Duran, Carsken Brayl P. GM232 Nov. 21, 2025

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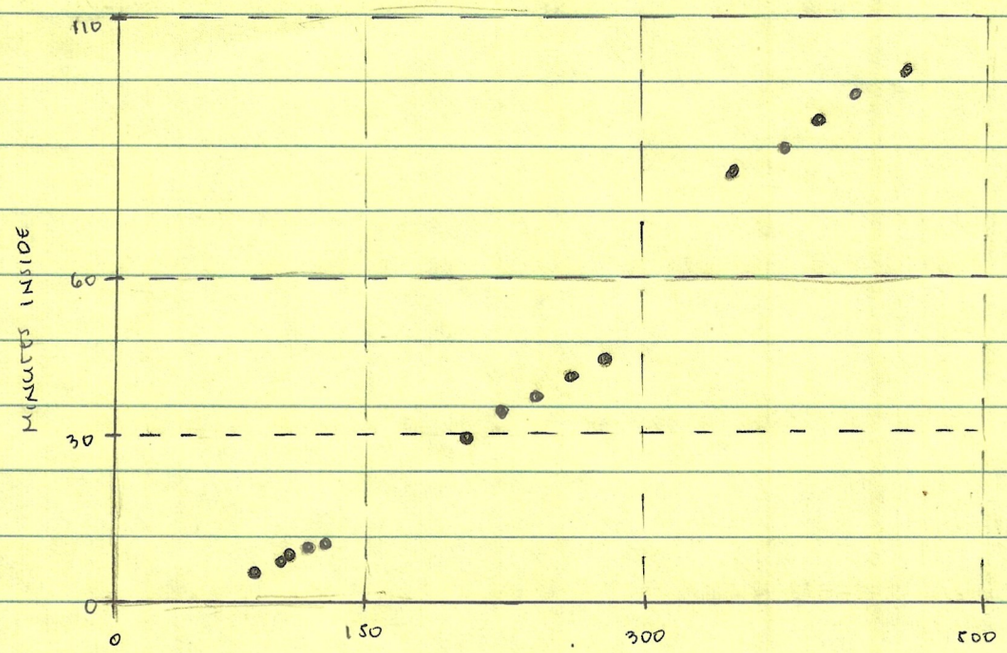
① Plot the data in a scatter plot



② Using the randomly selected initial cluster, calculate the distances of all data points using Euclidean Distance

Customer Name	MONEY SPENT (X)	MINUTES (Y)	d_1	d_2	d_3	Cluster
Chloe Mendoza	380	85	310.5	188.2	30.4	3
Anna Reyes	80	5	0	122.6	280.2	1
Mika Tan	280	45	204.0	81.4	78.3	3
Zach Uy	400	90	331.1	208.9	51.0	3
Kevin Ramos	220	35	143.2	20.6	137.6	2
Sofia Dela Peña	110	9	30.3	92.4	250.3	1
Brian Lim	350	80	280.2	158.1	0	3
Caleb Ong	450	100	392.0	259.6	102.0	3
Liam Cruz	100	8	20.2	102.4	266.2	1
Ella Navarro	240	38	163.4	40.8	117.7	2
John Mercado	120	10	40.3	82.5	240.4	1
Jared Flores	260	42	183.8	61.2	97.7	2
Mark Santos	95	7	15.1	107.5	265.2	1
Paula Gomez	200	30	122.6	0	158.1	2
Hannah Roque	420	95	351.7	229.4	71.6	3

d_1 =	80	5
d_2 =	350	80
d_3 =	200	30
	a	b

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(2) Randomly selected initial Clusters

Chloe Mendoza

$d_1 = \sqrt{(x-a_1)^2 + (y-b_1)^2}$ $d_2 = \sqrt{(x-a_2)^2 + (y-b_2)^2}$ $d_3 = \sqrt{(x-a_3)^2 + (y-b_3)^2}$

$d_1 = \sqrt{(380-80)^2 + (85-5)^2}$ $d_2 = \sqrt{(380-350)^2 + (85-80)^2}$ $d_3 = \sqrt{(380-200)^2 + (85-30)^2}$

