Pure 2 – Simultaneous Equations

Please **complete** this homework by _____. Start it early. If you can't do a question you will then have time to ask your teacher for help or go to a drop in session.

Section 1 – Review of previous topics. Please complete all questions.

1. Solve these quadratic equations. You may need to rearrange them first.

a. $x^2 = 5x$

b. $2x^2 + x = 15$

c. $2x^2 - 4x + 1 = 0$. Give your answers in the form $a \pm b\sqrt{2}$

[6]

2. Use the discriminant to determine the number of real roots of each of these quadratic equations.

a. $5x^2 - 3x + 7 = 0$

b. $6x^2 - 5x - 3 = 0$

c. $9x^2 - 12x + 4 = 0$ [6]

3. Sketch the graphs of these quadratic functions, in each case giving the coordinates of the vertex and the points of intersection with the axes.

a. $y = x^2 - 1$

b. $y = (x - 1)^2 + 3$ [6]

Section 2 – Consolidation of this week's topic. Please complete all questions.

1. Solve the following sets of simultaneous equations.

(a) $2x + 3y = -7$
$5x - 2y = 11$ [5]

(b) $y = x - 3$
$y^2 + xy + 4x = 7$ [5]

(c) $x + 2y = 13$
$x^2 - y^2 = 9$ [5]

2.

(a) On the same axes, draw the graphs of

(i) $y = x^2$ and $y = - x + 12$ (ii) $y = x^2$ and $x + y = - 8$
(iii) $y = x^2$ and $y = - x - ¼$ (iv) $y = x^2$ and $x = 3$

[5]

(b) Use your graphs to determine the number of solutions to the simultaneous equations.

[4]

(c) Solve the simultaneous equations to verify your answers. [15]

(Total 39 Marks)

Section 3 – Extension questions. If you are aiming for a top grade, you should attempt these questions.

1. The line $y = 5 - x$ intersects the curve $y = x^2 - 3x + 2$ at the points P and Q.
Find the length PQ in the form $k\sqrt{2}$.

2. Solve the simultaneous equations:

$3^{x-1} = 9^{2y}$
$8^{x-2} = 4^{1+y}$