

Section One: Calculator-free

35% (51 Marks)

This section has eight (8) questions. Answer all questions. Write your answers in the spaces provided.

Working time for this section is 50 minutes.

Question 1

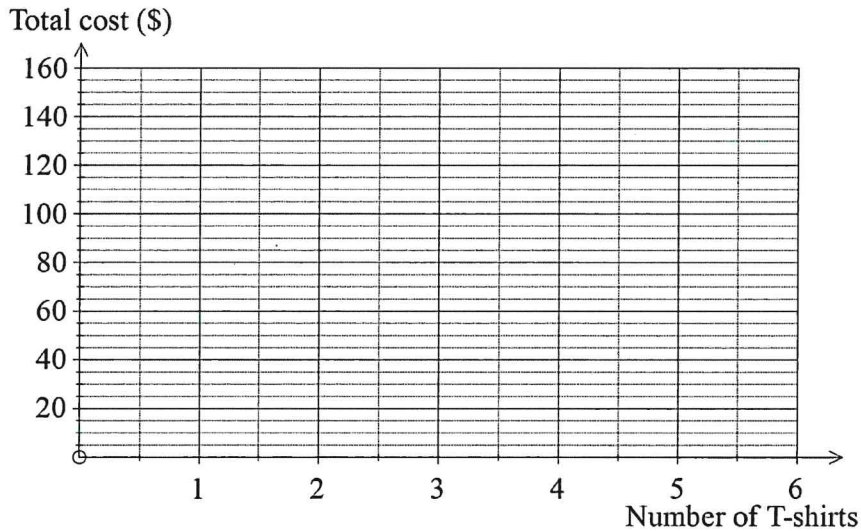
(7 marks)

An online company sell T-shirts for \$25 each plus a single \$15 shipping fee.

- (a) Complete the table below to show the total cost of purchasing up to five T-shirts. (2 marks)

Number of T-shirts	1	2	3	4	5
Total cost (\$)	40				

- (b) Display the information in the table in graphical form on the axes below. (2 marks)



- (c) State a rule for the total cost C of purchasing n T-shirts. (1 mark)
- (d) Determine how many T-shirts can be purchased for \$265. (2 marks)

Question 2**(5 marks)**

A sequence of numbers is described by the recursive equation $T_{n+1} = T_n - 8$, $T_4 = 35$.

(a) Determine T_6 . (1 mark)

(b) Determine T_1 . (1 mark)

(c) State a rule for the n^{th} term of this sequence. (2 marks)

(d) Determine T_{1001} . (1 mark)

Question 5

(9 marks)

(a) Some consecutive terms of an arithmetic sequence are shown in the table below.

n	4	5	6	7
T_n	21.5	24.2	26.9	29.6

- (i) Determine the eighth term of this sequence. (2 marks)
- (ii) Determine the first term of the sequence. (1 mark)
- (iii) State a rule for the n^{th} term of this sequence. (2 marks)
- (iv) Determine T_{101} . (1 mark)
- (b) The sum of the first three terms of another arithmetic sequence with a common difference of four is 45.
- (i) If the first term of this sequence is a , write down an equation that shows the first three terms of this sequence have a sum of 45. (1 mark)
- (ii) Solve your equation and hence determine the sixth term of this sequence. (2 marks)

Question 6

(8 marks)

(a) A sequence is defined by $T_{n+1} = T_n + 10$, $T_1 = 45$.

(i) Determine the next two terms of the sequence. (1 mark)

(ii) State a rule for the n^{th} term of this sequence. (2 marks)

(iii) Determine T_{45} . (1 mark)

(b) The first-order recurrence relation $T_{n+1} = aT_n + b$ was used with $T_1 = 3$ to calculate $T_2 = 4$ and $T_3 = 7$. Determine the values of a , b and T_5 . (4 marks)