$d_1 = \sqrt{(300)^2 + (80)^2}$ $d_2 = \sqrt{(30)^2 + (5)^2}$ $d_3 = \sqrt{(180)^2 + (55)^2}$

$d_1 = \sqrt{90,000 + 6,400}$ $d_2 = \sqrt{900 + 25}$ $d_3 = \sqrt{32,400 + 3,025}$

$d_1 = \sqrt{96,400}$ $d_2 = \sqrt{925}$ $d_3 = \sqrt{35,425}$

$d_1 = 310.48$ $d_3 = 30.41$ $d_3 = 188.21$

Anna Reyes

$d_1 = \sqrt{(x-a_1)^2 + (y-b_1)^2}$ $d_2 = \sqrt{(x-a_2)^2 + (y-b_2)^2}$ $d_3 = \sqrt{(x-a_3)^2 + (y-b_3)^2}$

$d_1 = \sqrt{(80-80)^2 + (5-5)^2}$ $d_2 = \sqrt{(80-350)^2 + (5-80)^2}$ $d_3 = \sqrt{(80-200)^2 + (5-30)^2}$

$d_1 = \sqrt{0+0}$ $d_2 = \sqrt{(-270)^2 + (-75)^2}$ $d_3 = \sqrt{(-120)^2 + (-25)^2}$

$d_1 = \sqrt{0}$ $d_2 = \sqrt{72,900 + 5,625}$ $d_3 = \sqrt{14,400 + 625}$

$d_1 = 0$ $d_2 = \sqrt{78,525}$ $d_3 = \sqrt{15,025}$

$d_2 = 280.22$ $d_3 = 122.58$

Mika Tan

$d_1 = \sqrt{(x-a_1)^2 + (y-b_1)^2}$ $d_2 = \sqrt{(x-a_2)^2 + (y-b_2)^2}$ $d_3 = \sqrt{(x-a_3)^2 + (y-b_3)^2}$

$d_1 = \sqrt{(280-80)^2 + (45-5)^2}$ $d_2 = \sqrt{(280-350)^2 + (45-80)^2}$ $d_3 = \sqrt{(280-200)^2 + (45-30)^2}$

$d_1 = \sqrt{(200)^2 + (40)^2}$ $d_2 = \sqrt{(-70)^2 + (-35)^2}$ $d_3 = \sqrt{(80)^2 + (15)^2}$

$d_1 = \sqrt{40,000 + 1,600}$ $d_2 = \sqrt{4,900 + 1,225}$ $d_3 = \sqrt{6,400 + 225}$

$d_1 = \sqrt{41,600}$ $d_2 = \sqrt{6,125}$ $d_3 = \sqrt{6,625}$

$d_1 = 203.96$ $d_2 = 78.26$ $d_3 = 81.39$

Zach Uy

$d_1 = \sqrt{(x-a_1)^2 + (y-b_1)^2}$ $d_2 = \sqrt{(x-a_2)^2 + (y-b_2)^2}$ $d_3 = \sqrt{(x-a_3)^2 + (y-b_3)^2}$

$d_1 = \sqrt{(400-80)^2 + (90-5)^2}$ $d_2 = \sqrt{(400-350)^2 + (90-80)^2}$ $d_3 = \sqrt{(400-200)^2 + (90-30)^2}$

$d_1 = \sqrt{(320)^2 + (85)^2}$ $d_2 = \sqrt{(50)^2 + (10)^2}$ $d_3 = \sqrt{(200)^2 + (60)^2}$

$d_1 = \sqrt{102,400 + 7225}$ $d_2 = \sqrt{2500 + 100}$ $d_3 = \sqrt{40,000 + 3,600}$

$d_1 = \sqrt{109,625}$ $d_2 = \sqrt{2,600}$ $d_3 = \sqrt{43,600}$

$d_1 = 331.01$ $d_2 = 50.99$ $d_3 = 208.80$

	a	b
d_1	80	5
d_2	350	80
d_3	200	30
	a	b

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Kevin Ramos

$d_1 = \sqrt{(x-a_1)^2 + (y-b_1)^2}$ $d_2 = \sqrt{(x-a_2)^2 + (y-b_2)^2}$ $d_3 = \sqrt{(x-a_3)^2 + (y-b_3)^2}$

