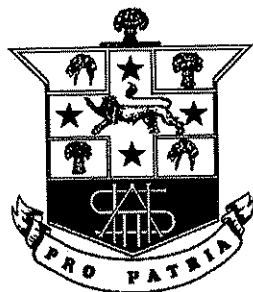# HURLSTONE AGRICULTURAL HIGH SCHOOL

GENERAL MATHEMATICS
4TH DECEMBER 2003

YEAR 12

ASSESSMENT TASK 1

EXAMINERS ~ S. HACKETT, R. YEN, G. RAWSON

GENERAL INSTRUCTIONS

- Reading time – 5 minutes.
- Working time – 40 hours.
- This paper has 3 questions, worth 13 marks each.
- Attempt **all** questions.
- **Start each question on a new sheet of paper**.
- Necessary working should be shown in every question.

- Marks may not be awarded for careless or badly arranged work.
- Board-approved calculators may be used.
- This examination must **NOT** be removed from the examination room.
- A formula sheet is provided at the back of this paper and may be detached for use.

STUDENT NAME: _____

QUESTION 1 (Start a new sheet).

(a) The speed in km/h of cars on a main road was recorded and graphed with class centres 56, 60, 64 and so on up to 80. The cumulative frequency histogram and polygon of the results are shown below:
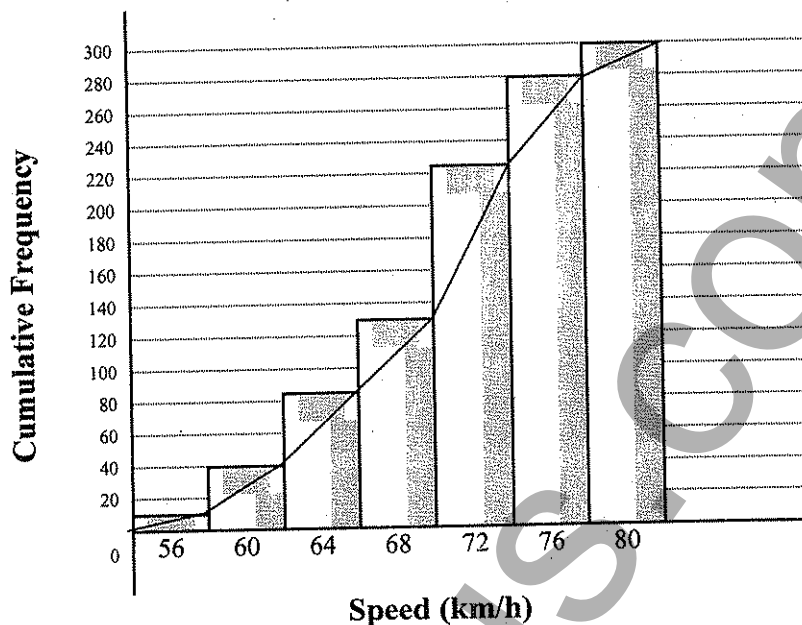
(i) How many cars' speeds were recorded during the period? **1**

(ii) What is the highest possible speed that could have been recorded? **1**

(iii) Use the graph to estimate the median speed. **1**

(iv) Determine an estimate of the interquartile range from the graph. **2**

(b) The number of matches in 15 matchboxes was counted. The data is shown below:

52	51	50	49	50	58	51	48
51	50	49	53	50	49	51	

(i) Calculate the mean and standard deviation for the data correct to 1 decimal place. **2**

(ii) Find the five-number summary for the data. **2**

(iii) Draw a boxplot to represent the data. **2**

(iv) Which measure of location (mean, median or mode) would best represent the number of matches in a box? Give a reason for your answer. **2**

QUESTION 2 (Start a new sheet).

(a) If an event has a probability of $\frac{5}{9}$, would the event be unlikely,

fifty-fifty or probable?   **1**

(b) From past performances, it is known that a golfer has a probability
of 0.8 of sinking a putt. What is the probability that he misses the putt?   **1**

(c) What is the probability of correctly guessing the 4-digit PIN number to
a bank account card?   **2**

(d) Alex is choosing the background colour for three consecutive pages of
his Art assignment. For the first page he must choose either red, black
or white; for the second page, black or orange; and for the third,
red or black.

