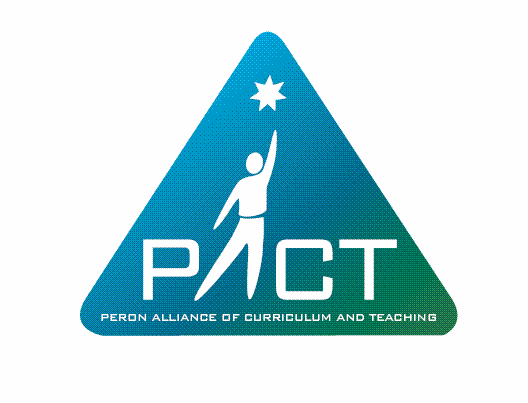
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**METHODS MAT 11**

**Test 4 - 2015**

**Topics: Counting, Probability and Sequences**

**Total Time:**  *55 minutes*  **Weighting:** *6% of the year.*

*This test comprises of* ***TWO sections****. The* ***first section*** *is* ***calculator free*** *where no calculators of any kind are to be used. The* ***second section*** *is* ***calculator assumed*** *where the CAS calculator may be used. All questions must be answered in both sections.* ***Answers should be rounded to 2 decimal places unless specified****. All working should be shown in the space provided. Solutions without working may not be awarded full marks. Please take the marks for each question into account when answering the question.*

**SECTION 1: CALCULATOR FREE**

**Time:** 25 minutes**Equipment Allowed:** Formula sheet

**Marks for Section 1:** *28marks*

1. (5 marks)

Joanne is going on a holiday. She selects three T-shirts at random from

seven differently coloured T shirts.

(a) In how many ways can this be done? (2)

(b) In how many ways can the three T shirts be selected if the black T shirt

must be selected and the blue T shirt cannot be selected? (3)

2. (10 marks)

(a) Use Pascal’s Triangle to fully expand the expression. (3)

(b) Use the expansion in (a) to prove that

 (4)

(c) Determine the value of the sum of the coefficients of the expansion of  (1)

(d) Find the fifth term of the expansion (2x-y)8 (2)

3. (10 marks)

(a) Write down the first four terms of the function defined by

(i)  (2)

(ii)  (2)

(b) An arithmetic sequence is described by the rule Tn =150 -4n, where

n = 1,2,3,4,5…….

(i) Find the first three terms of the sequence (3)

(ii) State the recursive rule for this sequence (1)

4. (a) (3 marks)

Find P ( A or B) if A and B are mutually exclusive, P(A)= 0.42, P(B) = 0.15 (1)

(b) The probability it will rain at Safety Bay on any day in June is 0.6. The probability it will rain at both Safety Bay and Baldivis on any day in June is 0.36. What is the probability of rain at Baldivis, given it is raining at Safety Bay? (2)

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**SECTION 2: CALCULATOR ASSUMED**

**Time:** *30 minutes* **Equipment Allowed:** Formula sheet, *1 page of notes (A4), CAS and scientific calculators*

**Marks for Section 2:** *32 marks*

5.(11 marks)

Once a learner driver has complete a minimum of 50 supervised driving hours, he is permitted to try the test for his provisional licence. The probability of passing the driving test at the first attempt is approximately 0.35. The probability of passing the test the second and subsequent times is close to 0.4.

(a) Use a tree diagram to show the probabilities of the outcomes of sitting the test up to 3 times. (4)

(b) Determine the probability of passing the driving test before the third attempt. (2)

(c) Determine the probability that if the licence is obtained in three or fewer attempts, it is not obtained on the first attempt. (3)

(d) Describe the probability of never passing the test. (2)

6. (3 marks)

Three people are to be randomly selected from six women and four men.

What is the probability that the three selected will be

(i) all men (1)

(ii) two women and one man (2)

7. (15 marks)

(a) A sequence is define by 

(i) Determine the first 6 terms. (2)

(ii) Find the sum of the first 10 terms showing your method. (3)

(iii) Write down the sum of the first terms. (2)

(b) Determine the sum of the first 20 terms of the sequence 10 + 13 + 16 + …

(2)

(c) Determine the sum of the first 20 terms of the sequence 2 + 6 + 18 + …

(3)

(d) The sum of the first n terms of a geometric sequence is Sn = 10 × 4n –10.

Find the first term and common ratio of this sequence (3)

8. (3 marks)

Let and be events for which.

The events and are independent. Determine. (3)