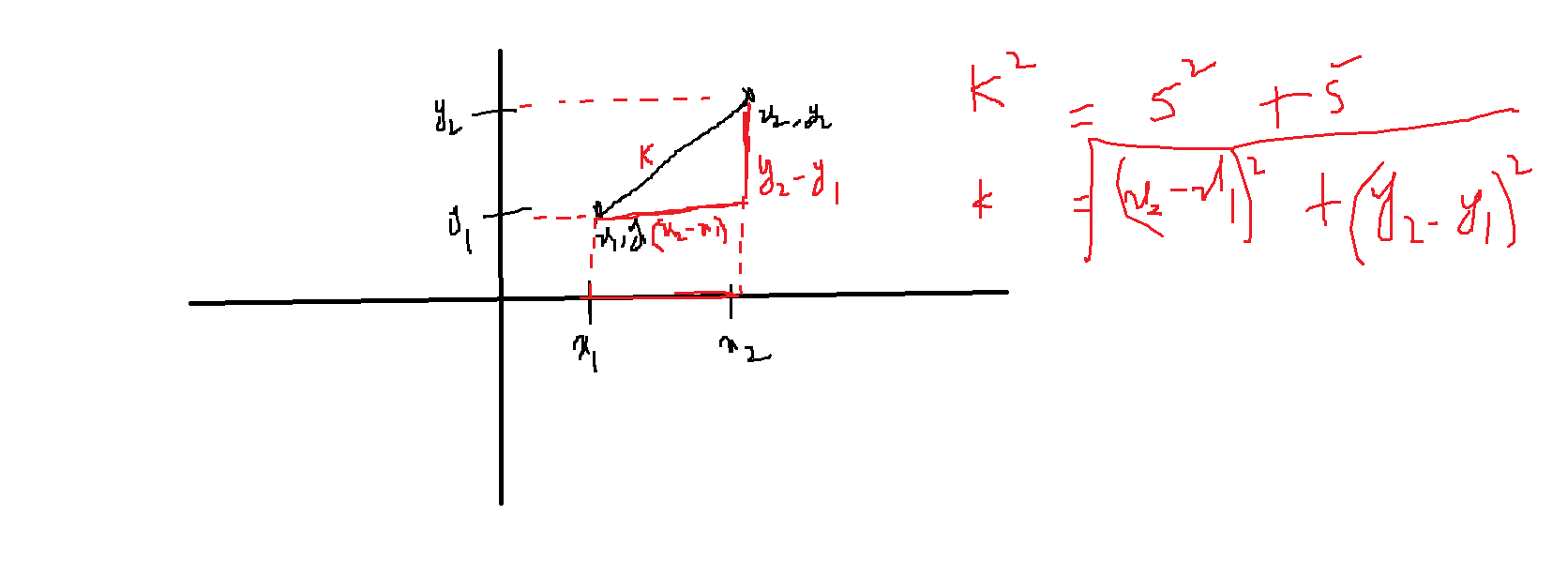
K-Nearest Neighbors

Closest relation And far relation

Maths: Distance between two points



| X1 | X2 | y |
| --- | --- | --- |
| 7 | 7 | Bad |
| 7 | 4 | Bad |
| 3 | 4 | Good |
| 1 | 4 | Good |

Question:

If new tuple X1=3, and X2=7 what is Y?

Step-1: Calculate distance between each observation

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| X1 | X2 | y | d |
| --- | --- | --- | --- |
| 7 | 7 | Bad |  |
| 7 | 4 | Bad |  |
| 3 | 4 | Good |  |
| 1 | 4 | Good |  |

Step-2: Provide the ranking

| X1 | X2 | y | d | Rank |
| --- | --- | --- | --- | --- |
| 7 | 7 | Bad |  | 3 |
| 7 | 4 | Bad |  | 4 |
| 3 | 4 | Good |  | 1 |
| 1 | 4 | Good |  | 2 |

Step-3: choose your neighbors k=3

| X1 | X2 | y | d | Rank | Neighbor or not |
| --- | --- | --- | --- | --- | --- |
| 7 | 7 | Bad |  | 3 | Yes |
| 7 | 4 | Bad |  | 4 | No |
| 3 | 4 | Good |  | 1 | Yes |
| 1 | 4 | Good |  | 2 | Yes |

Step-4: for only those are neighbors write the original label

| X1 | X2 | y | d | Rank | Neighbor or not | Original |
| --- | --- | --- | --- | --- | --- | --- |
| 7 | 7 | Bad |  | 3 | Yes | Bad |
| 7 | 4 | Bad |  | 4 | No | ------ |
| 3 | 4 | Good |  | 1 | Yes | Good |
| 1 | 4 | Good |  | 2 | Yes | Good |

Bad Good Good

3 member committee : majority of voting

Conclusion: Good