$d_1 = \sqrt{(220-80)^2 + (35-5)^2}$ $d_2 = \sqrt{(220-350)^2 + (35-80)^2}$ $d_3 = \sqrt{(220-200)^2 + (35-30)^2}$

$d_1 = \sqrt{(140)^2 + (30)^2}$ $d_2 = \sqrt{(-130)^2 + (-45)}$ $d_3 = \sqrt{(20)^2 + (5)^2}$

$d_1 = \sqrt{19,600 + 900}$ $d_2 = \sqrt{16,900 + 2,025}$ $d_3 = \sqrt{400 + 25}$

$d_1 = \sqrt{20,500}$ $d_2 = \sqrt{18,925}$ $d_3 = \sqrt{425}$

$d_1 = 143.18$ $d_2 = 137.57$ $d_3 = 20.61$

Josia Dela Peña

$d_1 = \sqrt{(x-a_1)^2 + (y-b_1)^2}$ $d_2 = \sqrt{(x-a_2)^2 + (y-b_2)^2}$ $d_3 = \sqrt{(x-a_3)^2 + (y-b_3)^2}$

$d_1 = \sqrt{(110-80)^2 + (9-5)^2}$ $d_2 = \sqrt{(110-350)^2 + (9-80)^2}$ $d_3 = \sqrt{(110-200)^2 + (9-30)^2}$

$d_1 = \sqrt{(30)^2 + (4)^2}$ $d_2 = \sqrt{(-240)^2 + (-71)^2}$ $d_3 = \sqrt{(-90)^2 + (-21)^2}$

$d_1 = \sqrt{900 + 16}$ $d_2 = \sqrt{57,600 + 5,041}$ $d_3 = \sqrt{8,100 + 441}$

$d_1 = \sqrt{916}$ $d_2 = \sqrt{62,641}$ $d_3 = \sqrt{8,541}$

$d_1 = 30.26$ $d_2 = 250.28$ $d_3 = 94.03$

Lyan Lim

$d_1 = \sqrt{(x-a_1)^2 + (y-b_1)^2}$ $d_2 = \sqrt{(x-a_2)^2 + (y+b_2)^2}$ $d_3 = \sqrt{(x-a_3)^2 + (y-b_3)^2}$

$d_1 = \sqrt{(350-80)^2 + (80-5)^2}$ $d_2 = \sqrt{(350-350)^2 + (80+80)^2}$ $d_3 = \sqrt{(350-200)^2 + (80-30)^2}$

$d_1 = \sqrt{(270)^2 + (75)^2}$ $d_2 = \sqrt{(0)^2 + (0)^2}$ $d_3 = \sqrt{(150)^2 + (50)^2}$

$d_1 = \sqrt{72,900 + 5625}$ $d_2 = \sqrt{0}$ $d_3 = \sqrt{22,500 + 2500}$

$d_1 = \sqrt{78,525}$ $d_2 = 0$ $d_3 = \sqrt{25,000}$

$d_1 = 280.22$ $d_3 = 158.11$

Caleb Ong

$d_1 = \sqrt{(x-a_1)^2 + (y-b_1)^2}$ $d_2 = \sqrt{(x-a_2)^2 + (y-b_2)^2}$ $d_3 = \sqrt{(x-a_3)^2 + (y-b_3)^2}$

$d_1 = \sqrt{(450-80)^2 + (100-5)^2}$ $d_2 = \sqrt{(450-350)^2 + (100-80)^2}$ $d_3 = \sqrt{(450-200)^2 + (100-30)^2}$

$d_1 = \sqrt{(370)^2 + (95)^2}$ $d_2 = \sqrt{(100)^2 + (20)^2}$ $d_3 = \sqrt{(250)^2 + (70)^2}$

$d_1 = \sqrt{136,900 + 9,025}$ $d_2 = \sqrt{10,000 + 400}$ $d_3 = \sqrt{62,500 + 4,900}$

