

# QUADRATIC AND CUBIC GRAPHS

*KCSE 1989 – 2012 Form 3 Mathematics*

**1. 1989 Q22 P1**

- (a) Using the grid provided below draw the graph of  $y = -2x^2 + x + 8$  for values of  $x$  between -3 and 4 (4marks)
- (b) From your graphs find the roots of  $-2x^2 + x + 8 = 0$  (1mark)
- (c) By drawing a suitable straight line graph on the same axes, find the roots of  $-x^2 + 4x + 12 = 0$  (3marks)

**2. 1991 Q19 P2**

Complete the table given below for the equation  $y = 5 + 3x - 2x^2$  by filling in the blank spaces.

x	y
-2	-9
-1.5	
-1	
-0.5	3
0	
0.5	6
1	
1.5	
2	
2.5	
3	-4
3.5	

Use the values from the table above to draw the graph of  $y = 5 + 3x - 2x^2$

Use your graph to determine the ranges of values of  $x$  which satisfy the inequality  $5 + 3x - 2x^2 \leq -2$

(3marks)

**3. 1992 Q19 P1**

- On the grid provided, draw the graph of  $y = 2x^2 - 3x - 5$  for  $-2 < x < 3$ . (4marks)
- In order to solve graphically the equation  $2x^2 - x - 3 = 0$ , a straight line must be drawn to intersect the curve  $y = 2x^2 - 3x - 5$ .
- Obtain the equation of this straight line, draw the straight line and hence obtain the graphical solution to the equation  $2x^2 - x - 3 = 0$  (4marks)

**4. 1993 Q20 P1**

On the the grid provided, plot the graph of  $y = -2x^2 + 3x + 6$  for values of  $x$  and  $y$  from  $x = -3$  to  $x = 4$ . Use your graph to find the roots of the equation  $-2x^2 + x + 9 = 0$  (8marks)

5. **1994 Q20 P1**  
 Draw the graph of the function  $y = 2x^2 + 6x - 5$  by taking the integral values of  $x$  in  $-4 \leq x \leq 3$ .  
 (4marks)  
 Use the graph to solve the following equations.  
 (i)  $2x^2 + 6x - 5 = 0$  (4marks)  
 (ii)  $2x^2 - x - 6 = 0$

6. **1995 Q21 P1**  
 (a) Construct a table of values for the function  
 $y = x^2 - 6$  for  $-3 < x < 4$  (2 marks)  
 (b) By drawing a suitable line on the same grid estimate the roots of the equation  $x^2 + 2x - 2 = 0$   
 (3 marks)

7. **1997 Q20 P1**  
 (a) Draw the graph of  $y = 6 + x - x^2$ , taking integral value of  $x$  in  $4 \leq x \leq 5$ . (The grid is provided. Using the same axes draw the graph of  $y = 2 - 2x$   
 (b) From your graphs, find the values of  $X$  which satisfy the simultaneous equations  $y = 6 + x - x^2$   
 $y = 2 - 2x$   
 (c) Write down and simplify a quadratic equation which is satisfied by the values of  $x$  where the two graphs intersect.

8. **1999 Q20 P1**  
 (a) Complete the following table for the equation  
 $y = x^3 - 5x^2 + 2x + 9$

x	$x^3$	$-5x^2$	$2x$	9	y
-2		-20	-4	9	
-1.5	-3.4	-11.3	-3	9	-8.7
-1	-1	-5		9	
0	0	0	0	9	9
1	1	-1	2	9	7
2		-20	4	9	
3	27	-45	6	9	
4	64		8	9	
5	125		10	9	

- (b) On the grid provided draw the graph of  
 $y = x^3 - 5x^2 + 2x + 9$  for  $-2 \leq x \leq 5$   
 (c) Using the graph estimate the root of the equation  
 $x^3 - 5x^2 + 2x + 9 = 0$  between  $x = 2$  and  $x = 3$   
 (d) Using the same axes draw the graph of  $y = 4 - 4x$  and estimate a solution to the equation  
 $x^2 - 5x^2 + 6x + 5 = 0$

9. **2000 Q19 P1**

(a) Complete the table below for the equation  $y = 2x^3 + 5x^2 - x - 6$

(2marks)

x	-4	-3	-2	-1	0	1	2
$2x^3$	-128	-54			0	2	16
$5x^2$	80	45	20	5	0	5	20
-x	4	3				-1	
-6	-6	-6	-6	-6	-6	-6	-6
y	-50				-6	0	

(b) On the grid provided draw the graph

$y = 2x^3 + 5x^2 - x - 6$  for  $-4 \leq x \leq 2$ . Use 2cm to represent 1 unit on the x axis and 1cm to represent 5 units on the y axis

(3marks)

(c) By drawing a suitable line use the graph in (b) to solve the equation  $2x^3 + 5x^2 - x - 4 = 0$

(3marks)

