Unsupervised Learning

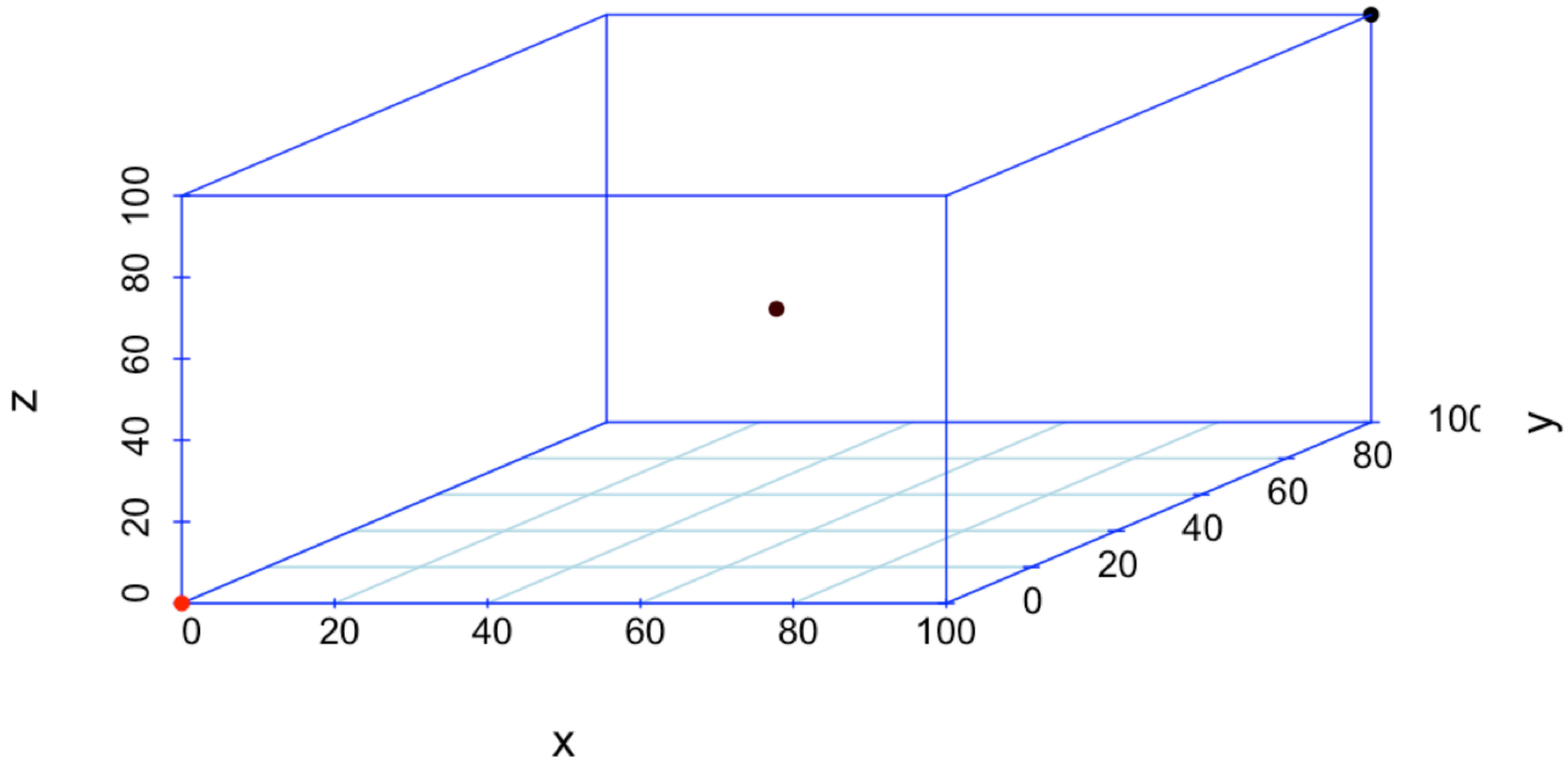
Romeo Kienzler

Understanding Distance

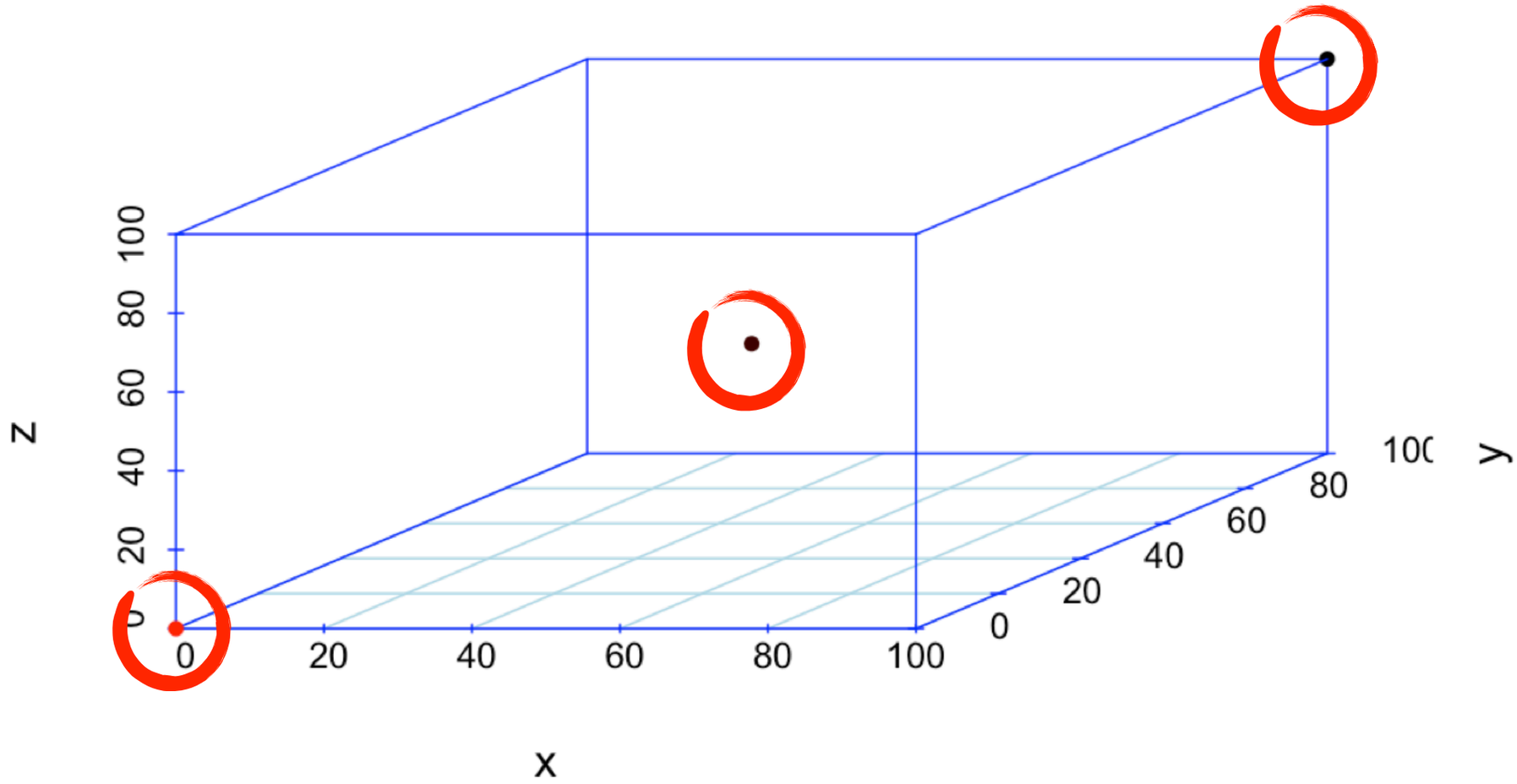
Romeo Kienzler

	x	y	z
1	0	0	0
2	50	50	50
3	100	100	100

	x	y	z
1	0	0	0
2	50	50	50
3	100	100	100



	x	y	z
1	0	0	0
2	50	50	50
3	100	100	100