$d_1 = \sqrt{145,925}$ $d_2 = \sqrt{10,400}$ $d_3 = \sqrt{67,400}$

$d_1 = 382.00$ $d_2 = 101.98$ $d_3 = 259.61$

d_1 : 80 5

d_2 : 350 80

d_3 : 200 30

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Liam Cruz

$d_1 = \sqrt{(x-a_1)^2 + (y-b_1)^2}$ $d_2 = \sqrt{(x-a_2)^2 + (y-b_2)^2}$ $d_3 = \sqrt{(x-a_3)^2 + (y-b_3)^2}$

$d_1 = \sqrt{(100-80)^2 + (8-5)^2}$ $d_2 = \sqrt{(100-350)^2 + (8-80)^2}$ $d_3 = \sqrt{(100-200)^2 + (8-30)^2}$

$d_1 = \sqrt{(20)^2 + (3)^2}$ $d_2 = \sqrt{(-250)^2 + (-72)^2}$ $d_3 = \sqrt{(-100)^2 + (-22)^2}$

$d_1 = \sqrt{400 + 9}$ $d_2 = \sqrt{62,500 + 5,184}$ $d_3 = \sqrt{10,000 + 484}$

$d_1 = \sqrt{409}$ $d_2 = \sqrt{67,684}$ $d_3 = \sqrt{10,484}$

$d_1 = 20.22$ $d_2 = 260.16$ $d_3 = 102.39$

Ella Navarro

$d_1 = \sqrt{(x-a_1)^2 + (y-b_1)^2}$ $d_2 = \sqrt{(x-a_2)^2 + (y-b_2)^2}$ $d_3 = \sqrt{(x-a_3)^2 + (y-b_3)^2}$

$d_1 = \sqrt{(240-80)^2 + (38-5)^2}$ $d_2 = \sqrt{(240-350)^2 + (38-80)^2}$ $d_3 = \sqrt{(240-200)^2 + (38-30)^2}$

$d_1 = \sqrt{(160)^2 + (33)^2}$ $d_2 = \sqrt{(-110)^2 + (-42)^2}$ $d_3 = \sqrt{(40)^2 + (8)^2}$

$d_1 = \sqrt{25,600 + 1,089}$ $d_2 = \sqrt{12,100 + 1,764}$ $d_3 = \sqrt{1,600 + 64}$

$d_1 = \sqrt{26,689}$ $d_2 = \sqrt{13,864}$ $d_3 = \sqrt{1,664}$

$d_1 = 163.37$ $d_2 = 117.74$ $d_3 = 40.79$

John Mercado

$d_1 = \sqrt{(x-a_1)^2 + (y-b_1)^2}$ $d_2 = \sqrt{(x-a_2)^2 + (y-b_2)^2}$ $d_3 = \sqrt{(x-a_3)^2 + (y-b_3)^2}$

$d_1 = \sqrt{(120-80)^2 + (10-5)^2}$ $d_2 = \sqrt{(120-350)^2 + (10-80)^2}$ $d_3 = \sqrt{(120-200)^2 + (10-30)^2}$

$d_1 = \sqrt{(40)^2 + (5)^2}$ $d_2 = \sqrt{(-230)^2 + (-70)^2}$ $d_3 = \sqrt{(-80)^2 + (-20)^2}$

$d_1 = \sqrt{1,600 + 25}$ $d_2 = \sqrt{52,900 + 4,900}$ $d_3 = \sqrt{6,400 + 400}$

$d_1 = \sqrt{1,625}$ $d_2 = \sqrt{57,800}$ $d_3 = \sqrt{6,800}$

$d_1 = 40.31$ $d_2 = 240.42$ $d_3 = 82.46$

Jared Flores

$d_1 = \sqrt{(x-a_1)^2 + (y-b_1)^2}$ $d_2 = \sqrt{(x-a_2)^2 + (y-b_2)^2}$ $d_3 = \sqrt{(x-a_3)^2 + (y-b_3)^2}$

$d_1 = \sqrt{(260-80)^2 + (42-5)^2}$ $d_2 = \sqrt{(260-350)^2 + (42-80)^2}$ $d_3 = \sqrt{(260-200)^2 + (42-30)^2}$

$d_1 = \sqrt{(180)^2 + (37)^2}$ $d_2 = \sqrt{(-90)^2 + (-38)}$ $d_3 = \sqrt{(60)^2 + (12)^2}$

