Year 10 Mathematical Methods
Department of Mathematics 2017
Parade College

Name: _____

Tutor Group: _____

TEST: Ch 11 Probability

Section	Marks	Your mark
A: Vocabulary knowledge	5	
B: Multiple Choice	10	
C: Short Answer	31	
D: Analysis Problem	5	
Total Marks = 50		

Instructions

- Read questions carefully
- CAS calculators may be used.
- No sharing of equipment, including calculators.
- Use a pencil when completing questions.

Section A: Vocabulary Knowledge

Complete the sentence by choosing the appropriate word from the word list below. (5 x 1 = 5 marks)

1. _____ events have no common elements and together make up the universal set.
2. The _____ of rolling a six sided die is {1,2,3,4,5,6}.
3. The result of a _____ is called an outcome.
4. Probabilities in gambling can be expressed as _____.
5. Finding the probability of A or B is the same as finding their _____.

WORD LIST

Union	Mutually exclusive	Sample space	Outcome	Independent
Complementary	Intersection	Venn diagram	Odds	Trial

Section B: Multiple Choice (10 x 1 mark)

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10

Question 1

In a class of 29 maths students it was found that 6 had blue eyes and 15 had brown eyes.
If a student is chosen at random, what is the probability they do not have brown eyes?

A $\frac{6}{29}$

B $\frac{8}{29}$

C $\frac{14}{29}$

D $\frac{15}{29}$

E $\frac{21}{29}$

Question 2

What is the probability of rolling 2 sixes in a row from a six sided die?

A $\frac{1}{2}$

B $\frac{1}{3}$

C $\frac{1}{6}$

D $\frac{1}{18}$

E $\frac{1}{36}$

Question 3

What is the probability of rolling a number less than 3 with a six sided die?

A $\frac{1}{6}$

B $\frac{1}{3}$

C $\frac{1}{2}$

D $\frac{2}{3}$

E $\frac{3}{6}$

Use the following information to answer questions 4 – 6

Suppose that

$\varepsilon = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

$A = \{\text{all even numbers}\}$

$B = \{\text{multiples of 3}\}$

Question 4

The set which represents $(A \cap B)$ is

A $\{6\}$

B $\{6,12\}$

C $\{2, 3\}$

D $\{1, 5, 7, 11\}$

E $\{2, 3, 4, 6, 8, 9, 10, 12\}$

Question 5

The set which represents (B') is

A $\{3\}$

B $\{3, 6, 9, 12\}$

C $\{1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$

D $\{1, 2, 4, 5, 7, 8, 10, 11\}$

E $\{2, 4, 6, 8, 10, 12\}$

Question 6

The set which represents $(A \cup B)$ is

A $\{6\}$

B $\{6,12\}$

C $\{2, 3\}$

D $\{1, 5, 7, 11\}$

E $\{2, 3, 4, 6, 8, 9, 10, 12\}$

Question 7

The complement of the event "Susan had her hair cut today" is:

A "Susan had her hair coloured today"

B "Susan's haircut looks nice"

C "Sally had her hair cut today"

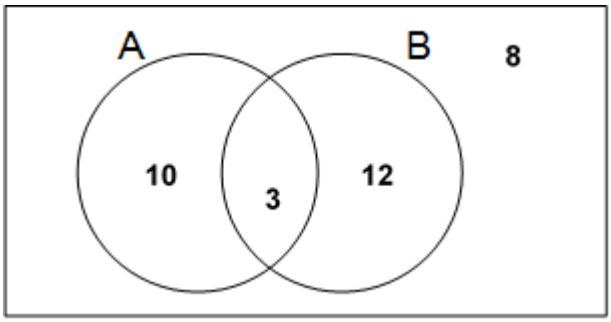
D "Susan did not have her hair cut today"

E "Susan had her hair cut yesterday"

Use the Venn diagram at right to answer questions 8 – 10

Question 8

Find n($A \cap B'$)



A 3

B 8

C 10

D 25

E 33

Question 9

$P(A \cup B)$ is closest to:

A 0.09

B 0.24

C 0.36

D 0.67

E 0.76

Question 10

Which of these is true?

A P(A) = P(B)

B P(A) > P(B)

C P($A \cap B$) > P($A' \cap B'$)

D P($A \cap B'$) $> P(A' \cap B')$

E $P(A') < P(B')$

Section C: Short Answer Section (30 marks)

- Working out must be shown to gain full marks.
- CAS may be used to check answers and must be used when asked in the question.

Question 1

A bag containing 4 blue, 3 red and 2 green balls has a ball selected at random. Find the probability of the following events.

(a) A red ball is selected.

(1 mark)

(b) Either a blue or a green ball is selected.

(1 mark)

(c) A green ball is not selected.

(1 mark)

Question 2

In Melbourne it rains an average of 10 out of the 31 days in the month of October.

(a) What is the probability of rain on any day?

(1 mark)

(b) What is the probability of rain on two successive days?

(2 marks)

(c) What is the probability that it will not rain for 3 consecutive days.
(Give your answer as a percentage).

(2 marks)

Question 3

Russell is colour-blind but knows that in his sock drawer he has 10 green and 20 red socks which are not in pairs. He selects two single socks from the drawer one at a time without replacement.

(a) Draw a tree diagram to represent the possible outcomes of the first and second selections and their probabilities.

(3 marks)

(b) What is the probability he selects a matching pair of red socks?

(2 marks)

(c) What is the probability he chooses a matching pair of either red or green socks?

(2 marks)

(d) What is the probability he chooses a red sock if he has already selected a green sock first?

(1 mark)

Question 4

In a survey of 30 year 10 students it was found that 18 enjoyed eating burgers while 16 enjoyed eating kebabs. There were 4 students who did not like either.

(a) Draw the Venn diagram of this situation

(3 marks)

(b) Find the probability that a student enjoys both burgers and kebabs.

(2 marks)

(c) Find the probability that a student does not enjoy burgers.

(2 marks)

(d) If we surveyed an additional 10 students, how many would we expect to enjoy burgers?

(1 mark)

Question 5

If: P(A) = 0.5 $P(B') = 0.45$ $P(A \cup B) = 0.8$
Find the following:

(a) $P(B)$

(1 mark)

(b) $P(A \cap B)$

(2 marks)

(c) $P(A')$

(1 mark)

Question 6

Ryan bets $50 on a horse called Long Shot, which has odds of 20-1

(a) What is the probability that Long Shot will win?

(1 mark)

(b) What is the payout that Ryan will receive if Long Shot wins?

(1 mark)

Section D: Analysis Section (5 marks)

- All working out must be shown to gain full marks.

Max is late to school once in every 4 school days and Jake is late to school once in every 5 school days. The probability that they are both late for school is 0.05.

(a) Are the events "Max is late for school" and "Jake is late for school" independent events? You must show calculations to prove your answer.

(2 marks)

(b) **Show that** probability that either Max or Jake is late for school is 40%.

(2 mark)

(c) What is the probability that neither Max nor Jake is late for school on any day?

(1 mark)