SKETCHING CUBICS

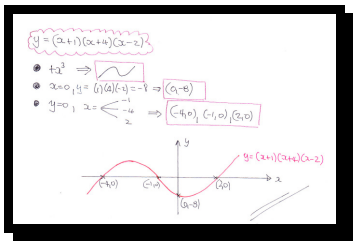
Question 1

Sketch the graph of the curve with equation

$$y=(x+1)(x+4)(x-2),\ x\in\mathbb{R}.$$

The sketch must include the coordinates of all the points where the curve meets the coordinate axes.

graph



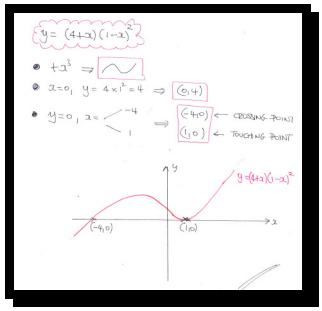
Question 2

Sketch the graph of the curve with equation

$$y=(4+x)(1-x)^2,\ x\in\mathbb{R}.$$

The sketch must include the coordinates of all the points where the curve meets the coordinate axes.

graph



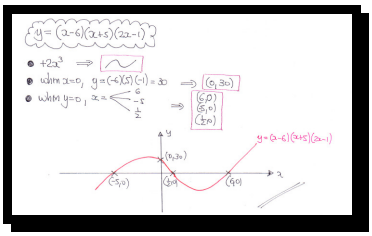
Question 3

Sketch the graph of the curve with equation

$$y=(x-6)(x+5)(2x-1),\ x\in\mathbb{R}.$$

The sketch must include the coordinates of all the points where the curve meets the coordinate axes.

graph



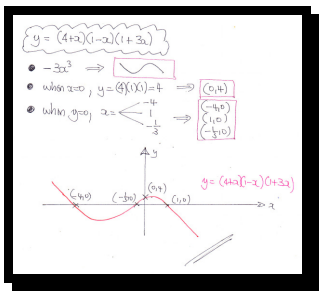
Question 4

Sketch the graph of the curve with equation

$$y=(4+x)(1-x)(1+3x),\ x\in\mathbb{R}.$$

The sketch must include the coordinates of all the points where the curve meets the coordinate axes.

graph



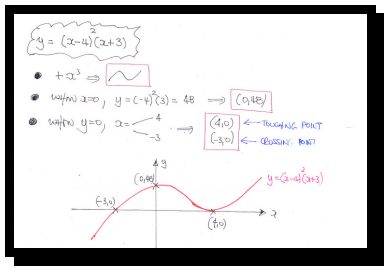
Question 5

Sketch the graph of the curve with equation

$$y=(x-4)^2(x+3),\ x\in\mathbb{R}.$$

The sketch must include the coordinates of all the points where the curve meets the coordinate axes.

graph



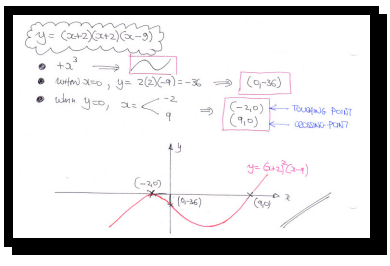
Question 6

Sketch the graph of the curve with equation

$$y=(x+2)(x+2)(x-9),\ x\in\mathbb{R}.$$

The sketch must include the coordinates of all the points where the curve meets the coordinate axes.

graph



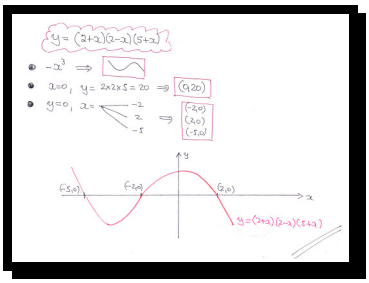
Question 7

Sketch the graph of the curve with equation

$$y=(2+x)(2-x)(5+x),\ x\in\mathbb{R}.$$

The sketch must include the coordinates of all the points where the curve meets the coordinate axes.

graph



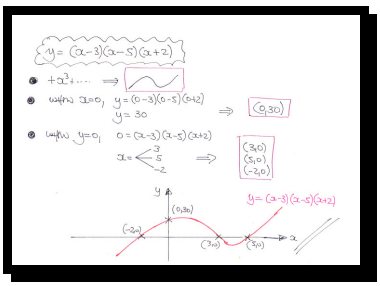
Question 8

Sketch the graph of the curve with equation

$$y=(x-3)(x-5)(x+2),\ x\in\mathbb{R}.$$

The sketch must include the coordinates of all the points where the curve meets the coordinate axes.

