f(x, n - 1)$

(b)
input (x, n)
$z = x^2$
For $i = 1$ to n:
    $z = (z + x)^2$
next i
output z

2. (a) $C(17, 5)$ (b) $C(12, 5) - C(9, 5)$

3. (a) $(-8)C(8, 3)$ (b) C(8,3)$(\frac{1}{6})^3(\frac{5}{6})^5$

4. $\frac{3}{7}$

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