X1

X2

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X1

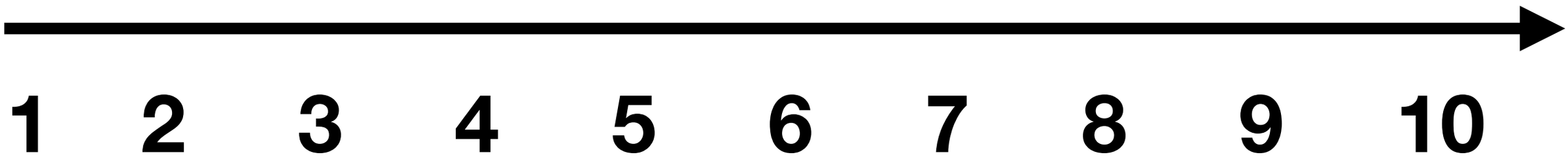
X2

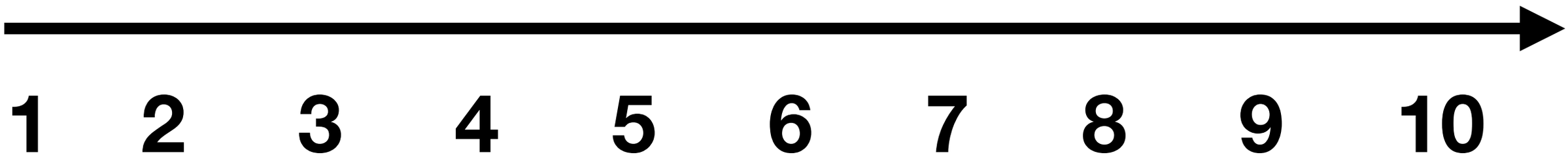
1 2 3 4 5 6 7 8 9 10

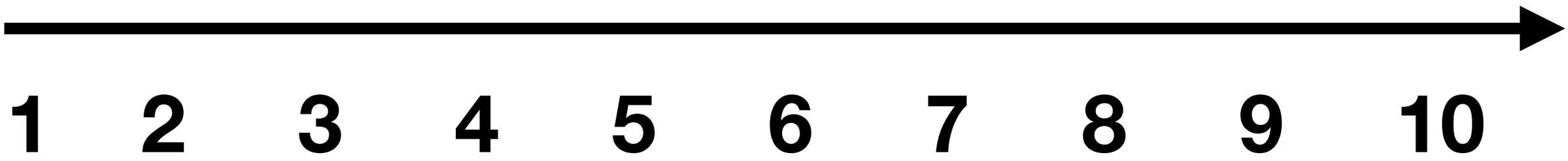
X1 =2

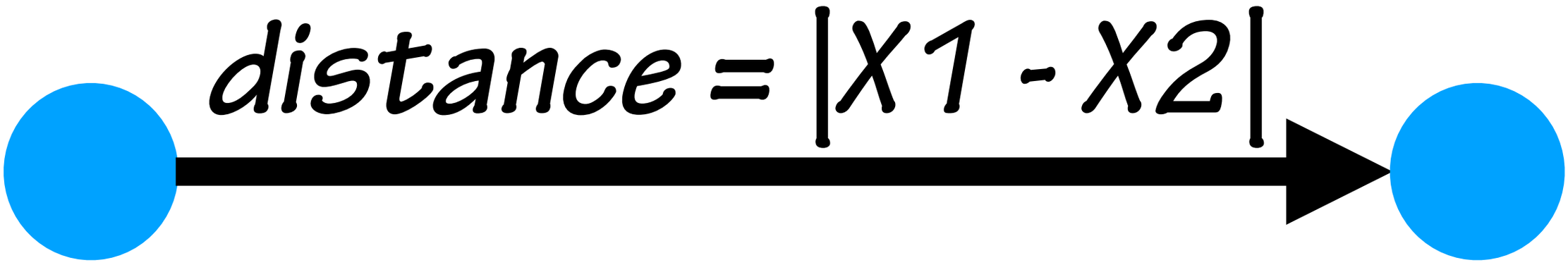
X2 =10