10. **2001 Q22 P1**

(a) Complete the following table for the equation

$$y = x^3 + 2x^2$$

x	$x^3$	$2x^2$	y
-3	-27	18	-9
-2.5			
-2	-8	8	0
-1.5	-3.375	4.5	1.125
-1	-1	2	1
-0.5	0.125	0.5	0.375
0	0	0	0
1	0.125	0.5	0.625
1.5	3.375	4.5	7.875

(b) On the grid provided draw the graph  $y = x^3 + 2x^2$  for  $-3 \leq x \leq 1.5$

Take the scale: 2cm for 1 unit on the X- axis and 1 cm for 1 unit on y - axis

(c) By drawing a suitable line on the same grid, Estimate the roots of the equation:

$$x^3 + 2x^2 - x - 2 = 0$$

**2003 Q22 P1**11 Complete the table below, for function  $y = 2x^2 + 4x - 3$ 

X	-4	-3	-2	-1	0	1	2
$2x^2$	3		8	2	0	2	
$4x - 3$			-11				5
y			-3		-3	3	1
							3

b) On the grid provided, draw the graph of the function  $y = 2x^2 + 4x - 3$  for  $-4 \leq x \leq 2$  and use the graph to estimate the roots of the equation  $2x^2 + 4x - 3 = 0$  to 1 decimal place. (3marks)

c) In order to solve graphically the equation  $2x^2 + x - 5 = 0$ , straight line must be drawn to intersect the curve  $y = 2x^2 + 4x - 3$ . Determine the equation of this straight line, draw the straight line hence obtain the roots of the equation  $2x^2 + x - 5 = 0$  to 1 decimal place (3marks)

**2004 Q18 P1**12 The equation of a curve is given  $y = x^3 + 4x^2 - 2$ 

- a) Determine the coordinates of the turning points of the curve, correct to 1 decimal place.  
 b) Use the equation of the curve to complete the table below.

x	-4	-3	-2	-1	0	1
y	-2		6	1		

- c) i) On the grid provided, use the solutions in part (a) and the values in the table in part (b) to draw the curve for  $-4 < x < 1$ .  
 ii) Use the graph to solve the equation  $x^3 + 4x^2 - 2 = 0$

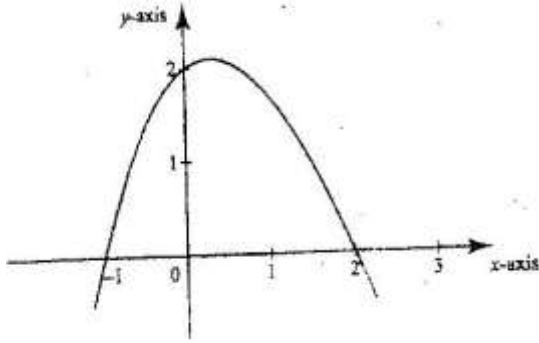
**2006 Q14 P2**13 The table shows some corresponding values of x and y for the curve represented by  $y = \frac{1}{4}x^3 - 2$ 

X	Y
-3	-8.8
-2	-4
-1	-2.3
0	-2
1	-1.8
2	0
3	4.8

On the grid provided below, draw the graph of  $y = \frac{1}{4}x^3 - 2$  for  $-3 \leq x \leq 3$ . Use the graph to estimate the value of x when  $y = 2$  (3 marks)

14 **2007 Q14 P2**

The figure below is a sketch of the graph of the quadratic function  $y = k(x+1)(x-2)$



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**2008 Q24 P2**

The table below shows values of  $x$  and some values of  $y$  for the curve  $y = x^3 + 3x^2 - 4x - 12$  in the range  $-4 \leq x \leq 2$ .

a) Complete the table by filling in the missing values of  $y$ .

$x$	$y$
-4	
-3.5	-4.1
-3	
-2.5	-1.1
-2	
-1.5	-2.6
-1	
-0.5	-9.4
0	
0.5	-13.1
1	
1.5	-7.9
2	

b) On the grid provided, draw the graph  $y = x^3 + 3x^2 - 4x - 12$  for  $-4 \leq x \leq 2$ .

Use the scale. Horizontal axis 2cm for 1 unit and vertical axis 2cm for 5 units.

(3mks)

c) By drawing a suitable straight line on the same grid as the curve, solve the equation  $x^3 + 3x^2 - 5x - 6 = 0$   
(5mks)

16 **2011 Q21 P2**

The table below shows values of  $x$  and some values of  $y$  for the curve  $y=x^3+2x^2-3x-4$  for  $-3 \leq x \leq 2$ .

(a) Complete the table by filling in the missing values of  $y$ , correct to 1 decimal place.

(2marks)

$x$	$y$
-3	-4
-2.5	0.4
-2	
-1.5	1.6
-1	0
-0.5	
0	-4
0.5	-4.9
1	
1.5	
2	6

(b) On the grid provided, draw the graph of

$y=x^3+2x^2-3x-4$ . Use the scale: 1cm represents 0.5 units on  $x$ -axis

1cm represents 1 unit on  $y$ - axis (3marks)

(c) Use the graph to:

(i) Solve the equation  $x^3+2x^2-3x-4=0$ ; (3marks)

(ii) Estimate the coordinates of the turn points of the curve (2marks)