

Math Function



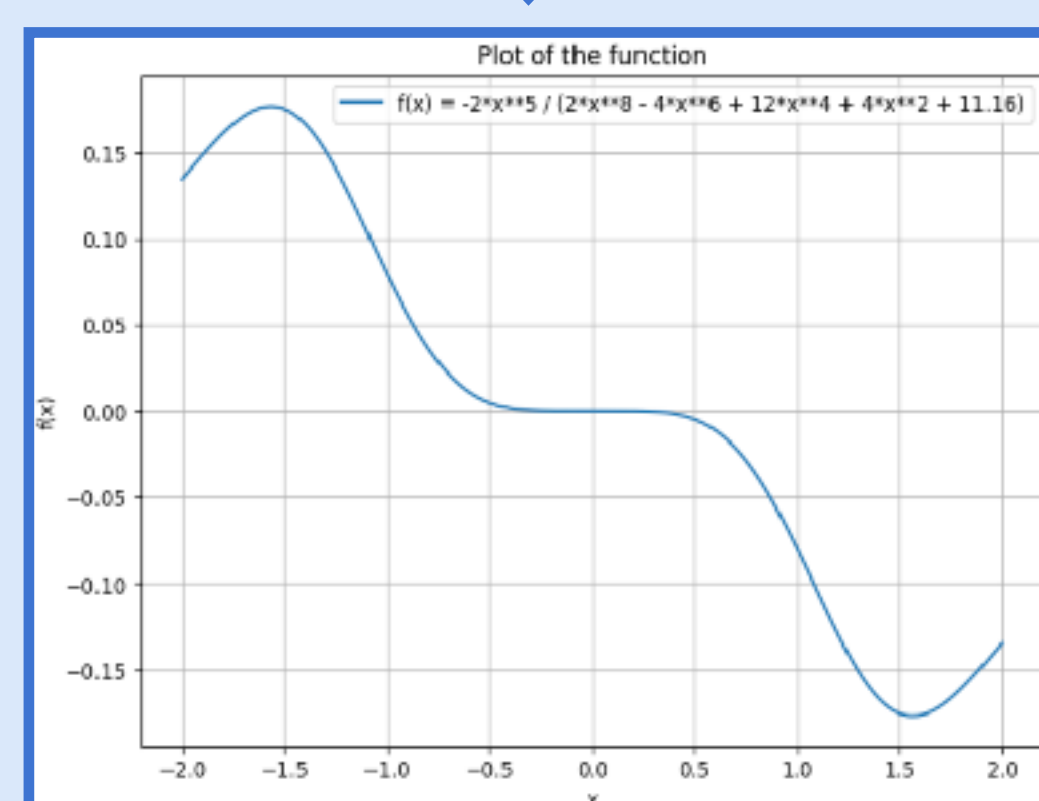
Is $f(x)$ even, odd, or neither? $f(x) = -\frac{2x^5}{2x^8 - 4x^6 + 12x^4 + 4x^2 + 11.16}$

THOUGHT 1: Even functions are symmetric about the y-axis, and odd functions are symmetric about the origin. I need to plot the function.

ACTION 1: Call Python Plotting tool

```
y=-2 * x**5/ (2 * x**8 - 4 * x**6 + 12 * x**4 + 4 * x**2 + 11.16)
plt.plot(x, y)
```