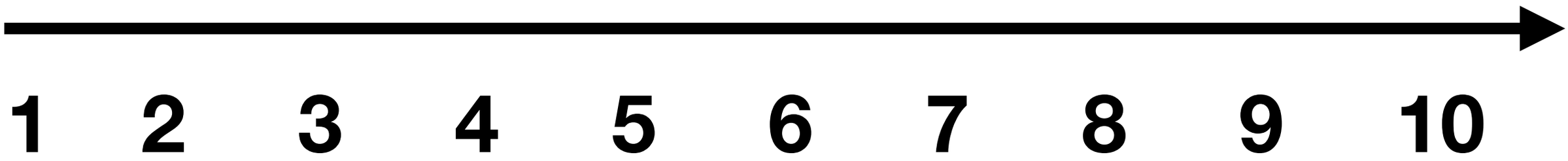
1 2 3 4 5 6 7 8 9 10





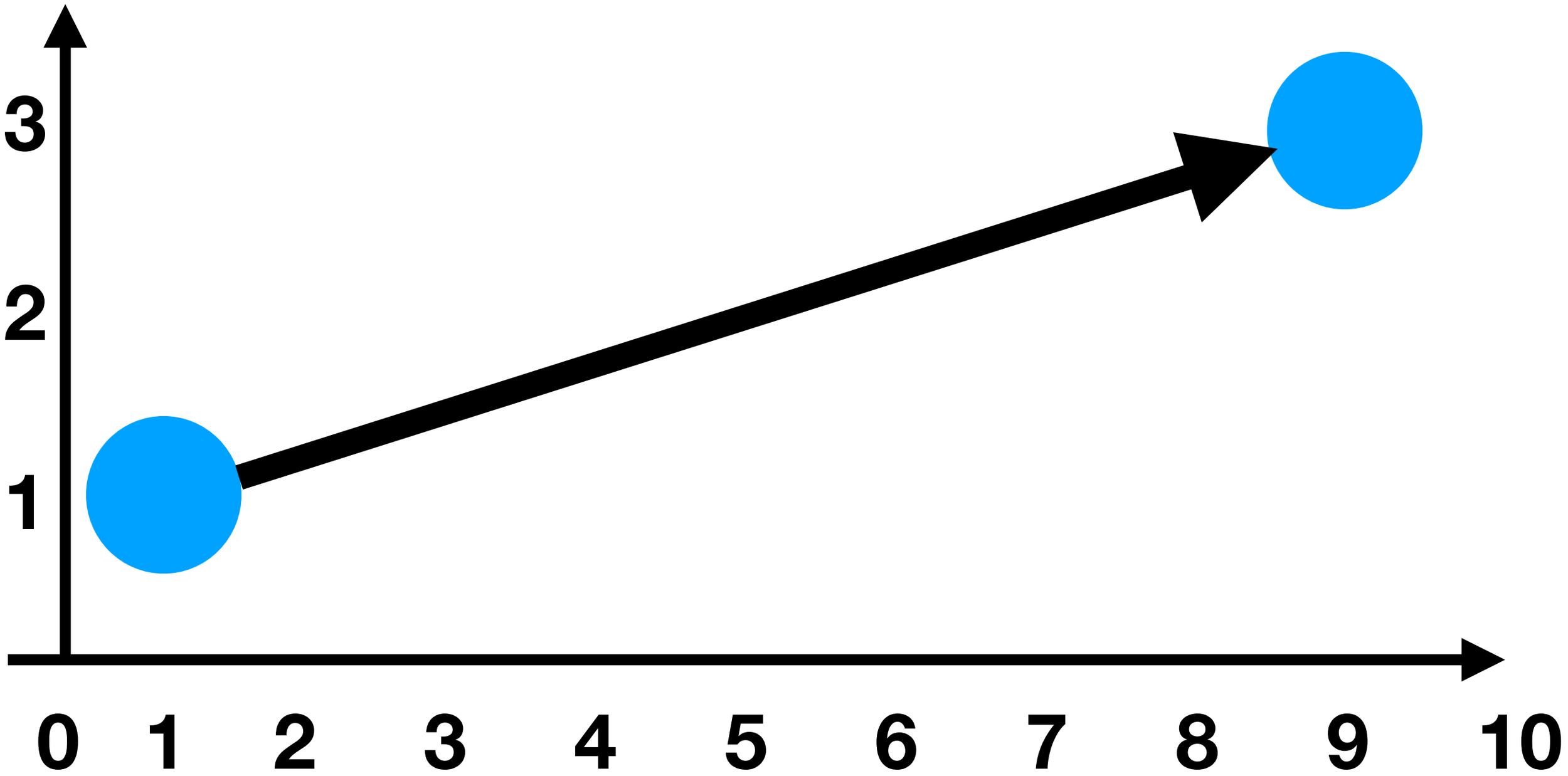


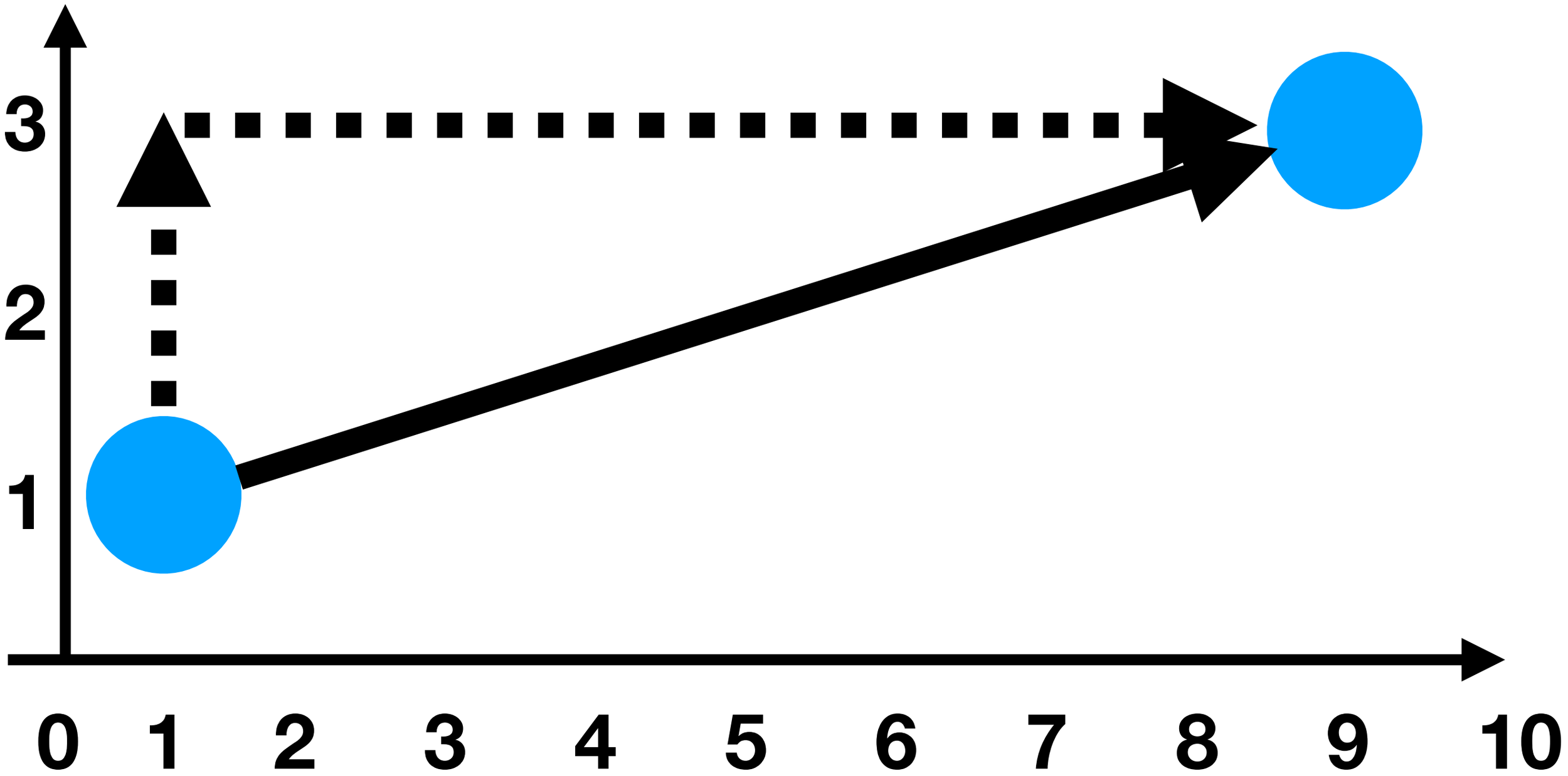


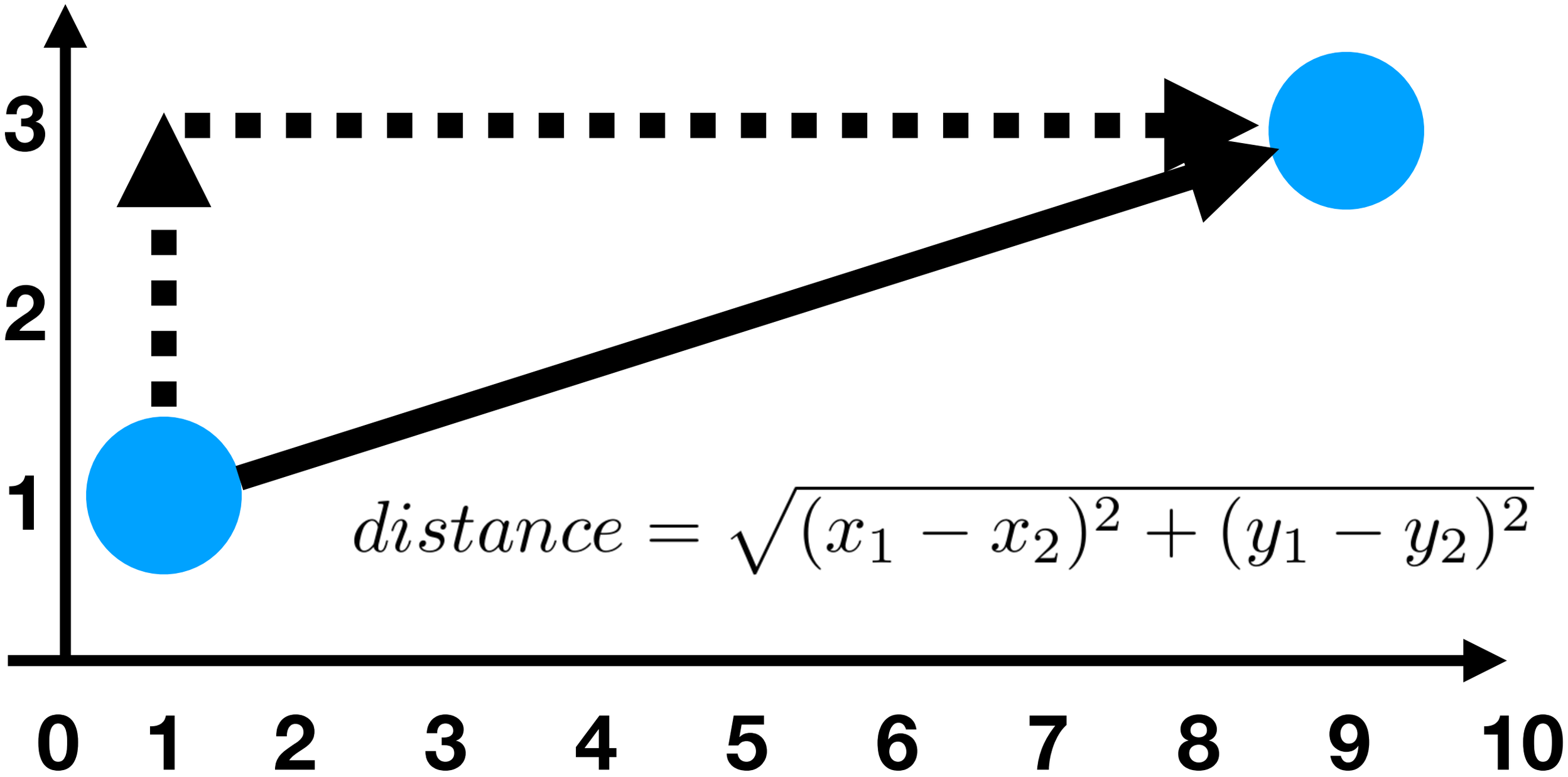


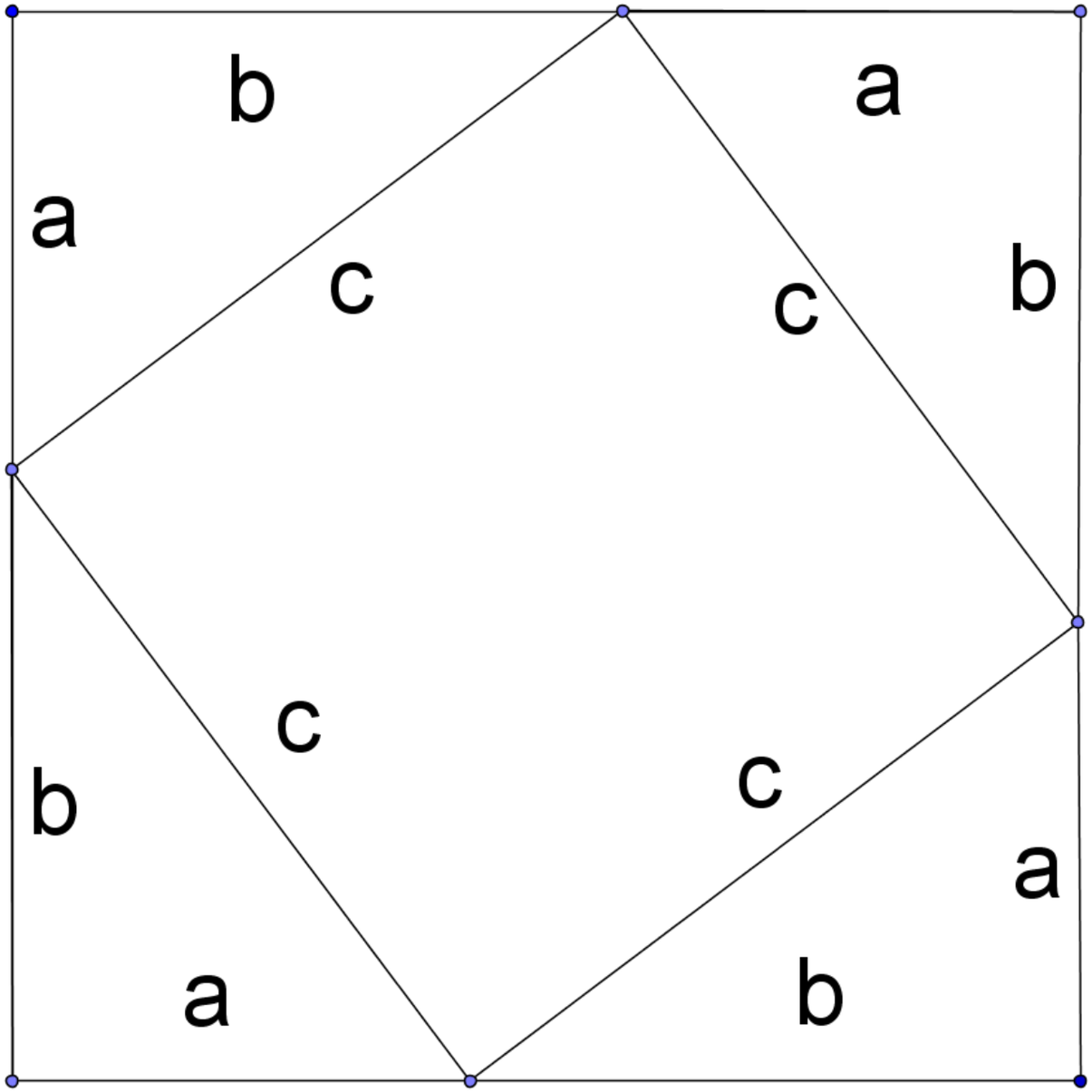
$$distance = \sqrt{(x_1 - x_2)^2}$$

1 2 3 4 5 6 7 8 9 10





