Write a complete program, including comments, to do the following: Your program will compute values of a formula that expresses y in terms of x. The formula is:

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$$y = \frac{x^4 - x^3 - 7x^2 + x + 6}{|x - 3| + \text{sqrt}(5 - x)}$$

where:

$|x - 3|$ means absolute value of $x - 3$
sqrt(5 - x) means square root of 5 - x

The program should evaluate the formula starting with x = -4, going up by 0.5 each time until it reaches 3. Therefore, it will use these values for x: -4, -3.5, -3, -2.5, ..., -0.5, 0, 0.5, 1, ..., 2, 2.5, 3.

For each x value, the program should compute the corresponding y value. It should print the string 'X=', then the value of x, the string 'Y=', the value of y, and then a message. The message should say one of three things.

- If the value of y is 0, then the message should say Y IS ZERO.
- If the value of y is positive, the message should say Y IS POSITIVE.
- If the value of y is negative, the message should say Y IS NEGATIVE.

A typical line of output would look like this:

X = -2 Y = 0 Y IS ZERO

Once you have finished using x = 3, the program should print a message saying that it is halting, then stop.

NOTE: Your x and y values will print in scientific notation, so the numbers will really look like this: x = -2.000000000E+00, etc.

In addition to the above:

1. Have your program find which of the y values is closest to 1 (either larger or smaller). Have the program print the x value that gives this closest y value. Also print how close the y value is to 1.

2. Have your program count how many times the formula is positive, how many times it is negative, and how many times it is zero.