

3. [Maximum mark: 6]

In an arithmetic sequence, $u_1 = -5$ and $d = 3$.

- (a) Find u_8 . [2]

(b) Find the value of n for which $u_n = 67$. [4]



4. [Maximum mark: 6]

Let $b = \log_2 a$, where $a > 0$. Write down each of the following expressions in terms of b .

- (a) $\log_2 a^3$ [2]
(b) $\log_2 8a$ [2]
(c) $\log_8 a$ [2]



2. [Maximum mark: 6]

The following table shows the hand lengths and the heights of five athletes on a sports team.

Hand length (x cm)	21.0	21.9	21.0	20.3	20.8
Height (y cm)	178.3	185.0	177.1	169.0	174.6

The relationship between x and y can be modelled by the regression line with equation $y = ax + b$.

- (a) (i) Find the value of a and of b .
(ii) Write down the correlation coefficient.

(b) Another athlete on this sports team has a hand length of 21.5 cm. Use the regression equation to estimate the height of this athlete.



- 5.** [Maximum mark: 6]

The sum of an infinite geometric sequence is 33.25. The second term of the sequence is 7.98. Find the possible values of r .



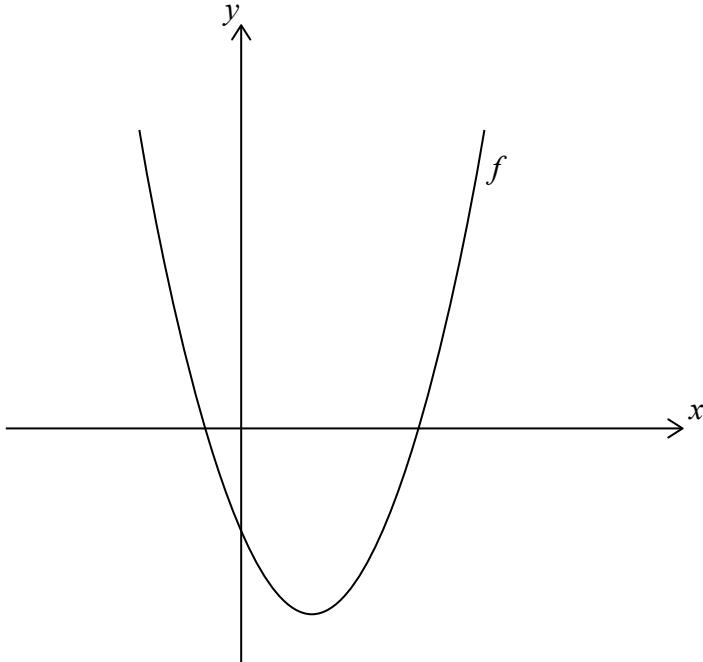
Do **not** write solutions on this page.

Section B

Answer **all** questions in the answer booklet provided. Please start each question on a new page.

8. [Maximum mark: 16]

Let $f(x) = x^2 - 4x - 5$. The following diagram shows part of the graph of f .



- (a) Find the x -intercepts of the graph of f . [5]
- (b) Find the equation of the axis of symmetry of the graph of f . [2]
- (c) The function can be written in the form $f(x) = (x - h)^2 + k$.
- (i) Write down the value of h .
 - (ii) Find the value of k . [4]

The graph of a second function, g , is obtained by a reflection of the graph of f in the y -axis, followed by a translation of $\begin{pmatrix} -3 \\ 6 \end{pmatrix}$.

- (d) Find the coordinates of the vertex of the graph of g . [5]



(Question 3 continued)

The grouped frequency table summarizes the examination results of this group of students.

Examination result (x)	$0 < x \leq 20$	$20 < x \leq 40$	$40 < x \leq 60$	$60 < x \leq 80$	$80 < x \leq 100$
Frequency	150	350	1100	1400	200

(c) Write down

- (i) the modal class;
- (ii) the mid-interval value of the modal class.

[3]

(d) Calculate an estimate of

- (i) the mean examination result;
- (ii) the standard deviation, giving your answer correct to **three decimal places**.

[3]

The teacher sets a grade boundary that is one standard deviation below the mean.

(e) Use the cumulative frequency graph to estimate the number of students whose final examination result was below this grade boundary.

[3]