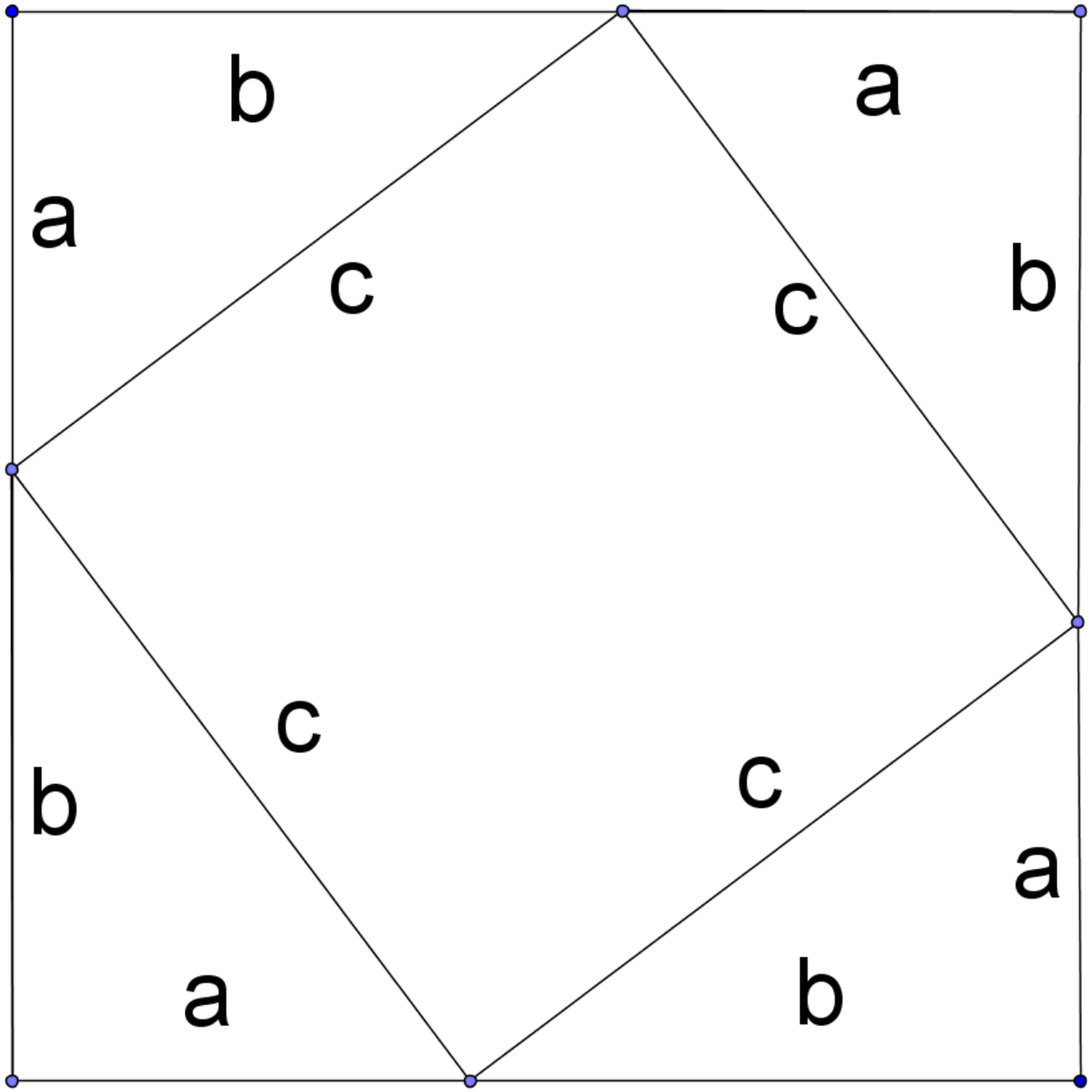




$$(a+b)^2 = 4\,\frac{ab}{2} + c^2$$

$$a^2 + 2ab + b^2 = 2ab + c^2$$

$$\boxed{a^2 + b^2 = c^2}$$



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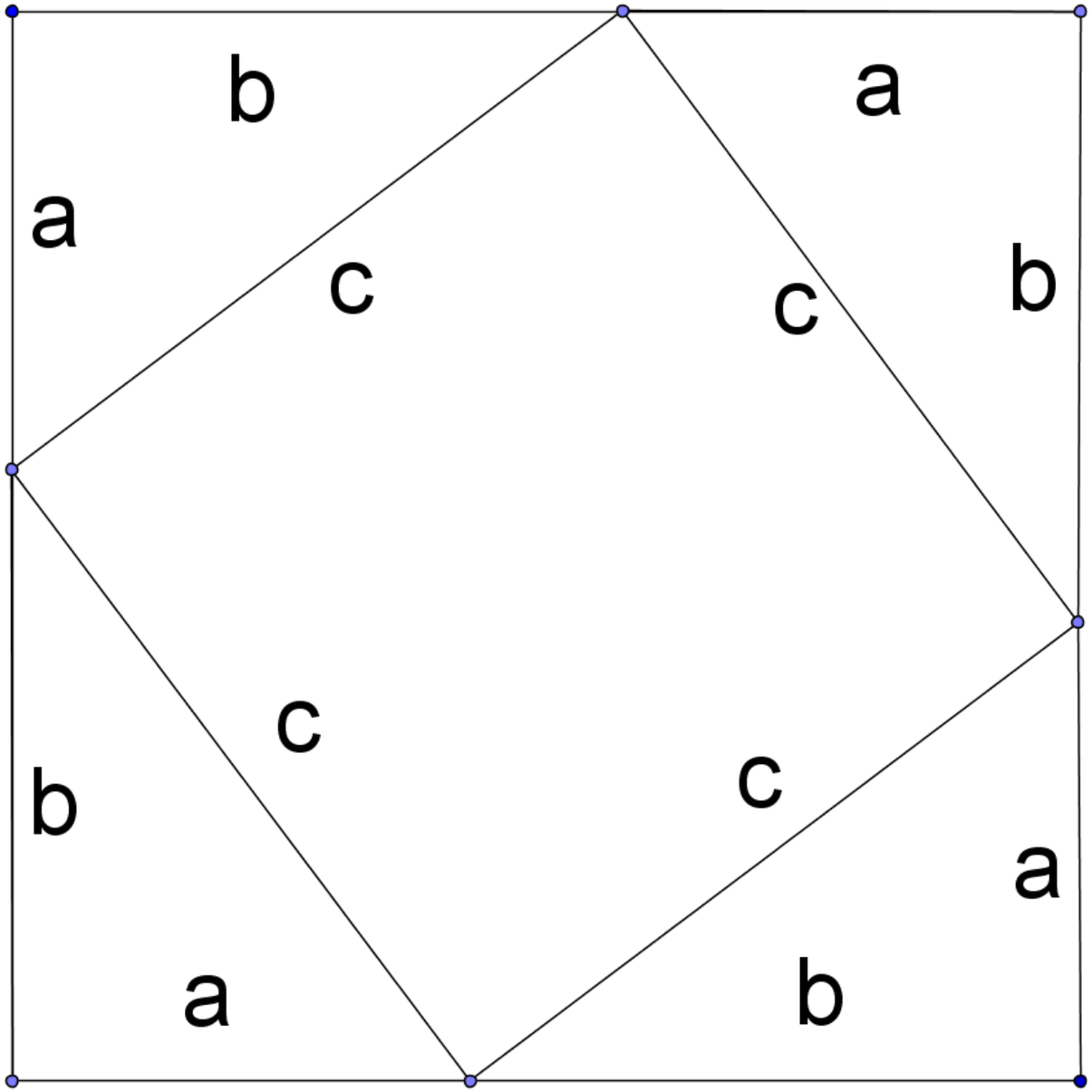

$$(a+b)^2 = 4\,\frac{ab}{2} + c^2$$

$$a^2 + 2ab + b^2 = 2ab + c^2$$

$$a^2 + b^2 = c^2$$

$$d(\mathbf{p}, \mathbf{q}) = d(\mathbf{q}, \mathbf{p}) = \sqrt{(q_1 - p_1)^2 + (q_2 - p_2)^2 + \cdots + (q_n - p_n)^2}$$

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$$= \sqrt{\sum_{i=1}^{n} (q_i - p_i)^2}.$$