$d_1 = \sqrt{32,400 + 1,369}$ $d_2 = \sqrt{8,100 + 1,444}$ $d_3 = \sqrt{3,600 + 144}$

$d_1 = \sqrt{33,769}$ $d_2 = \sqrt{9,544}$ $d_3 = \sqrt{3,744}$

$d_1 = 183.76$ $d_2 = 97.69$ $d_3 = 61.18$

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Mark Santos

$d_1 = \sqrt{(x-a_1)^2 + (y-b_1)^2}$ $d_2 = \sqrt{(x-a_2)^2 + (y-b_2)^2}$ $d_3 = \sqrt{(x-a_3)^2 + (y-b_3)^2}$

$d_1 = \sqrt{(95-80)^2 + (7-5)^2}$ $d_2 = \sqrt{(95-350)^2 + (7-80)^2}$ $d_3 = \sqrt{(95-200)^2 + (7-30)^2}$

$d_1 = \sqrt{(15)^2 + (2)^2}$ $d_2 = \sqrt{(-255)^2 + (-73)^2}$ $d_3 = \sqrt{(-105)^2 + (-23)^2}$

$d_1 = \sqrt{225 + 4}$ $d_2 = \sqrt{64,009 + 5,329}$ $d_3 = \sqrt{11,025 + 529}$

$d_1 = \sqrt{229}$ $d_2 = \sqrt{69,338}$ $d_3 = \sqrt{11,554}$

$d_1 = 15.13$ $d_2 = 263.32$ $d_3 = 107.49$

Paula Gomez

$d_1 = \sqrt{(x-a_1)^2 + (y-b_1)^2}$ $d_2 = \sqrt{(x-a_2)^2 + (y-b_2)^2}$ $d_3 = \sqrt{(x-a_3)^2 + (y-b_3)^2}$

$d_1 = \sqrt{(200-80)^2 + (30+5)^2}$ $d_2 = \sqrt{(200-350)^2 + (30-80)^2}$ $d_3 = \sqrt{(200-200)^2 + (30-30)^2}$

$d_1 = \sqrt{(120)^2 + (35)^2}$ $d_2 = \sqrt{(-150)^2 + (-50)^2}$ $d_3 = \sqrt{0}$

$d_1 = \sqrt{14,400 + 1,225}$ $d_2 = \sqrt{22,500 + 2,500}$ $d_3 = 0$

$d_1 = \sqrt{15,625}$ $d_2 = \sqrt{25,000}$

$d_1 = 125.0$ $d_2 = 158.11$

Hannah Roque

$d_1 = \sqrt{(x-a_1)^2 + (y-b_1)^2}$ $d_2 = \sqrt{(x-a_2)^2 + (y-b_2)^2}$ $d_3 = \sqrt{(x-a_3)^2 + (y-b_3)^2}$

$d_1 = \sqrt{(420-80)^2 + (95-5)^2}$ $d_2 = \sqrt{(420-350)^2 + (95-80)^2}$ $d_3 = \sqrt{(420-200)^2 + (95-30)^2}$

$d_1 = \sqrt{(340)^2 + (90)^2}$ $d_2 = \sqrt{(70)^2 + (15)^2}$ $d_3 = \sqrt{(220)^2 + (65)^2}$

$d_1 = \sqrt{115,600 + 8,100}$ $d_2 = \sqrt{4,900 + 225}$ $d_3 = \sqrt{48,400 + 4,225}$

$d_1 = \sqrt{123,700}$ $d_2 = \sqrt{5,125}$ $d_3 = \sqrt{52,625}$

$d_1 = 351.7$ $d_2 = 71.59$ $d_3 = 229.40$

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4. Calculate the mean of each cluster

Cluster 1

Anna Reyes (80, 5)

Sofia Dela Peña (110, 9)

Liam Cruz (100, 8)

John Mercado (120, 10)

Mark Santos (95, 7)

New Centroid for Cluster 1

$X_1 = \frac{80 + 110 + 100 + 120 + 95}{5} = \frac{505}{5} = 101$

$Y_1 = \frac{5 + 9 + 8 + 10 + 7}{5} = \frac{39}{5} = 7.8$

New Centroid 1 = (101, 7.8)

