ST BENEDICT'S

SUBJECT	**Mathematics**	PAPER	**AP Maths Paper 2**
GRADE	**12**	DATE	3 July 2018
EXAMINER	Mr Benecke	MARKS	
NAME		MODERATOR	Mrs Povall
TEACHER		DURATION	

QUESTION NO	DESCRIPTION	MAXIMUM MARK	ACTUAL MARK
1-5	Probability	43	
6-7	Confidence Intervals and Hypothesis Testing	25	
8-9	Distributions	26	
10	Theory	6	
TOTAL		100	

INSTRUCTIONS:

1. This paper consists of 10 questions and 5 pages.

2. Read the questions carefully.

3. Answer all questions.

4. Number your answers clearly and use the same numbering as in the question paper.

5. You may use an approved non-programmable and non-graphical calculator, unless otherwise stated.

6. Round off your answers to **four** decimal digits where necessary.

7. All necessary working details must be shown. Answers only, without the relevant calculations will not be given marks. Equations may not be solved solely with a calculator.

8. It is in your interest to write legibly and present your work neatly.

9. You may detach the Information Sheet at the back of the question paper.

QUESTION 1   13 MARKS

In a suburb in Bedfordview: 65% of the houses are painted white, 40% of the houses have palisade fencing, and 30% are painted white and have palisade fencing. What is the probability that a randomly selected house is:

a)   painted white or has palisade fencing?   (3)

b)   painted white given it has palisade fencing?   (4)

c)   doesn't have palisade fencing and it's not painted white?   (2)

d)   doesn't have palisade fencing given it's not painted white?   (4)

QUESTION 2   11 MARKS

Arsenal, Liverpool and Chelsea all volunteer to send 5 footballers **each** as ambassadors for football to the UN conference. However, the UN only selects 3 footballers in total as ambassadors. What is the probability that:

a)   Two footballers from Arsenal are selected and one from Chelsea is selected?   (3)

b)   At least one footballer from Liverpool is selected?   (4)

c)   All three footballers selected come from the same club?   (4)

QUESTION 3   9 MARKS

The letters of the word STEEPLED are arranged randomly in a row. What is the probability that the new word will:

a)   Start with "T" and end with "P"?   (3)

b)   Start and end with a vowel?   (3)

c)   Start with "S" and end with "E"?   (3)

QUESTION 4   6 MARKS

10 men are tested for a disease that is known to affect 8% of the population. What is the
probability that at least 2 of the men have the disease.   (6)

QUESTION 5   4 MARKS

Jack removes three broken light bulbs from his bedroom and accidently mixes them up with the
three good light bulbs he planned as replacements. Jack cannot tell the difference between the
good light bulbs and the broken ones. If Jack randomly selects three light bulbs, what is the
probability that all three light bulbs work.   (4)

QUESTION 6   14 MARKS

During a sample poll of 50 college students Mr Smith discovers that 80% of the students receive
pocket money monthly. He also finds the distribution to be normal.

a)   Find a 98% confidence interval for the proportion of all students who receive pocket
      money.   (5)

b)   Describe, in words, what this confidence interval mean statistically.   (3)

c)   How many students must be sampled to to be 95% confident that the estimate does not
      differ from the true proportion by more than 5%   (6)

QUESTION 7   11 MARKS

A news report stated that on average high school boys weigh 70 kg with a standard deviation of
9 kg. Their weights are normally distributed. Mr Joe writes in and says he thinks South African
high school boys weigh more. Mr Joe tests 100 South African high school boys and finds that
they have a mean weight of 71,6 kg. Determine whether Mr Joe's claim is correct with a 4%
level of significance.   (11)

QUESTION 8   13 MARKS

a)   A six-sided die is rolled twice.

     1)   Draw a probability distribution table for the number of times the die lands on a "6". (4)

     2)   Determine the expected value. $E(x) = \sum x . P(X = x)$. (4)

     3)   State the mode. (1)

b)   A six-sided die is rolled 50 times. What is the probability that the die will land on a "6" 10 times. (4)

QUESTION 9   13 MARKS

A random variable X has the density function:

$$f(x) = \begin{cases} kx^{-3} & if\ x \geq 1 \\ 0 & elsewhere \end{cases}$$

a)   Show that $k = 2$. (5)

b)   Find $P(2 < X < 3)$. (4)

c)   Determine the median (4)

QUESTION 10   6 MARKS

A probability model has been developed for flights departing from OR Tambo. Events A and B can be described as follows: Let A be the event "a flight's departure time is affected by the weather". Let B be the event "a flight's departure time is affected by passenger behaviour" Under this model it is given that $P(A \cup B) = 0{,}52$ and $P(A' \cup B) = 0{,}92$.

What is the probability that a flight's departure time is affected by passenger behaviour?