graph



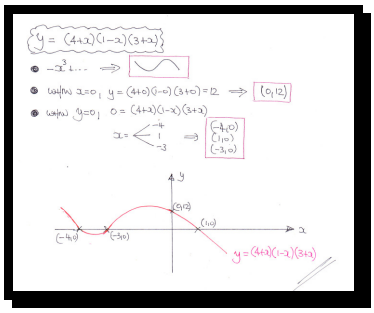
Question 9

Sketch the graph of the curve with equation

$$y=(4+x)(1-x)(3+x),\ x\in\mathbb{R}.$$

The sketch must include the coordinates of all the points where the curve meets the coordinate axes.

graph



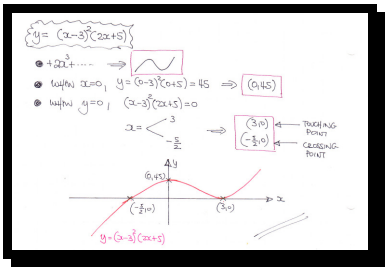
Question 10

Sketch the graph of the curve with equation

$$y=(x-3)^2(2x+5),\ x\in\mathbb{R}.$$

The sketch must include the coordinates of all the points where the curve meets the coordinate axes.

graph



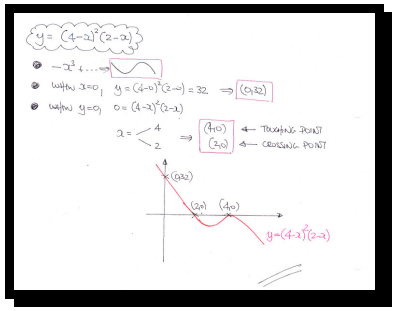
Question 11

Sketch the graph of the curve with equation

$$y=(4-x)^2(2-x),\ x\in\mathbb{R}.$$

The sketch must include the coordinates of all the points where the curve meets the coordinate axes.

graph



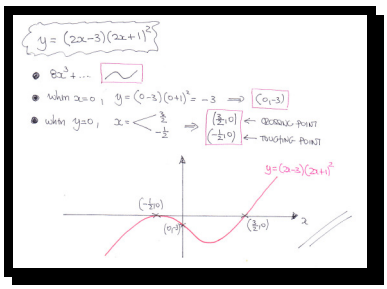
Question 12

Sketch the graph of the curve with equation

$$y=(2x-3)(2x+1)^2,\ x\in\mathbb{R}.$$

The sketch must include the coordinates of all the points where the curve meets the coordinate axes.

graph



Question 13

A cubic curve C has equation

$$y = x^3 + x^2 - 24x + 36 .$$

a) Find the values of the constants A and B, so that

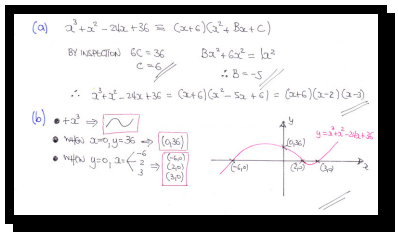
$$x^3 + x^2 - 24x + 36 \equiv (x+6)\left(x^2 + Bx + C\right),$$

and hence express y as a product of three linear factors.

b) Sketch the graph of C.

The sketch must include any points where the graph meets the coordinate axes.

$$\boxed{B = -5}, \quad \boxed{C = 6}, \quad \boxed{y = (x+6)(x-3)(x-2)}$$



Question 14

A cubic curve C has equation

$$y = 2x^3 + x^2 - 41x + 20 .$$

a) Find the values of the constants A, B and C, so that

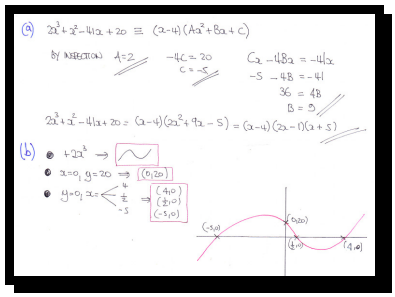
$$2x^3 + x^2 - 41x + 20 \equiv (x-4)\left(Ax^2 + Bx + C\right),$$

and hence express y as a product of three linear factors.

b) Sketch the graph of C.