Cluster 2

Kevin Ramos (220, 35)

Ella Navarro (240, 38)

Jared Flores (260, 42

Paula Gomez (200, 30)

New Centroid for Cluster 2

$X_2 = \frac{220 + 240 + 260 + 200}{4} = \frac{920}{4} = 230$

$Y_2 = \frac{35 + 38 + 42 + 30}{4} = \frac{145}{4} = 36.25$

New Centroid 2 = (230, 36.25)

Cluster 3

Chloe Mendoza (380, 85)

Mika Tan (280, 45)

Zach Uy (400, 90

Brian Lim (350, 80)

Cabeb Ong (450, 100)

Mannah Roque (420, 95)

New Centroid for Cluster 3

$X_3 = \frac{380 + 280 + 400 + 350 + 450 + 420}{6} = \frac{2280}{6} = 380$

$Y_3 = \frac{85 + 45 + 90 + 80 + 100 + 95}{6} = \frac{495}{6} = 82.5$

New Centroid 3 = (380, 82.5

Customer Name	Money Spent	Minutes	d_1	d_2	d_3	Final Cluster
Chloe Mendoza	380	85	289.5	157.7	2.5	3
Anna Reyes	80	5	21.2	153.2	309.8	1
Mika Tan	280	45	182.8	50.8	106.8	2
Zach Uy	400	90	310.7	178.3	21.4	3
Kevin Ramos	220	35	122.1	10.1	166.9	2
Sofia Dela Peña	110	9	9.1	123.1	279.8	1
Brian Lim	350	80	259.3	127.7	30.1	3
Cabeb Ong	450	100	361.0	229.1	72.2	3
Liam Cruz	100	8	1.0	133.0	289.7	1
Ella Navarro	240	38	142.2	10.2	146.9	2
John Mercado	120	10	19.1	113.1	270.0	1
Jared Flores	260	42	162.6	30.5	126.7	2
Mark Santos	95	7	6.1	138.1	294.8	1
Paula Gomez	200	30	101.5	30.6	187.5	2
Mannah Roque	420	95	336.7	198.9	41.9	3

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Recalculation

Chloe Mendoza

$d_1 = \sqrt{(380-101)^2 + (85-7.8)^2}$ $d_2 = \sqrt{(380-230)^2 + (85-36.25)^2}$ $d_3 = \sqrt{(390-380)^2 + (85-82.5)^2}$

$d_1 = \sqrt{77841 + 5953.84}$ $d_2 = \sqrt{22500 + 2376.56}$ $d_3 = \sqrt{0 + 6.25}$

$d_1 = \sqrt{83794.84}$ $d_2 = \sqrt{24876.56}$ $d_3 = \sqrt{6.25}$

$d_1 = 289.5$ $d_2 = 157.7$ $d_3 = 2.5$

Anna Reyes

$d_1 = \sqrt{(80-101)^2 + (5-7.8)^2}$ $d_2 = \sqrt{(80-230)^2 + (5-36.25)^2}$ $d_3 = \sqrt{(80-380)^2 + (5-82.5)^2}$

$d_1 = \sqrt{441 + 7.84}$ $d_2 = \sqrt{22500 + 975.56}$ $d_3 = \sqrt{90000 + 6006.25}$

$d_1 = \sqrt{23475.84}$ $d_2 = \sqrt{23475.56}$ $d_3 = \sqrt{96006.25}$

$d_1 = 21.2$ $d_2 = 153.2$ $d_3 = 309.8$

Mika Tan

$d_1 = \sqrt{(280-101)^2 + (45-7.8)^2}$ $d_2 = \sqrt{(280-230)^2 + (45-36.25)^2}$ $d_3 = \sqrt{(280-380)^2 + (45-82.5)^2}$

$d_1 = \sqrt{32041 + 1383.84}$ $d_2 = \sqrt{2500 + 76.56}$ $d_3 = \sqrt{10000 + 1406.25}$