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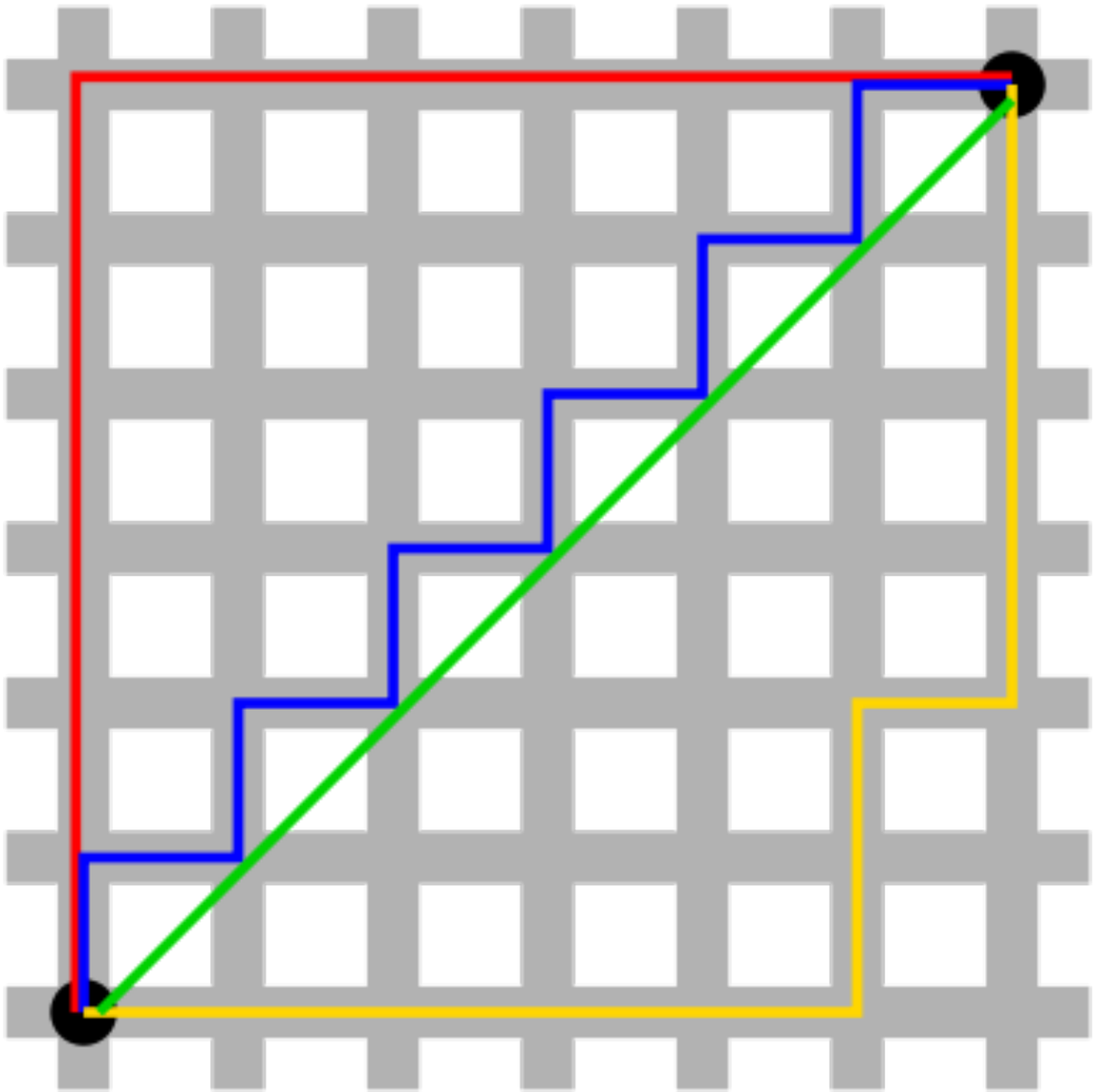
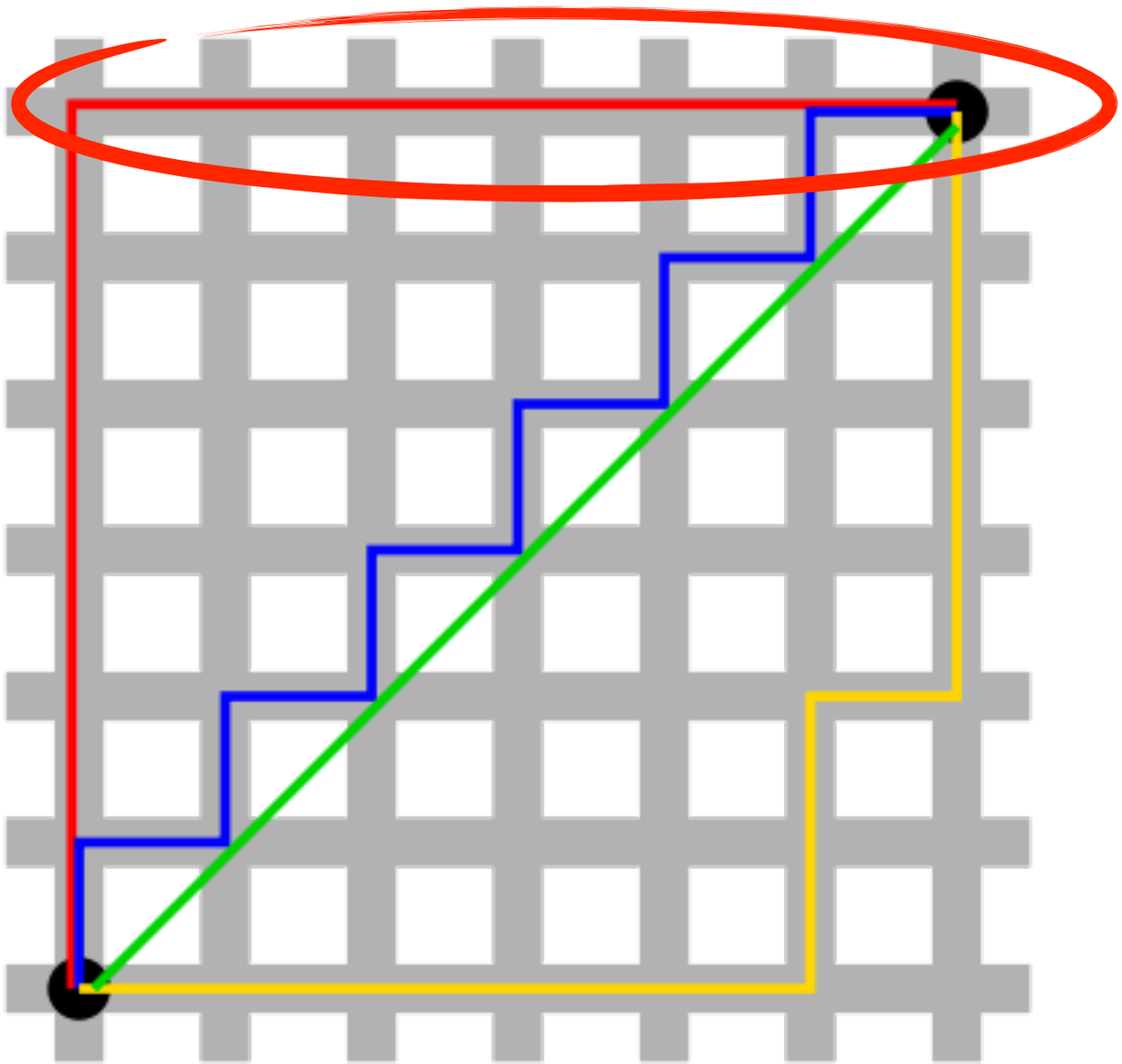