    (i) Draw a tree diagram to show all possible outcomes.   **3**

    (ii) If Alex selects each colour at random, find the probability
that at least two of the pages will be black.   **2**

(e) The number of days absent of the workers at a factory are shown on this
frequency table.

Days absent x	Number of workers f
0	7
1	3
2	11
3	6
4	2
5	1

If one is selected at random from the factory, what is the probability that
the worker has been absent for:

    (i) 4 days?   **2**

    (ii) less than 4 days?   **1**

    (iii) less than 7 days?   **1**

QUESTION 3 (Start a new sheet).

(a) Calculate the simple interest earned on a principal of $14 200 invested
at 3.75% p.a. for 18 months.

2

(b) An apartment unit appreciates by 10.5% every year. Its present value
is $175 000. Find, correct to the nearest dollar:

(i) its value 3 years from now

2

(ii) its value 3 years ago

2

(c) Use the table below to calculate the compound interest earned on
$28 000 invested at 6% p.a. compounded yearly for 4 years.

2

No. of periods, n	Final amount of an investment of $1 Values of $(1 + r)^n$								
	Interest rate per compounding period, r								
	0.01	0.03	0.04	0.05	0.06	0.08	0.1	0.15	0.2
1	1.010	1.030	1.040	1.050	1.060	1.080	1.100	1.150	1.200
2	1.020	1.061	1.082	1.103	1.124	1.166	1.210	1.323	1.440
3	1.030	1.093	1.125	1.158	1.191	1.260	1.331	1.521	1.728
4	1.041	1.126	1.170	1.216	1.262	1.360	1.464	1.749	2.074
5	1.051	1.159	1.217	1.276	1.338	1.469	1.611	2.011	2.488
6	1.062	1.194	1.265	1.340	1.419	1.587	1.772	2.313	2.986
7	1.072	1.230	1.316	1.407	1.504	1.714	1.949	2.660	3.583
8	1.083	1.267	1.369	1.477	1.594	1.851	2.144	3.059	4.300

(d) Cassie bought 2400 shares in Network Ten through a stockbroker for
$3.15 each. The brokerage was 3% of the buying price and the stamp duty
was 30 cents per $100 or part thereof of the buying price.

(i) Calculate Cassie's total cost of buying the shares.

2

(ii) Calculate the dividend yield correct to one decimal place if each
share earned a dividend of 69 cents.

1

(e) Calculate the final amount when an amount of $28 000 is invested at 5.7% p.a.
compounded half-yearly over 5 years. Answer to the nearest dollar.

2

END OF TEST.

FORMULAE SHEET

Simple interest

$$I = Prn$$

P = initial quantity

r = percentage interest rate per period, expressed as a decimal

n = number of periods

Compound interest

$$A = P(1+r)^n$$

A = final balance

P = initial quantity

n = number of compounding periods

r = percentage interest rate per compounding period, expressed as a decimal

Future value (A) of an annuity

$$A = M\left\{\frac{(1+r)^n - 1}{r}\right\}$$

M = contribution per period, paid at the end of the period

Present value (N) of an annuity

$$N = M\left\{\frac{(1+r)^n - 1}{r(1+r)^n}\right\}$$

or

$$N = \frac{A}{(1+r)^n}$$

Straight-line formula for depreciation

$$S = V_0 - Dn$$

S = salvage value of asset after n periods

V_0 = purchase price of the asset

D = amount of depreciation apportioned per period

n = number of periods

Declining balance formula for depreciation

$$S = V_0(1-r)^n$$

S = salvage value of asset after n periods

r = percentage interest rate per period, expressed as a decimal

Mean of a sample

$$\bar{x} = \frac{\sum x}{n}$$

$$\bar{x} = \frac{\sum fx}{\sum f}$$

$\bar{x}$ = mean

x = individual score

n = number of scores

f = frequency

Formula for a z-score

$$z = \frac{x - \bar{x}}{s}$$

s = standard deviation

Gradient of a straight line

$$m = \frac{\text{vertical change in position}}{\text{horizontal change in position}}$$

Gradient–intercept form of a straight line

$$y = mx + b$$

m = gradient

b = y-intercept

Probability of an event

The probability of an event where outcomes are equally likely is given by:

$$P(\text{event}) = \frac{\text{number of favourable outcomes}}{\text{total number of outcomes}}$$