$d_1 = \sqrt{33424.84}$ $d_2 = \sqrt{2576.56}$ $d_3 = \sqrt{11406.25}$

$d_1 = 182.8$ $d_2 = 50.8$ $d_3 = 106.8$

Zach Uy

$d_1 = \sqrt{(400-101)^2 + (90-7.8)^2}$ $d_2 = \sqrt{(400-230)^2 + (90-36.25)^2}$ $d_3 = \sqrt{(400-380)^2 + (90-82.5)^2}$

$d_1 = \sqrt{89401 + 6756.84}$ $d_2 = \sqrt{28900 + 2882.56}$ $d_3 = \sqrt{400 + 56.25}$

$d_1 = \sqrt{96157.84}$ $d_2 = \sqrt{31797.56}$ $d_3 = \sqrt{465.25}$

$d_1 = 310.1$ $d_2 = 178.3$ $d_3 = 21.4$

Kevin Ramos

$d_1 = \sqrt{(220-101)^2 + (35-7.8)^2}$ $d_2 = \sqrt{(220-230)^2 + (35-36.25)^2}$ $d_3 = \sqrt{(220-380)^2 + (35-82.5)^2}$

$d_1 = \sqrt{14161 + 739.84}$ $d_2 = \sqrt{100 + 1.56}$ $d_3 = \sqrt{25600 + 2256.25}$

$d_1 = \sqrt{14900.84}$ $d_2 = \sqrt{101.56}$ $d_3 = \sqrt{27856.25}$

$d_1 = 122.1$ $d_2 = 10.1$ $d_3 = 166.9$

Sofia Dela Peña

$d_1 = \sqrt{(110-101)^2 + (9-7.8)^2}$ $d_2 = \sqrt{(110-230)^2 + (9-36.25)^2}$ $d_3 = \sqrt{(110-380)^2 + (9-82.5)^2}$

$d_1 = \sqrt{8641.44}$ $d_2 = \sqrt{14400 + 742.56}$ $d_3 = \sqrt{72900 + 5402.25}$

$d_1 = \sqrt{82.44}$ $d_2 = \sqrt{15142.56}$ $d_3 = \sqrt{78302.25}$

$d_1 = 9.1$ $d_2 = 123.1$ $d_3 = 279.8$

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Brian Lin

$d_1 = \sqrt{(350-101)^2 + (80-7.8)^2}$ $d_2 = \sqrt{(350-230)^2 + (80-36.25)^2}$ $d_3 = \sqrt{(350-380)^2 + (10+82.5)^2}$

$d_1 = \sqrt{62001 + 5212.84}$ $d_2 = \sqrt{14400 + 1914.06}$ $d_3 = \sqrt{900 + 6.25}$

$d_1 = \sqrt{67213.84}$ $d_2 = \sqrt{16314.06}$ $d_3 = \sqrt{906.25}$

$d_1 = 259.3$ $d_2 = 127.3$ $d_3 = 30.1$

Caleb Ong

$d_1 = \sqrt{(450-101)^2 + (100-7.8)^2}$ $d_2 = \sqrt{(450-230)^2 + (100-36.25)^2}$ $d_3 = \sqrt{(450-380)^2 + (100-82.5)^2}$

$d_1 = \sqrt{121801 + 8500.84}$ $d_2 = \sqrt{48400 + 4020.06}$ $d_3 = \sqrt{4900 + 306.25}$

$d_1 = \sqrt{130301.84}$ $d_2 = \sqrt{52420.06}$ $d_3 = \sqrt{5206.25}$

$d_1 = 361.0$ $d_2 = 229.1$ $d_3 = 72.2$

Liam Cruz

$d_1 = \sqrt{(100-101)^2 + (8-7.8)^2}$ $d_2 = \sqrt{(100-230)^2 + (8-36.25)^2}$ $d_3 = \sqrt{(100-380)^2 + (8-82.5)^2}$

$d_1 = \sqrt{1 + 0.04}$ $d_2 = \sqrt{16900 + 798.06}$ $d_3 = \sqrt{78400 + 5550.25}$

$d_1 = \sqrt{1.04}$ $d_2 = \sqrt{17698.06}$ $d_3 = \sqrt{83950.25}$

$d_1 = 1.0$ $d_2 = 133.0$ $d_3 = 289.7$

Talia Navarro

$d_1 = \sqrt{(290-101)^2 + (31-7.8)^2}$ $d_2 = \sqrt{(120-230)^2 + (10-36.25)^2}$ $d_3 = \sqrt{(120-380)^2 + (10-82.5)^2}$

