Problem of the Week

Problem D

Mapping the Beats 2

Streaming services often use artificial intelligence to recommend music. One way to do this is to represent song attributes and a listener's preferences using numbers or points on a grid. Recommendations for a listener can then be made by looking for songs represented by points that are close in distance to the point representing the listener's preferences.

A particular music app represents song attributes and listener preferences using two scores: Energy and Happiness, which are each integers from 1 to 10. Suppose that three songs are represented by the following points:

Song	(Energy, Happiness)
A	$(5, 5)$
B	$(4, 3)$
C	$(2, 8)$

(a) Denise's song preference score is represented as $(6, 4)$. Use the distance formula $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ to calculate the distance from Denise's song preference score to each song. Which of the three songs would the streaming service recommend to Denise?

(b) After an app update, a song is recommended if its distance from the listener's score is most 4. How many different scores of (E, H) could there be in the songs recommended to Denise?

