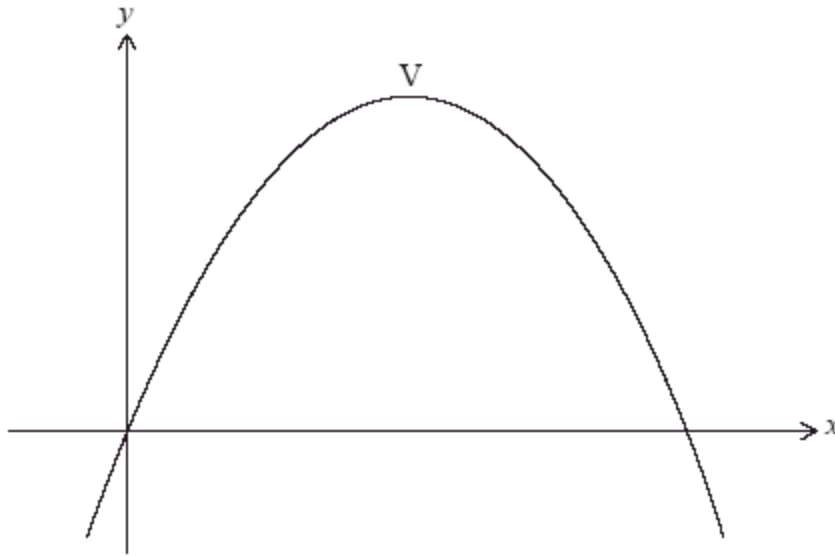


1. A quadratic curve with equation $y = ax(x - b)$ is shown in the following diagram.



The x -intercepts are at $(0, 0)$ and $(6, 0)$, and the vertex V is at $(h, 8)$.

- (a) Find the value of h .

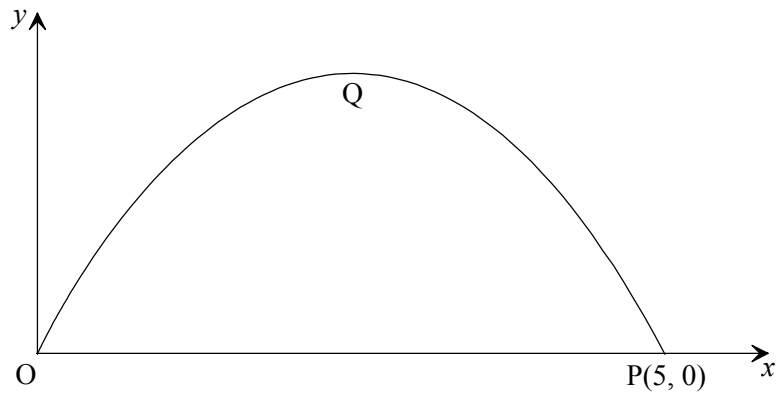
(2)

- (b) Find the equation of the curve.

(4)

(Total 6 marks)

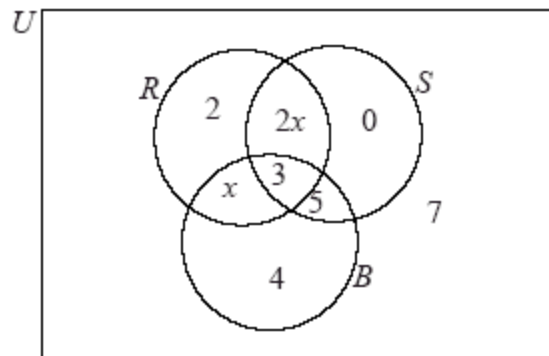
2. The diagram below shows the graph of $y = c + kx - x^2$, where k and c are constants.



- (a) Find the values of k and c .
- (b) Find the coordinates of Q , the highest point on the graph.

(Total 8 marks)

3. A survey was carried out in a year 12 class. The pupils were asked which pop groups they like out of the *Rockers* (R), the *Salseros* (S), and the *Bluers* (B). The results are shown in the following diagram.



- (a) Write down $n(R \cap S \cap B)$.

(1)

- (b) Find $n(R')$.

(2)

(c) Describe which groups the pupils in the set $S \cap B$ like. (2)

(d) Use set notation to describe the group of pupils who like the *Rockers* and the *Bluers* but do not like the *Salseros*. (2)

There are 33 pupils in the class.

(e) (i) Find x .

(ii) Find the number of pupils who like the *Rockers*.

(3)
(Total 10 marks)

4. Let p and q represent the propositions

p : food may be taken into the cinema

q : drinks may be taken into the cinema

(a) Complete the truth table below for the symbolic statement $\neg(p \vee q)$.

p	q	$p \vee q$	$\neg(p \vee q)$
T	T		
T	F		
F	T		
F	F		

(2)

(b) Write down in words the meaning of the symbolic statement $\neg(p \vee q)$.

(2)

- (c) Write in symbolic form the compound statement:

“no food and no drinks may be taken into the cinema”.

(2)

(Total 6 marks)

5. The first term of an arithmetic sequence is 0 and the common difference is 12.

- (a) Find the value of the 96th term of the sequence.

(2)

The first term of a geometric sequence is 6. The 6th term of the geometric sequence is equal to the 17th term of the arithmetic sequence given above.

- (b) Write down an equation using this information.

(2)

- (c) Calculate the common ratio of the geometric sequence.

(2)

(Total 6 marks)

6. The marks obtained by 8 candidates in Physics and Chemistry tests are given below.

Physics (x)	6	8	10	11	10	5	4	12
Chemistry (y)	8	11	14	13	11	7	5	15

- (a) Write down the product moment correlation coefficient, r .

(1)

- (b) Write down, in the form $y = mx + c$, the equation of the regression line y on x for the 8 candidates.

(2)

A ninth candidate obtained a score of 7 in the Physics test but was absent for the Chemistry test.

- (c) Use your answer to (b) to estimate the score he would have obtained on the Chemistry test.

(2)

- (d) Give a reason why it is valid to use this regression line to estimate the score on the Chemistry test.

(1)

(Total 6 marks)