OBSERVATION 1

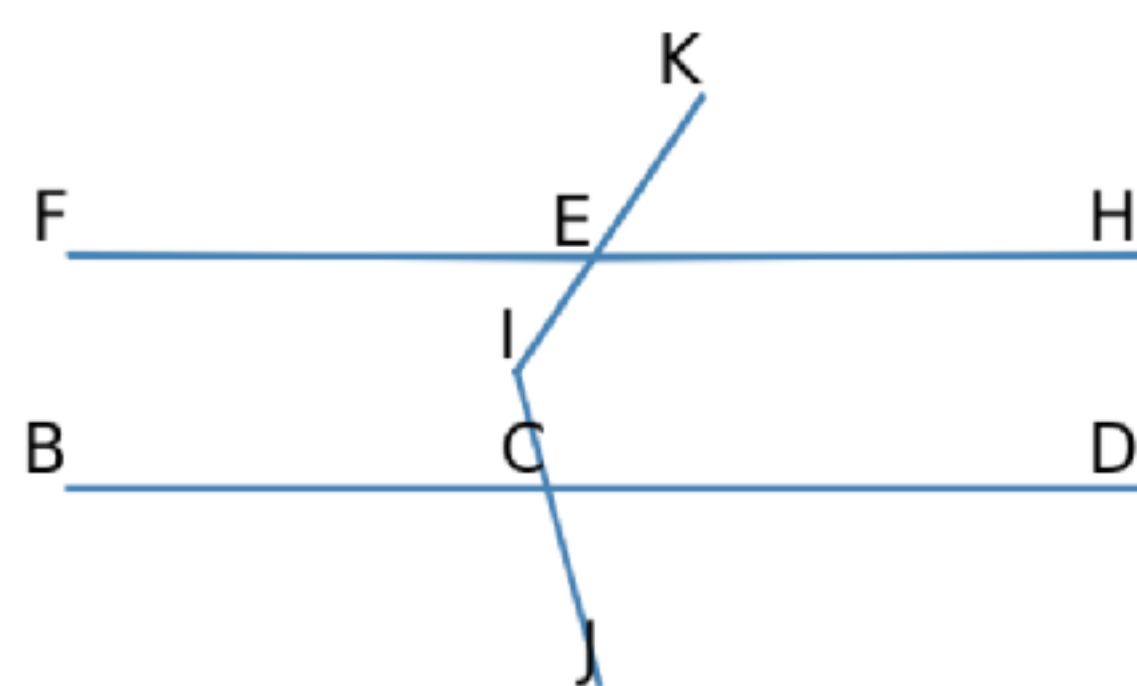


THOUGHT 2: The function is symmetric about the origin, indicating $f(x)$ is odd.