$d_1 = \sqrt{19321 + 912.04}$ $d_2 = \sqrt{12100 + 689.06}$ $d_3 = \sqrt{67600 + 5256.25}$

$d_1 = \sqrt{20233.04}$ $d_2 = \sqrt{12789.06}$ $d_3 = \sqrt{72856.25}$

$d_1 = 142.2$ $d_2 = 113.1$ $d_3 = 270.0$

John Mercado

$d_1 = \sqrt{(120-101)^2 + (10-7.8)^2}$ $d_2 = \sqrt{(120-230)^2 + (10-36.25)^2}$ $d_3 = \sqrt{(120-380)^2 + (10-82.5)^2}$

$d_1 = \sqrt{361 + 4.84}$ $d_2 = \sqrt{12100 + 689.06}$ $d_3 = \sqrt{67600 + 5256.25}$

$d_1 = \sqrt{365.84}$ $d_2 = \sqrt{12789.06}$ $d_3 = \sqrt{72856.25}$

$d_1 = 19.1$ $d_2 = 113.1$ $d_3 = 270.0$

Jared Flores

$d_1 = \sqrt{(260-101)^2 + (42-7.8)^2}$ $d_2 = \sqrt{(260-230)^2 + (42-36.25)^2}$ $d_3 = \sqrt{(260-380)^2 + (42-82.5)^2}$

$d_1 = \sqrt{25281 + 1169.64}$ $d_2 = \sqrt{900 + 33.06}$ $d_3 = \sqrt{14400 + 1640.25}$

$d_1 = \sqrt{26450.64}$ $d_2 = \sqrt{933.06}$ $d_3 = \sqrt{16040.25}$

$d_1 = 162.6$ $d_2 = 30.5$ $d_3 = 126.7$

NO.:
DATE:

Mark Santos

$d_1 = \sqrt{(95-101)^2+(7-7.5)^2}$ $d_2 = \sqrt{(95-230)^2+(7-36.25)^2}$ $d_3 = \sqrt{(95-350)^2+(7-82.5)^2}$

$d_1 = \sqrt{36+0.64}$ $d_2 = \sqrt{18225+855.56}$ $d_3 = \sqrt{81225+5700.25}$

$d_1 = \sqrt{36.64}$ $d_2 = \sqrt{19080.56}$ $d_3 = \sqrt{86925.25}$

$d_1 = 6.1$ $d_2 = 138.1$ $d_3 = 294.8$

Paula Gomez

$d_1 = \sqrt{(200-101)^2+(30-7.5)^2}$ $d_2 = \sqrt{(200-230)^2+(30-36.25)^2}$ $d_3 = \sqrt{(200-350)^2+(30-82.5)^2}$

$d_1 = \sqrt{9801+492.89}$ $d_2 = \sqrt{900+39.06}$ $d_3 = \sqrt{22400+2756.25}$

$d_1 = \sqrt{10293.89}$ $d_2 = \sqrt{939.06}$ $d_3 = \sqrt{25156.25}$

$d_1 = 101.5$ $d_2 = 30.6$ $d_3 = 187.5$

Hannah Rogue

$d_1 = \sqrt{(420-101)^2+(95-7.5)^2}$ $d_2 = \sqrt{(420-230)^2+95-36.25)^2}$ $d_3 = \sqrt{(420-350)^2+(95-82.5)^2}$

$d_1 = \sqrt{101761+7607.89}$ $d_2 = \sqrt{36100+23852.56}$ $d_3 = \sqrt{1600+156.25} = 41.9$

$d_1 = 109364.89$ $d_2 = \sqrt{29552.56}$ $d_3 = \sqrt{1756.25}$

$d_1 = 330.7$ $d_2 = 198.9$ $d_3 = 41.9$

2. Plot the Final cluster in a scatter plot.

Cluster 1 : represents customers who spends the least amount of time and spend less money (low)

Cluster 2 : represents customers with medium spending and moderate stay time

Cluster 3 : represents customers who spend significant more and stay longer