Examination Question Analysis – 2003.

The questions below are those for which the solution can be determined (full or in part) using the functionality of a graphic calculator (CASIO *CFX-9850GB PLUS*) that is not included (or is far more difficult to access) on a standard scientific calculator.

Question 2, 2003	Etech usefulness rating (+, 0, -)	Etech usefulness description
2 Simplify $3y^3 \div 12y^2$. (A) $4y$ (B) $\frac{4}{y}$ (C) $\frac{1}{4y}$ (D) $\frac{y}{4}$		

Question 4, 2003	Etech usefulness rating (+, 0, -)	Etech usefulness description
4 If $d = \sqrt{\frac{h}{5}}$, what is the value of d, correct to one decimal place, when $h = 28$? (A) 1.1 (B) 2.4 (C) 2.8 (D) 5.6		

Question 12, 2003	Etech usefulness rating (+, 0, -)	Etech usefulness description
Joy asked the students in her class how many brothers they had. The answers were recorded in a frequency table as follows. *Number of brothers* / *Frequency* 0 / 5 1 / 10 2 / 3 3 / 1 4 / 1 **12** What is the mean number of brothers? (A) 1.15 (B) 2 (C) 2.3 (D) 4		

Question 16, 2003	Etech usefulness rating (+, 0, -)	Etech usefulness description
16 Pauline calculates the present value (N) of an annuity. The interest rate is 4% per annum, compounded monthly. In five years the future value will be \$100 000. Which calculation will result in the correct answer? (A) $N = \frac{100\,000}{(1+0.04)^5}$ (B) $N = \frac{100\,000}{(1+0.04\div 12)^5}$ (C) $N = \frac{100\,000}{(1+0.04)^{60}}$ (D) $N = \frac{100\,000}{(1+0.04\div 12)^{60}}$		

This question is included for us to ponder what value this question has to student learning.

Question 24, 2003	Etech usefulness rating (+, 0, -)	Etech usefulness description

Question 24 (13 marks) Use a SEPARATE writing booklet.

(a) Minh invests $24 000 at an interest rate of 4.75% per annum, compounded monthly. What is the value of the investment after 3 years? **2**

(b) Vicki earns a taxable income of $58 624 from her job with an insurance company. She pays $14 410.80 tax on this income.

(i) Vicki has a second job which pays $900 gross income per month. **1**

What is Vicki's total annual taxable income from both jobs, assuming that she has no allowable tax deductions?

(ii) Use the tax table below to calculate the total tax payable on her income from both jobs. **2**

Taxable income	*Tax payable*
$0–$6 000	NIL
$6 001–$22 000	18 cents for each $1 over $6 000
$22 001–$55 000	$2 880 plus 30 cents for each $1 over $22 000
$55 001–$66 000	$12 780 plus 45 cents for each $1 over $55 000
$66 001 and over	$17 730 plus 48 cents for each $1 over $66 000

(iii) Show that Vicki's monthly net income from her second job is $486.44. **3**

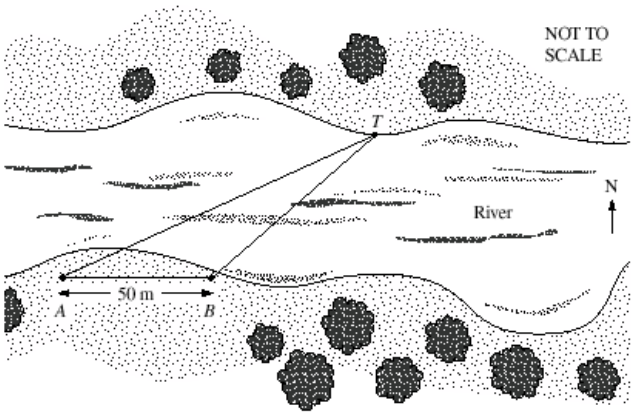
(iv) Vicki plans to take a holiday in two years time which she estimates will cost $12 000. At the end of each month, Vicki invests the net income from her second job in an account which pays 4% per annum, compounded monthly. **2**

Will she have enough in this account, immediately after the twenty-fourth payment, to pay for her holiday? Justify your answer with calculations.

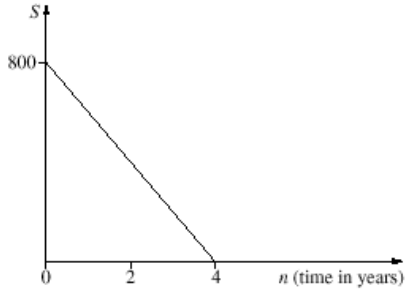
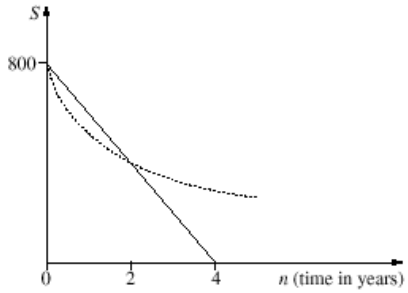
Question 25, 2003	Etech usefulness rating (+, 0, -)	Etech usefulness description
(a) A census was conducted of the 33 171 households in Sunnytown. Each household was asked to indicate the number of cars registered to that household. The results are summarised in the following table. *Number of cars* / *Frequency* 0 — 2 735 1 — 12 305 2 — 13 918 3 — 3 980 4 — 233 Total — 33 171 (i) (1) Determine the mode number of cars in a household. **1** (2) Explain what is meant by *the mode number of cars in a household*. **1** (ii) Sunnytown Council issued a 'free parking' sticker for each car registered to a household in Sunnytown. **2** How many parking stickers were issued?		

Included to illustrate a limitation of the GC, even though for this question it was of no consequence.

Question 25, 2003	Etech usefulness rating (+, 0, -)	Etech usefulness description
(c) Results for an aptitude test are given as z-scores. In this test, Hardev gains a z-score of 1. (i) Interpret Hardev's score with reference to the mean and standard deviation of the test. **2** (ii) The scores for the test are normally distributed. What proportion of people sitting the test obtain a higher score than Hardev? **1**		

Question 26, 2003	Etech usefulness rating (+, 0, -)	Etech usefulness description
(b)  In the diagram above, the following measurements are given: $\angle TAB = 30°$. B is 50 m due east of A. The bearing of T from B is 020°. Copy or trace ΔABT into your answer booklet. (i) Explain why $\angle ABT$ is 110°. **1** (ii) Calculate the distance BT (to the nearest metre). **3**		

Question 28, 2003	Etech usefulness rating (+, 0, -)	Etech usefulness description
Question 28 (13 marks) Use a SEPARATE writing booklet. (a) Sandra is on holiday in Mexico and she plans to buy some silver jewellery. Various silver pendants are on sale. The cost varies directly with the square of the length of the pendant. A pendant of length 30 mm costs 130 Mexican pesos. **2** How much does a pendant of length 40 mm cost? (Answer correct to the nearest Mexican peso.)		

Question 28, 2003	Etech usefulness rating (+, 0, -)	Etech usefulness description
(d) While Sandra is on holidays she buys a digital camera for $800. Using the straight-line method of depreciation, the salvage value, S, of the camera will be zero in four years time, as shown on the graph below. **4**  Using the declining balance method of depreciation, at a rate of R% per annum, the salvage value is represented by the dotted curve on the graph below.  NOT TO SCALE Both methods give the same salvage value after two years. Find the value of R. **End of paper**		