Geometry



Given $\angle BCJ = 105^\circ$,
 $\angle KEF = 105^\circ$. Find $\angle EIC$

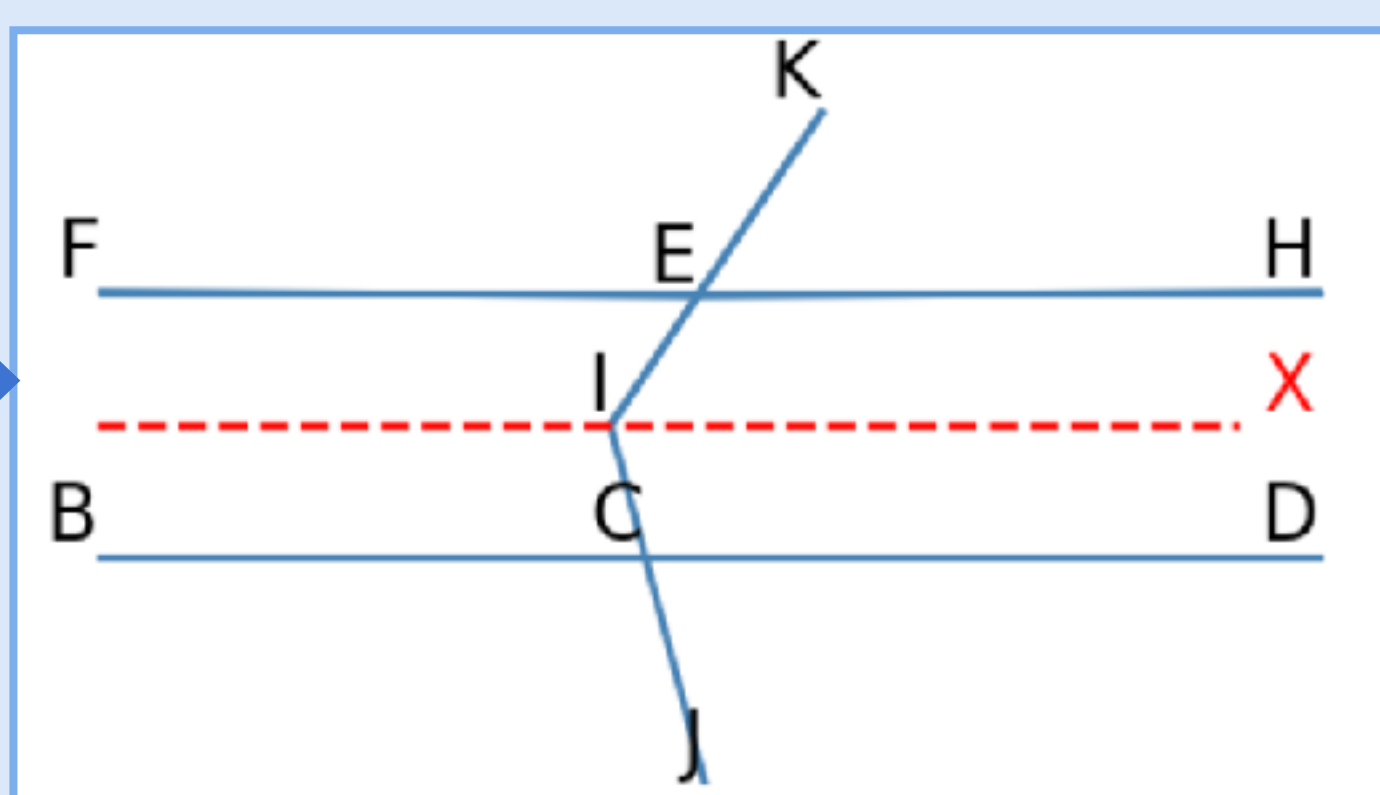


THOUGHT 1: I need to draw an auxiliary Line IX parallel to Line BD

ACTION 1: Draw the aux. line using Python Code

```
# Define auxiliary point X for the line IX
x_I = points["I"][0]
y_I = points["I"][1]
x_X = x_I + 100
y_X = y_I + slope_bd * (x_X - x_I)
# Plot the auxiliary line IX in red color
ax.plot([x_I, x_X], [y_I, y_X], 'red') ...
```

OBSERVATION 1



THOUGHT 2: Given $\angle BCJ = \angle KEF = 105^\circ$, their supplementary angles, $\angle KEH = \angle DCJ = 180^\circ - 105^\circ = 75^\circ$. Given BD parallel to IX, it follows that $\angle EIX = \angle KEH$, and $\angle XIC = \angle DCJ$, both measuring 75° . Therefore, $\angle EIC = \angle EIX + \angle XIC = 150^\circ$

Correspondence



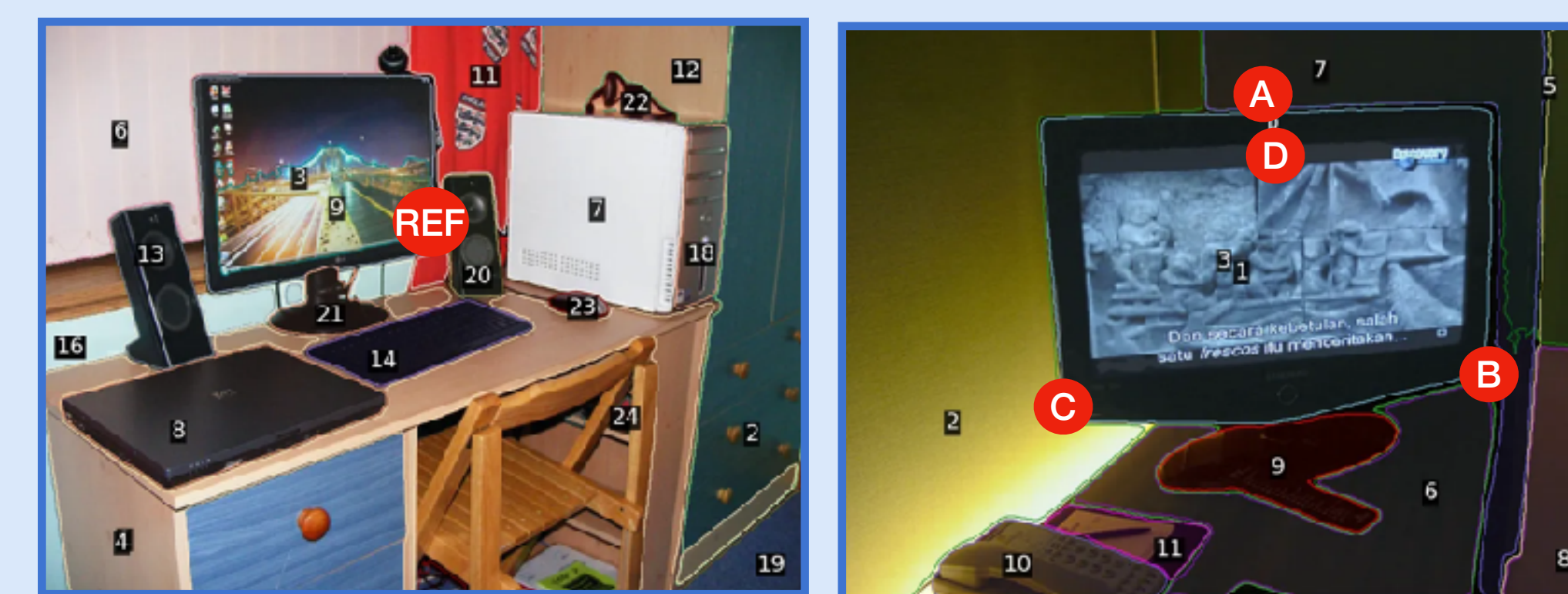
Which point is corresponding to the reference point?