The sketch must include any points where the graph meets the coordinate axes.

$$\boxed{A = 2}, \quad \boxed{B = 9}, \quad \boxed{C = -5}, \quad \boxed{y = (x+5)(x-4)(2x-1)}$$



Question 15

A cubic curve C has equation

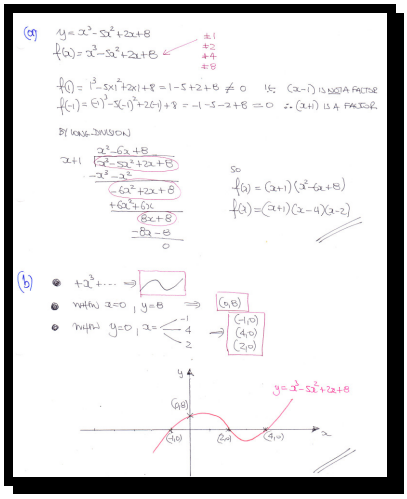
$$y = x^3 - 5x^2 + 2x + 8 .$$

a) Express y as a product of three linear factors.

b) Hence sketch the graph of C.

The sketch must include all points where the graph meets the coordinate axes.

$$\boxed{y = (x+1)(x-4)(x-2)}$$



Question 16

A cubic curve C has equation

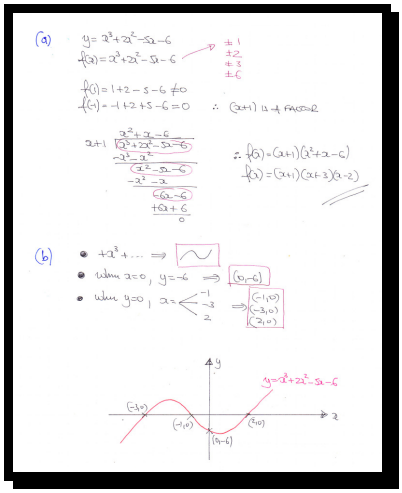
$$y = x^3 + 2x^2 - 5x - 6 .$$

a) Express y as a product of three linear factors.

b) Hence sketch the graph of C.

The sketch must include all points where the graph meets the coordinate axes.

$$\boxed{y = (x+1)(x+3)(x-2)}$$



Question 17

A cubic curve C has equation

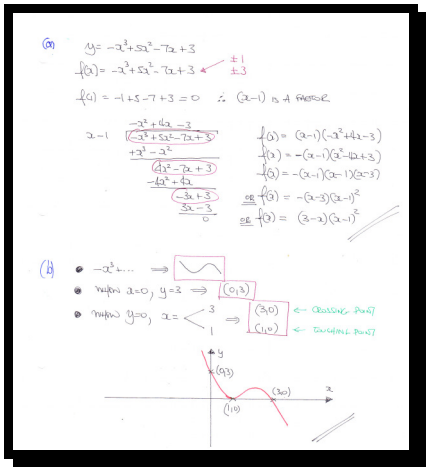
$$y = -x^3 + 5x^2 - 7x + 3 .$$

a) Express y as a product of three linear factors.

b) Hence sketch the graph of C.

The sketch must include all points where the graph meets the coordinate axes.

$$\boxed{y = (3-x)(x-1)^2}$$



Question 18

A cubic curve C has equation

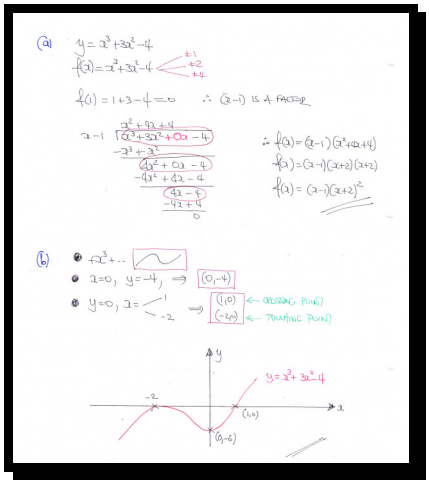
$$y = x^3 + 3x^2 - 4 .$$

a) Express y as a product of three linear factors.

b) Hence sketch the graph of C.

The sketch must include all points where the graph meets the coordinate axes.

$$\boxed{y = (x-1)(x+2)^2}$$



Question 19

A cubic curve C has equation

$$y = -x^3 + 7x^2 - 15x + 9 .$$

a) Express y as a product of three linear factors.

b) Hence sketch the graph of C.

The sketch must include all points where the graph meets the coordinate axes.

$$\boxed{y = (1-x)(x-3)^2}$$

