Homework Assignment on Math

Problem 1

A right triangle “abc” is given as the following figure. The lengths of the two sides, l_1 and l_2, are given. Solve the following questions:

i) What is the length of the third side, l_3?
ii) What is the value of $\sin(x)$?
iii) What is the angle x in degrees? (use a function on your calculator, usually labeled as $\sin^{-1}$)

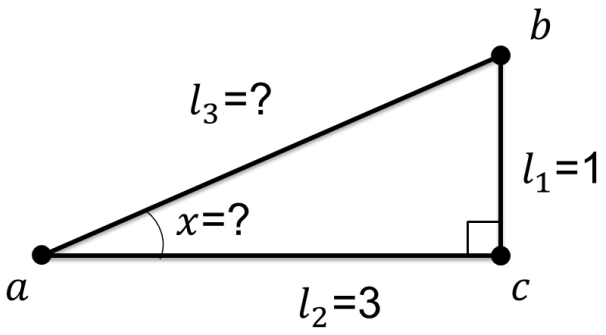

Figure for problem 1.

Problem 2

A coordinate system x-y is shown as the following figure. There are two points defined, (x_1, y_1) and (x_2, y_2). The length of the first link (the red link), is given as $L_1 = 12$, units in millimeters. The length of the second link (the blue link), is given as $L_2 = 10$, units in millimeters. The angles of the two links are also shown in the figure, whose values are $25°$ and $68°$ respectively. Solve the following questions:

i) What are the values of the coordinates of the first point (the red point), i.e. $x_1 =?\ y_1 =?$

ii) What are the values of $|x_2 - x_1|$ and $|y_2 - y_1|$?

iii) What are the values of the coordinates of the second point (the blue point), i.e. $x_2 =?\ y_2 =?$

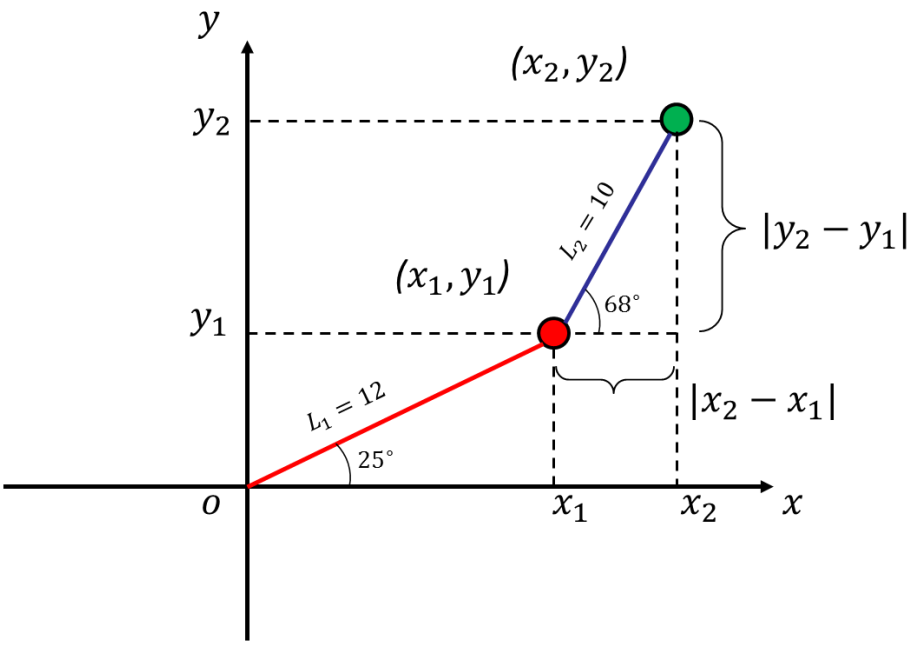

Figure for problem 2.

Problem 3

A coordinate system x-y is shown in the following figure. There are two points defined, (11.28, 4.10) and (13.86, 13.76). Or if we use variables to describe,

$$First\ point: (x_1, y_1), x_1 = 11.28, y_1 = 4.10$$

$$Second\ point: (x_2, y_2), x_2 = 13.86, y_2 = 13.76$$

The length of the first link (the red link), is given as $L_1 = 12$, units in millimeters. The length of the second link (the blue link), is given as $L_2 = 10$, units in millimeters. Solve the following questions:

i) What is the value of the angle of the first link, i.e. a=? (Units in degrees)
ii) What are the values of $|x_2 - x_1|$ and $|y_2 - y_1|$?
iii) What is the value of the angle of the second link, i.e. b=? (Units in degrees)
iv) What is the value of the angle between two links, i.e. θ =? Hint: the total angle of a circle is 360 degrees.

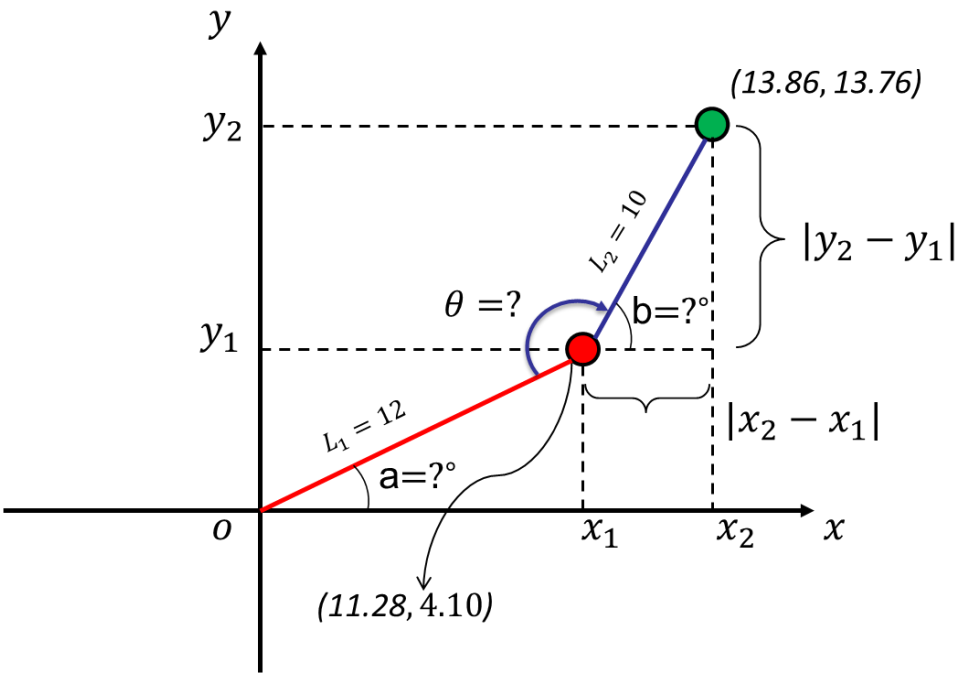

Figure for problem 3.