THOUGHT 1: To find the corresponding point for the reference point in the first image, I will use the segmentation and marking tool to understand the objects relationships

ACTION 1: Call segmentation and marking

```
segmented1, boxes1 = segment_and_mark(image_1)
segmented2, boxes2 = segment_and_mark(image_2)
```



THOUGHT 2: The reference point in the first image is on the monitor screen, specifically on the right speaker. In the second image, I need to find the point that corresponds to the right speaker on the monitor. The segmentation and marking tool has labeled the objects, and I can see that the monitor in the second image is labeled as 3. The corresponding point should be on the right side of the monitor, which is B.

Graph Connectivity



Is there a path between node 0 and node 4 in the graph?

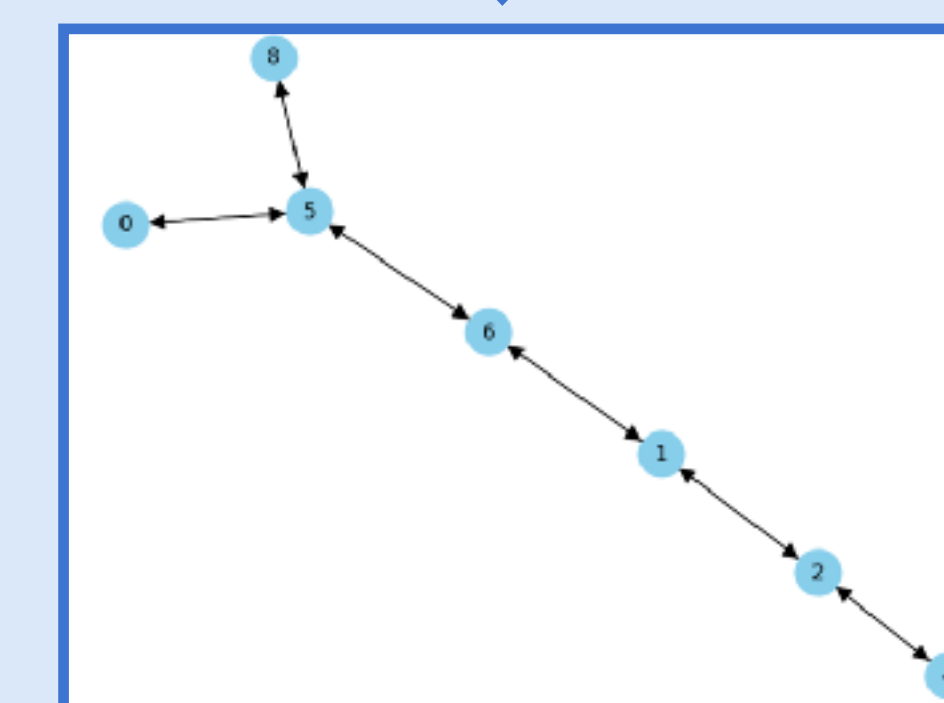
adjacency matrix =
$$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \end{bmatrix}$$

THOUGHT 1: We can use the networkx library to plot the graph

ACTION 1: Call Python Plotting tool

```
G = nx.from_numpy_matrix(np.array(adjacency_matrix),
create_using=nx.DiGraph)
pos = nx.spring_layout(G)
nx.draw(G, pos, with_labels=True)
```

OBSERVATION 1



THOUGHT 2: From the graph, I saw there is a path between node 0 and node 4.