	COPLAND COLLEGE **MA3 – Probability** **Sample Test June 2007**	**Copland College Maths Dept.**

Useful Formulae:

Quantity to calculate
$n! = n \times (n-1) \times (n-2) \times (n-3) \times \ldots 3 \times 2 \times 1$
$C = \frac{{}^{n}P_{r}}{r!}$
${}^{n}P_{r} = \frac{n!}{(n-r)!}$
Ways of arranging ***n*** *things made up of indistinguishable things,* ***n1*** *,in the first group,* ***n2*** *in the second group is* $\frac{n!}{n_1!n_2!n_3!\ldots}$
$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$
$P(A) = \frac{\text{Number of elements in favourable outcome subset}}{\text{Number of elements in sample space set}}$
$P(E) + P(E') = 1$
Permutation – order is important
Combination – order is not important

Calculators may be used throughout the test.

Multiple Choice Section – Select Best Alternative.

1 In rolling a normal die, the probability that a prime number results is: C

A $\frac{1}{6}$

B $\frac{2}{6}$

C $\frac{3}{6}$

D $\frac{4}{6}$

E $\frac{5}{6}$

2 The term which most closely represents a $\frac{7}{8}$ chance of something happening is: B

A certain
B highly likely
C fair chance
D unlikely
E no chance

3 The number of possible results for selecting a student from a class of 12 boys and 15 girls is: E

A 1
B 3
C 12
D 15
E 27

4 In a bag there are 4 yellow, 2 blue and 5 red marbles. The probability of selecting a blue marble is: B

A 0

B $\frac{2}{11}$

C $\frac{2}{9}$

D 1

E $\frac{2}{2}$

5 The sample space for spinning a spinner that is divided into four equal parts of red, white, blue and black is: C

A {4}
B {1}
C {red, white, blue, black}
D {red, white}
E {blue, black}

6 If I bought eight tickets in a raffle and the probability that I win is $\frac{8}{100}$, the total number of tickets sold in the raffle must be: D

A $\frac{8}{100}$

B 1
C 8
D 100
E 108

7 The probability of selecting a green ball from a box is $\frac{2}{5}$. The probability of selecting any other colour is therefore: B

A $\frac{2}{5}$

B $\frac{3}{5}$

C 1
D 2
E 5

8 On a roulette wheel there are 18 black numbers, 18 red numbers and 1 green number. On a random spin the probability of a black number not occurring is: E

A $\frac{1}{37}$

B $\frac{1}{36}$

C $\frac{1}{18}$

D $\frac{19}{36}$

E $\frac{19}{37}$

9 If a successful event is considered to be selecting a picture card from a pack of cards, then the complement of this event would be: A

A selecting a number card
B selecting an ace
C selecting a diamond
D selecting a picture or a number card
E selecting a red card

10 If a successful event has a probability of $\frac{1}{4}$, then its complement must have a probability of: B

A $\frac{1}{4}$

B $\frac{3}{4}$

C 1

D 3

E 4

11 Two dice are tossed. The probability of obtaining a 2 or a multiple of 3 or both is: **Note: This question is poorly worded - IGNORE** E?

A $\frac{1}{4}$

B $\frac{11}{36}$

C $\frac{2}{3}$

D $\frac{5}{9}$

E $\frac{3}{4}$

12 Three coins are tossed. The probability of obtaining at least one tail is: E

A $\frac{1}{8}$

B $\frac{1}{4}$

C $\frac{1}{2}$

D $\frac{3}{4}$

E $\frac{7}{8}$

13 In a group of 16 athletes, 8 play netball, 10 play hockey and 3 play both. The probability of playing neither netball nor hockey is: B

A 0

B $\frac{1}{16}$

C $\frac{1}{8}$

D $\frac{3}{16}$

E $\frac{1}{4}$

14 If card is randomly drawn from a pack of 52 playing cards, then the probability that it is either a black ace or a red 'picture' card is: C

A $\frac{4}{13}$

B $\frac{1}{13}$

C $\frac{2}{13}$

D $\frac{7}{26}$

E $\frac{5}{26}$

15 If a roulette wheel is numbered from 0 to 36 inclusive, the chance of the moving ball landing in a compartment numbered 13 to 24 inclusive is: B

A $\frac{1}{3}$

B $\frac{12}{37}$

C $\frac{11}{36}$

D $\frac{11}{37}$

E $\frac{11}{35}$

16 There are 17 horses in the Melbourne cup race. How many ways 1st, 2nd and 3rd positions be filled? D

A ${}^{17}C_3$

B $\frac{17!}{3!}$

C $17!$

D ${}^{17}P_3$

E 3

17 In my suitcase I have packed 3 pairs of shoes, 4 suits, 6 shirts and 5 ties. How many different combinations of outfits can I wear if I must wear one of each item. B

A 72

B 360

C 480

D 240

E 310

18 How many different ways can the letters in the word 'FERRARI' be arranged? D

A $7!$

B $5!$

C $7!3!$

D $\frac{7!}{3!}$

E $\frac{5!}{3!}$

19 How many different arrangements of the word 'FERRARI' are possible if the letters 'R' in the word must stay together? A

A $5!$

B $6!$

C $5!3!$

D $\frac{5!}{3!}$

E $\frac{6!}{3!}$

20 Debating teams consisting of 4 members are to be chosen from a group of 15 students. How many different teams could be organised? C

A $15!$

B ${}^{15}C_{11}$

C ${}^{15}C_4$

D ${}^{15}P_4$

E ${}^{15}P_{11}$

21 Jillian is renovating her bathroom and she gives the tiler 7 tiles identical except for their different colours (3 red, 2 white and 2 black). She asks the tiler to show her all the possible combinations if the tiles are placed in a row and the red tiles must stay together. How many combinations will he have to form? B

A $7!$

B $\dfrac{5!}{2! \times 2!}$

C $\dfrac{7!}{3! \times 2! \times 2!}$

D $\dfrac{5!}{3! \times 2! \times 2!}$

E $5!$

22 What number is in the 6th position in the 10th row of Pascal's triangle? A

A 252

B 120

C ${}^{10}C_7$

D 210

E ${}^{10}P_6$

23 The 4th term in the binomial expansion of $(x - 2a)^8$ is: A

A $-448\,x^5\,a^3$

B $1120\,x^4\,a^4$

C $-1792\,x^3\,a^5$

D $448\,x^5\,a^3$

E $-1120\,x^4\,a^4$

24 Kay and Hing play three games of golf. The probability that Hing wins any game is 0.8. The probability that Hing wins only two games is: D

A 0.032

B 0.128

C 0.256

D 0.384

E 0.512