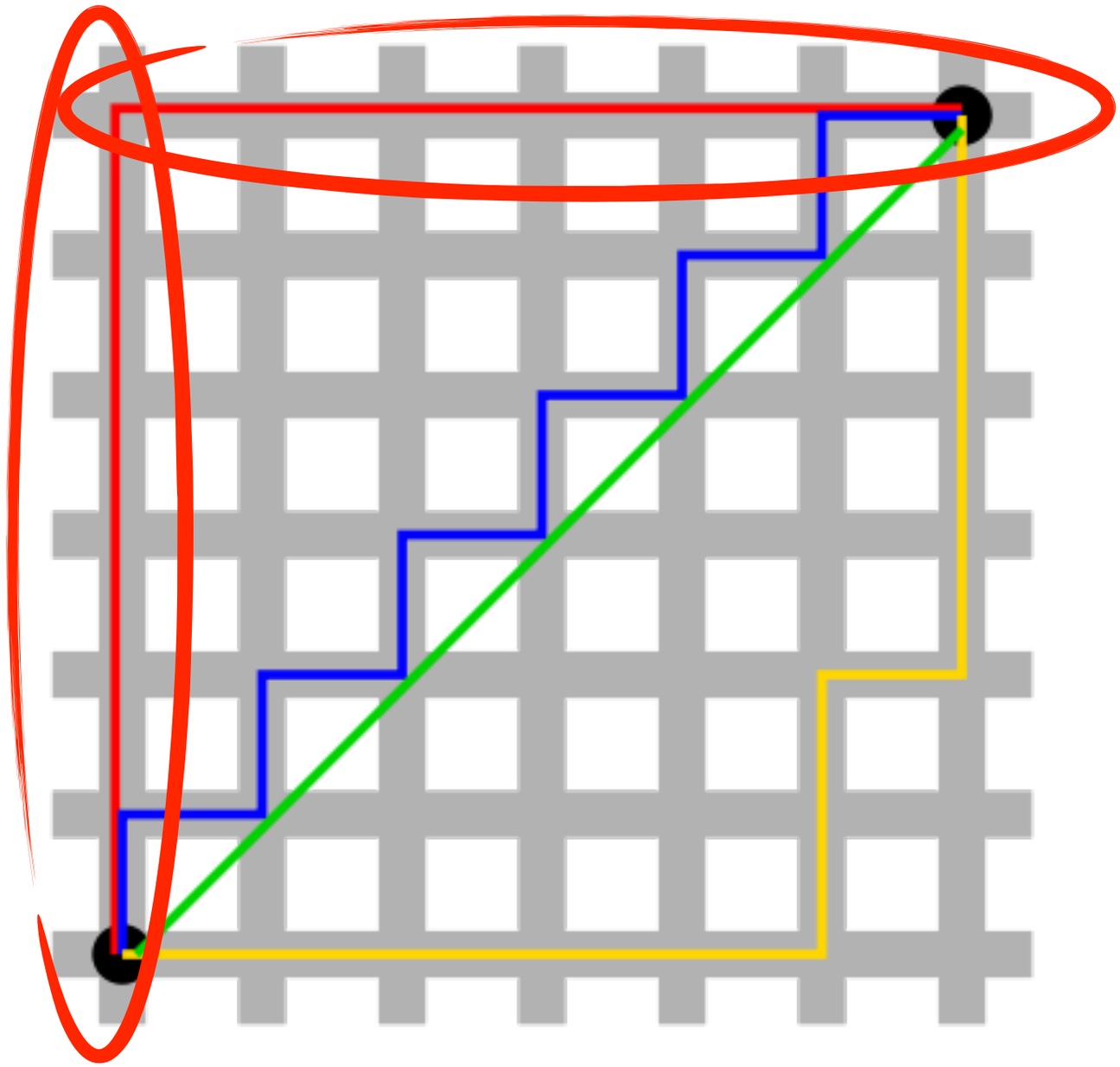
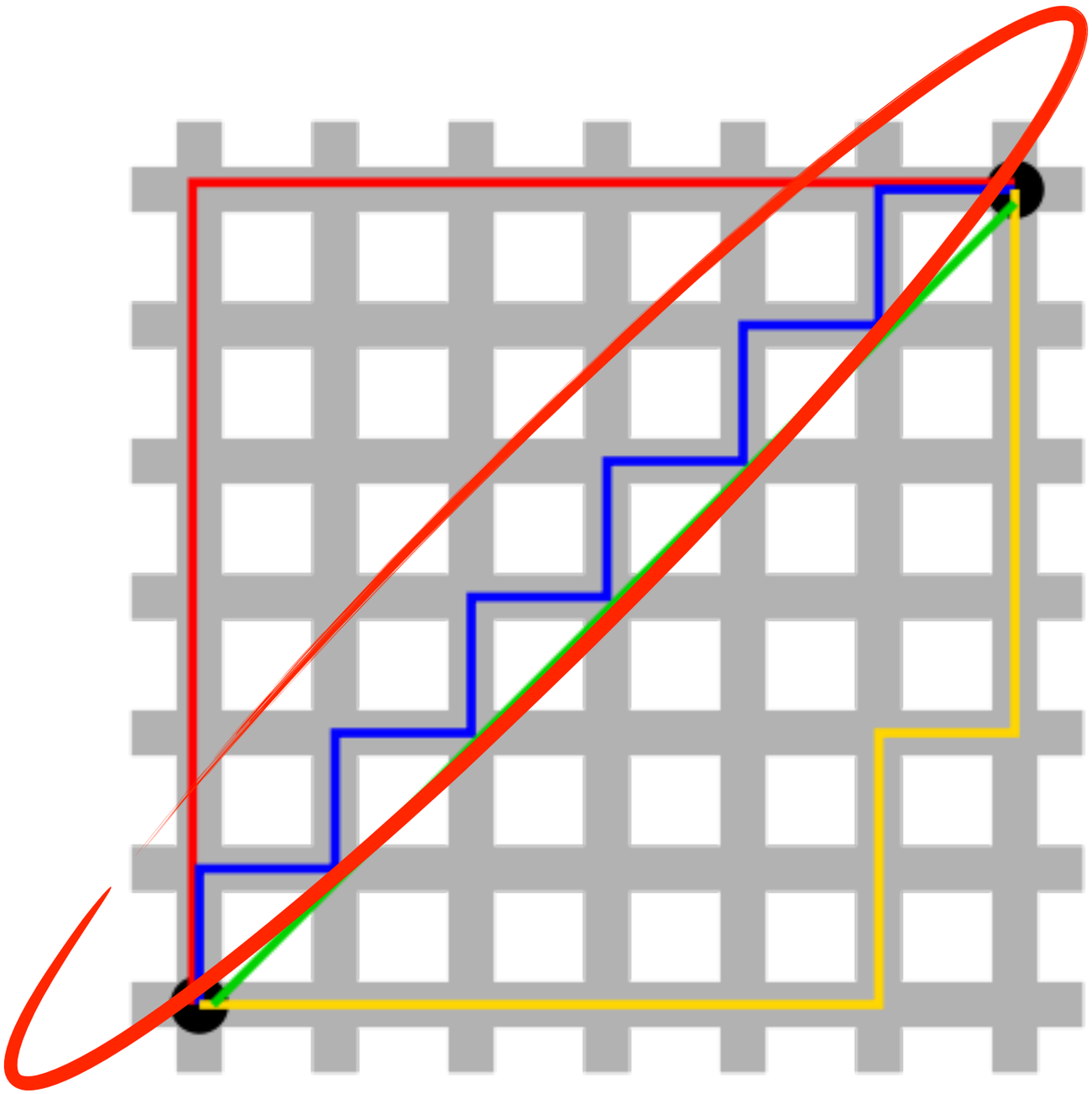
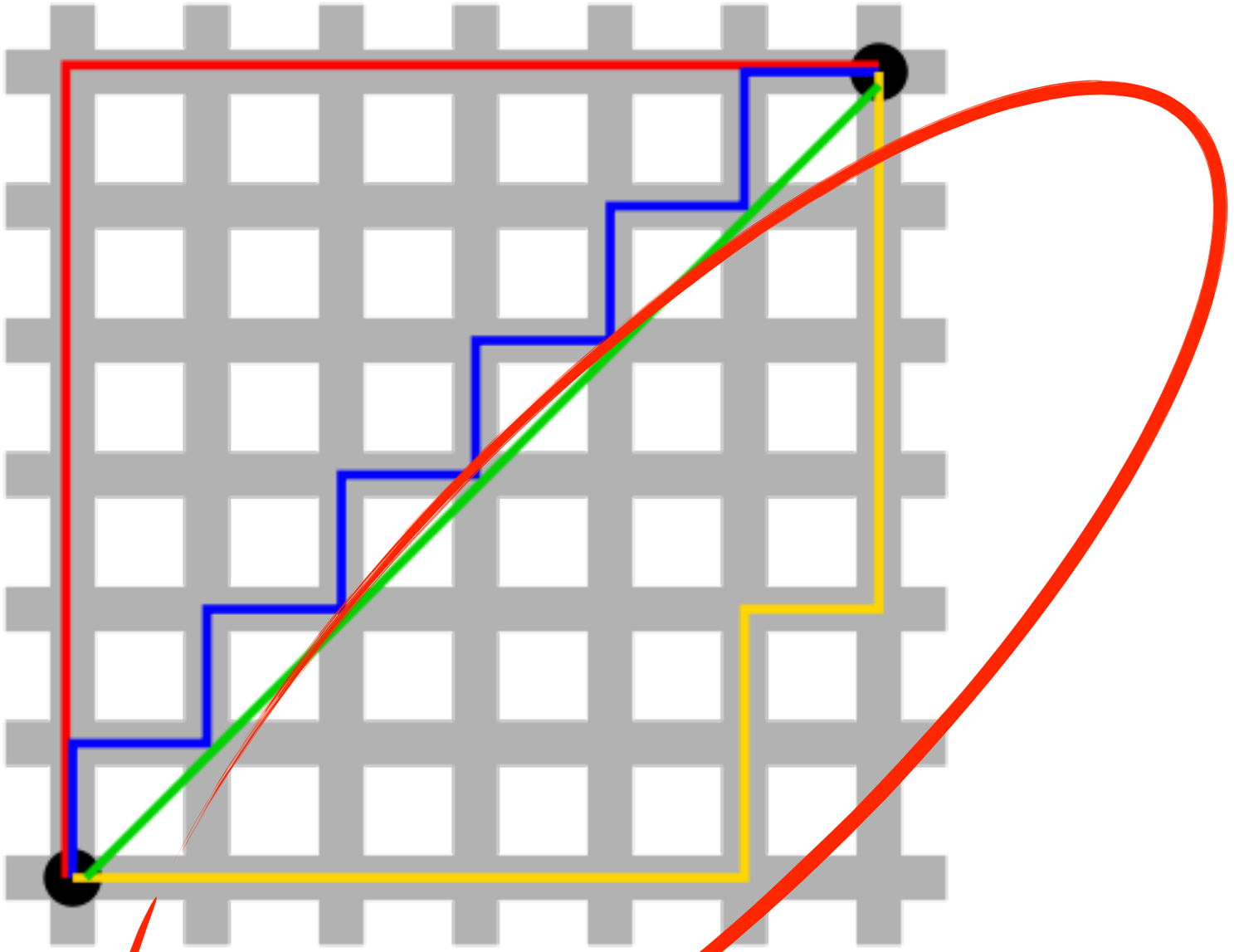
euclidian distance



