




**Maths
Junior Certificate
Higher Level**

**Past Exam Questions on
Quadratic Graphs**


Q5 Part (c) 2012 Paper 1

(c) Let f be the function $f: x \rightarrow 10 - x - 2x^2$.

- (i)  Draw the graph of f for $-3 \leq x \leq 3$, $x \in \mathbb{R}$.
- (ii) Use your graph to estimate the maximum value of $f(x)$.
- (iii) Use your graph to estimate the values of x for which $f(x) = 6$.


Q5 Part (b) & (c) 2011 Paper 1


(b) Let f be the function $f: x \rightarrow 7x - x^2$.

 Draw the graph of f for $0 \leq x \leq 7$, $x \in \mathbb{R}$.

(c) The formula for the height, y metres, of a golf ball above ground level x seconds after it is hit, is given by $7x - x^2$.

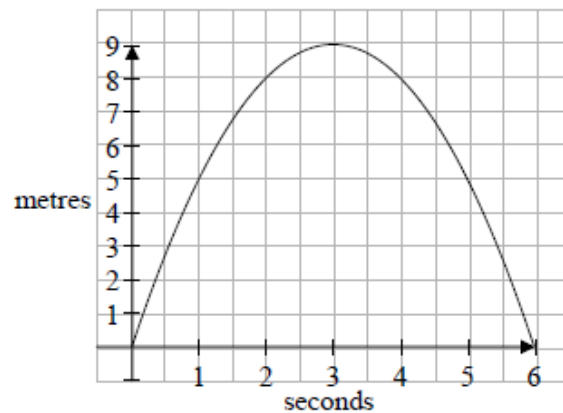
Use your graph from part (b):


(i)  to find the maximum height reached by the golf ball

(ii)  to estimate the number of seconds the golf ball was more than 2 metres above the ground.

The graph below represents the flight of another golf ball.

The flight of the golf ball is given by the formula $ax - x^2$, $x \in \mathbb{R}$.



(iii)  Find the value of a .

Q6 Part (b) & (c) 2010 Paper 1

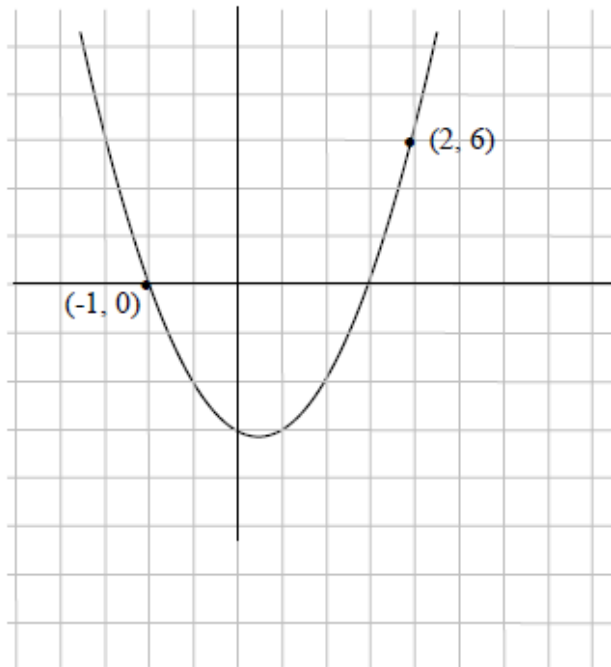
- (b) Let f be the function $f: x \rightarrow x^2 + 5x$ and let g be the function $g: x \rightarrow x + 2$.
- ~~✍~~ Using the same axes and scales, draw the graph of f and the graph of g , for $-5 \leq x \leq 1$, $x \in \mathbf{R}$.
- (c) Use your graphs from part (b) to estimate:
- ~~✍~~ The minimum value of $f(x)$
 - ~~✍~~ The values of x for which $f(x) = g(x)$
 - ~~✍~~ The range of values of x for which $f(x) \leq g(x)$.

Q5 Part (c) 2009 Paper 1

- (c) Let f be the function $f: x \rightarrow 2x^2 + x - 15$.
- ~~✍~~ Draw the graph of f for $-4 \leq x \leq 3$, $x \in \mathbf{R}$.
 - ~~✍~~ Use your graph to find the minimum value of $f(x)$.
 - ~~✍~~ Use your graph to find the range of values of x for which $f(x) \geq 0$.

Q5 Part (c) 2008 Paper 1

- (c) Let f be the function $f: x \rightarrow 4x^2 + bx + c$, $x \in \mathbf{R}$ and $b, c \in \mathbf{Z}$.
The points $(2, 6)$ and $(-1, 0)$ lie on the graph of f , as shown in the diagram.




- (i) ✎ Find the value of b and the value of c .
- (ii) ✎ Solve $f(x) = -6$.


