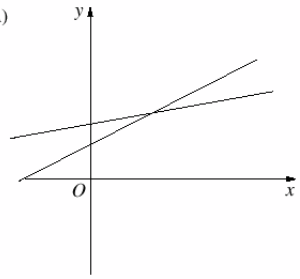
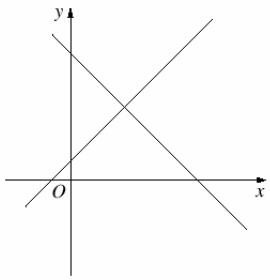
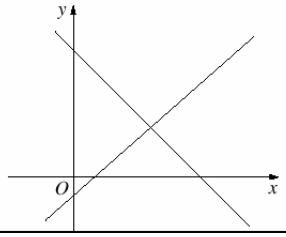
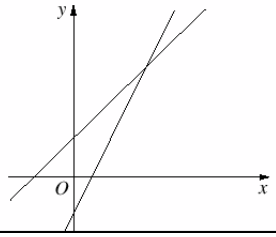
Examination Question Analysis – 2004.

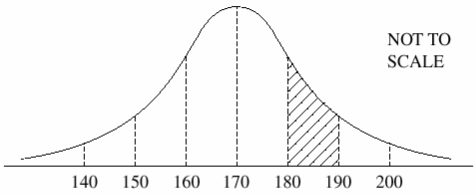
The questions below are those for which the solution can be determined (full or in part) using the functionality of a graphic calculator (CASIO *CFX-9850GB PLUS*) that is not included (or is far more difficult to access) on a standard scientific calculator.

Question 6 and 7, 2004	Etech usefulness rating (+, 0, -)	Etech usefulness description
Use the set of scores 1, 3, 3, 3, 4, 5, 7, 7, 12 to answer Questions 6 and 7. **6** What is the range of the set of scores? (A) 6 (B) 9 (C) 11 (D) 12 **7** What are the median and the mode of the set of scores? (A) Median 3, mode 5 (B) Median 3, mode 3 (C) Median 4, mode 5 (D) Median 4, mode 3		

Question 11, 2004	Etech usefulness rating (+, 0, -)	Etech usefulness description
11 If $d = 6t^2$, what is a possible value of t when $d = 2400$? (A) 0.05 (B) 20 (C) 120 (D) 400		

Question 16, 2004	Etech usefulness rating (+, 0, -)	Etech usefulness description
16 George drew a correct diagram that gave the solution to the simultaneous equations $y = 2x - 5$ and $y = x + 6$. Which diagram did he draw? (A)  (B)  (C)  (D) 		

Question 23, 2004	Etech usefulness rating (+, 0, -)	Etech usefulness description
Question 23 (continued) (b) Kirbee is shopping for computer software. *Novirus* costs \$115 more than *Funmaths*. Let x dollars be the cost of *Funmaths*. (i) Write an expression involving x for the cost of *Novirus*. **1** (ii) *Novirus* and *Funmaths* together cost \$415. Write an equation involving x and solve it to find the cost of *Funmaths*. **2**		

Question 24, 2004	Etech usefulness rating (+, 0, -)	Etech usefulness description
(c) The normal distribution shown has a mean of 170 and a standard deviation of 10.  (i) Roberto has a raw score in the shaded region. What could his z-score be? **1** (ii) What percentage of the data lies in the shaded region? **2**		

Question 26, 2004	Etech usefulness rating (+, 0, -)	Etech usefulness description
Question 26 (13 marks) Use a SEPARATE writing booklet. (a) (i) The number of bacteria in a culture grows from 100 to 114 in one hour. What is the percentage increase in the number of bacteria? **1** (ii) The bacteria continue to grow according to the formula $n = 100(1.14)^t$, where n is the number of bacteria after t hours. What is the number of bacteria after 15 hours? **1** Time in hours (t): 0, 5, 10, 15 Number of bacteria (n): 100, 193, 371, ? (iii) Use the values of n from $t = 0$ to $t = 15$ to draw a graph of $n = 100(1.14)^t$. Use about half a page for your graph and mark a scale on each axis. **4** (iv) Using your graph or otherwise, estimate the time in hours for the number of bacteria to reach 300. **1**		

Question 27, 2004	Etech usefulness rating (+, 0, -)	Etech usefulness description
(c) Sanjeev starts saving for a holiday that he wants to take when he finishes his TAFE course. He decides to invest $200 per month, at the end of each month, by placing it into an account earning 6% per annum compounded monthly. He will do this for four years. **3** Will Sanjeev reach his goal of $10 500? By how much will he fall short of or exceed his goal?		

Question 28, 2004	Etech usefulness rating (+, 0, -)	Etech usefulness description
Question 28 (13 marks) Use a SEPARATE writing booklet. (a) A health rating, R, is calculated by dividing a person's weight, w, in kilograms by the square of the person's height, h, in metres. (i) Fred is 150 cm and weighs 72 kg. Calculate Fred's health rating. **1** (ii) Over several years, Fred expects to grow 10 cm taller. By this time he wants his health rating to be 25. How much weight should he gain or lose to achieve his aim? Justify your answer with mathematical calculations. **2**		

Question 28, 2004	Etech usefulness rating (+, 0, -)	Etech usefulness description
(b)  A set of garden gnomes is made so that the cost (C) varies directly with the cube of the base length (b centimetres). A gnome with a base length of 10 cm has a cost of $50. (i) Write an equation relating the variables C and b, and a constant k. **1** (ii) Find the value of k. **1** (iii) Felicity says, 'If you double the base length, you double the cost.' **2** Is she correct? Justify your answer with mathematical calculations.		

Question 28, 2004	Etech usefulness rating (+, 0, -)	Etech usefulness description
(iii) The equation of the median regression line for the data may be approximated by $$\text{weight in kg} = \frac{2}{3}\,(\text{height in cm}) - 50.$$ (1) Use this model to predict the height of a person who weighs 75 kg. **1** (2) Give ONE limitation of this model for predicting weights from heights. **1**		

Note that in this question, may a student's inability to do parts i) and ii) (associated with fitting a median regression line) have resulted in them not bothering with part iii)?