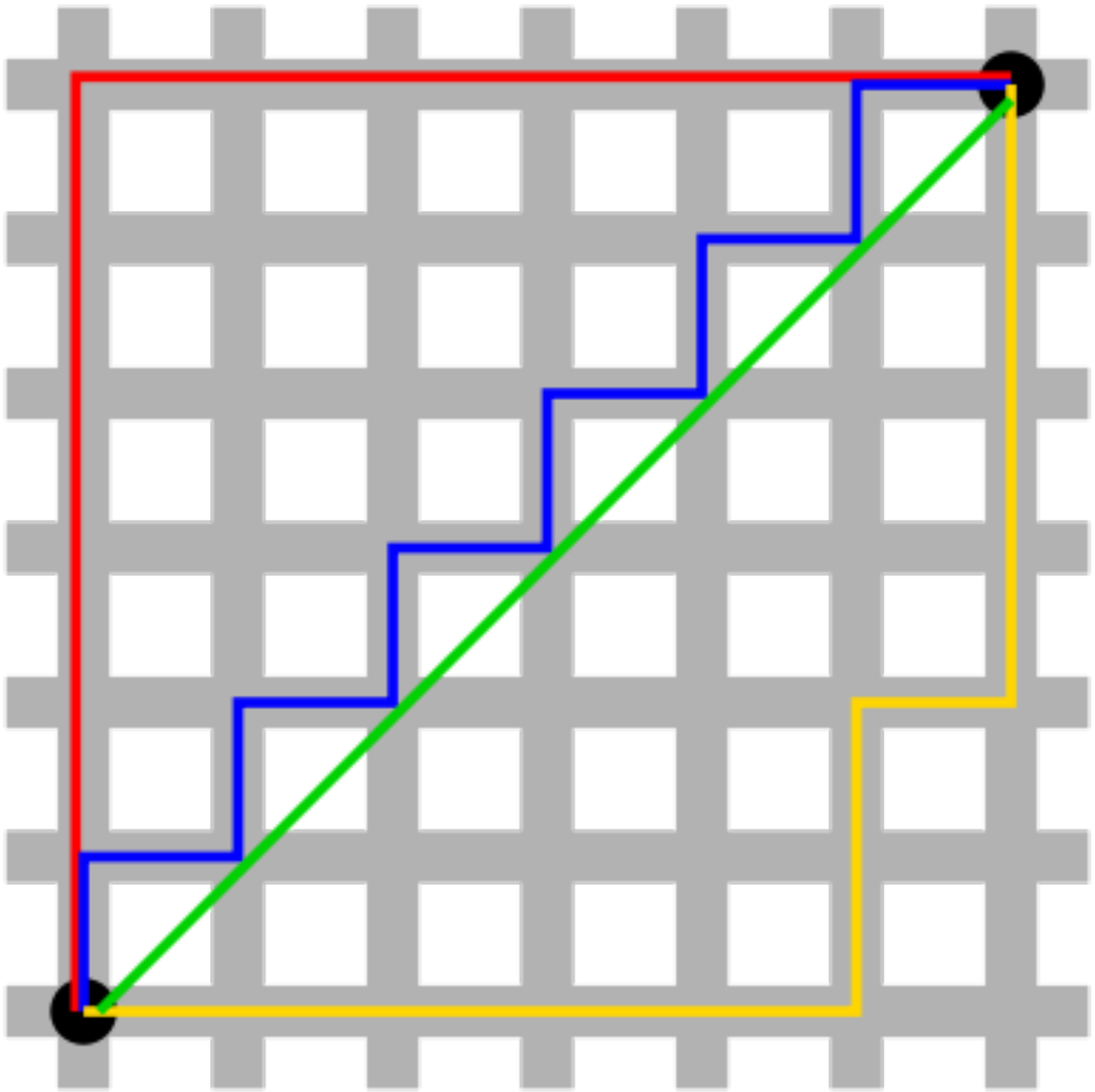








$$d_1(\mathbf{p}, \mathbf{q}) = \|\mathbf{p} - \mathbf{q}\|_1 = \sum_{i=1}^{n} |p_i - q_i|$$



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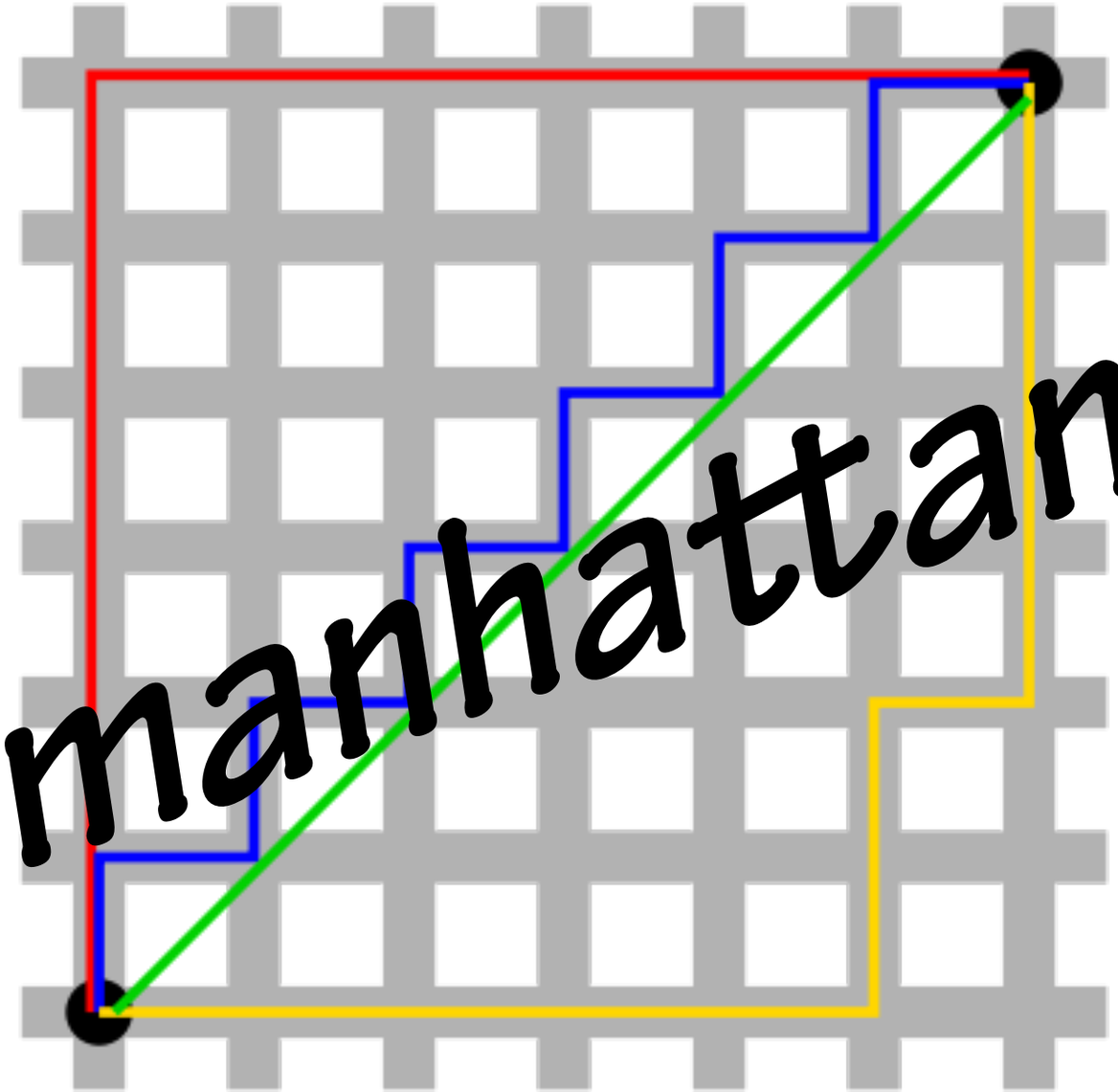

Summary