Q6 Part (c) 2008 Paper 1

- (c) The area of the inner section is represented by the function:
 $f: x \rightarrow -x^2 + 12x - 20$.
- (i) ✎ Draw the graph of f for $2 \leq x \leq 10$, $x \in \mathbf{R}$.
- (ii) Write down the maximum possible area of the inner section.

Q5 Part (b) 2007 Paper 1

(b) (i) Let f be the function $f: x \rightarrow 2x^2 - 4x + 5$.

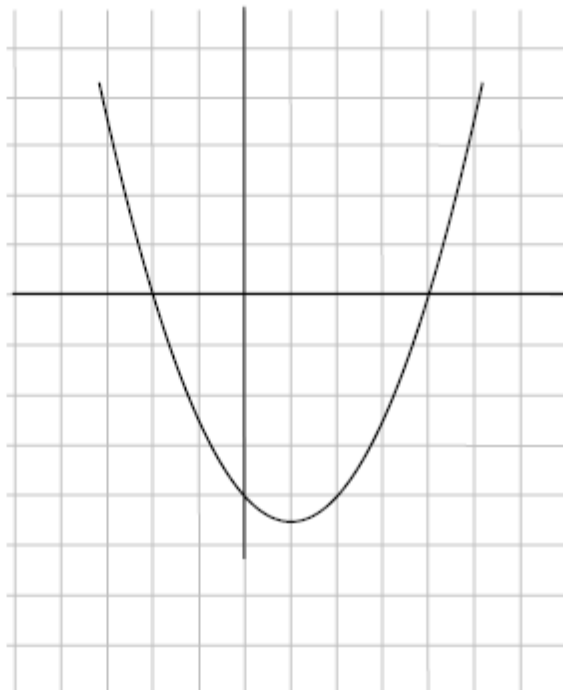
 Draw the graph of f for $-2 \leq x \leq 4$, $x \in \mathbf{R}$.

(ii)  Use your graph to find the values of x for which $f(x) = 7$.


Q6 Part (c) 2007 Paper 1


(c) The diagram shows part of the graph of the function

$$f: x \rightarrow x^2 + bx + c, \text{ where } x \in \mathbf{R} \text{ and } b, c \in \mathbf{Z}.$$



The graph intersects the x -axis at $(-1, 0)$ and $(2, 0)$.

(i)  Calculate the value of b and the value of c .

(ii)  $(k, -k+14)$ is a point on the graph, where $k \in \mathbf{Z}$.

Find the values of k .

Q6 Part (c) 2006 Paper 1

(c) Let f be the function $f: x \rightarrow 1 - 3x$ and g be the function $g: x \rightarrow 1 - x^2$.

(i) ✍ Find $f(-2)$ and $g(5)$.

(ii) ✍ Express $f(x + 1)$ in the form $ax + b$, a and $b \in \mathbf{Z}$.

(iii) ✍ Solve for x : $f(x + 1) = f(-2) + g(5)$.

Q5 Part (b) 2006 Paper 1

(b) Let f be the function $f: x \rightarrow 35x - 5x^2$.

Draw the graph of f for $0 \leq x \leq 7$, $x \in \mathbf{R}$.

Q5 Part (c) 2006 Paper 1

(c) The formula for the height, y metres, of a ball above ground level, x seconds after it is fired vertically into the air, is given by:

$$y = 35x - 5x^2.$$

Use your graph from part (b) to estimate:

(i) ✍ the maximum height reached by the ball

(ii) ✍ the height of the ball after 5.5 seconds.

On two occasions the ball is 20 metres above the ground.

(iii) ✍ Use your graph from part (b) to estimate the two times when this occurred.

Q6 Part (b) & (c) 2005 Paper 1

(b) Let f be the function $f: x \rightarrow 5 - 3x - 2x^2$ and g be the function $g: x \rightarrow -2x - 1$.

~~✍~~ Using the same axes and scales, draw the graph of f
and the graph of g , for $-3 \leq x \leq 2$, $x \in \mathbf{R}$.

(c) Use your graphs from part (b) to estimate:

(i) ~~✍~~ the maximum value of $f(x)$

(ii) ~~✍~~ the values of x for which $f(x) = g(x)$

(iii) ~~✍~~ the range of values of x for which $f(x) \geq g(x)$.

Q5 Part (c) 2005 Paper 1

(c) Let f be the function $f: x \rightarrow x^2 + bx + c$, $x \in \mathbf{R}$ and $b, c \in \mathbf{Z}$.

The graph of f cuts the x axis at the points where $x = -3$ and $x = 2$.

(i) ~~✍~~ Find the value of b and the value of c .

(ii) ~~✍~~ Find the value of x for which $f(x) = f(x + 2)$.