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1. a) [1, 5, 4, 2, 8, 10]

min = 1

max = 10

range = 10 - 1 = 9

normalized value = $\frac{x_i - min}{range}$

$= \frac{1-1}{9} = 0$

$= \frac{5-1}{9} = 0.44$

$= \frac{4-1}{9} = 0.33$

$= \frac{2-1}{9} = 0.11$

$= \frac{8-1}{9} = 0.77$

$= \frac{10-1}{9} = 1$ ※

b) $SD = \sqrt{\frac{\sum (x_i - \bar{x})^2}{N}}$

$= \sqrt{\frac{(1-5)^2 + (5-5)^2 + (4-5)^2 + (2-5)^2 + (8-5)^2 + (10-5)^2}{6}}$

$= 3.16$

standardized Value = $\frac{(x - \bar{x})}{SD}$

$\frac{1-5}{3.16} = -1.26$

$\frac{5-5}{3.16} = 0$

$\frac{4-5}{3.16} = -0.31$

$\frac{2-5}{3.16} = -0.95$

$\frac{8-5}{3.16} = 0.95$

$\frac{10-5}{3.16} = 1.58$ ※

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2. Calculate distance between x & y using Euclidean Distance

x = [1, 2, 3], y = [2, 1, 3]

$= \sqrt{(1-2)^2 + (2-1)^2 + (3-3)^2} = \sqrt{2} = 1.414$ ※

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3. Find Euclidean distance between z

$\sqrt{(1-0)^2 + (0-1)^2} = 1.414$

$\sqrt{(1-0)^2 + (0-2)^2} = 2.23$

$\sqrt{(1-0)^2 + (0-3)^2} = 3.16$

$\sqrt{(1-1)^2 + (0-1)^2} = 1$

$\sqrt{(1-1)^2 + (0-2)^2} = 2$

$\sqrt{(1-1)^2 + (0-3)^2} = 3$

sort distance from z, K = 3

(1, 1), (0, 1), (1, 2)

class: B A B

majority of neighbor of z = B

Predicted class of z is B ※