

# Thinking about loss...

A way to measure your accuracy



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# Matching X to Y

$$X = \{-1, 0, 1, 2, 3, 4\}$$

$$Y = \{-3, -1, 1, 3, 5, 7\}$$



Make a guess!

$$\mathbf{Y = 3X - 1}$$

$$X = \{ -1, 0, 1, 2, 3, 4 \}$$

$$Y = \{ -4, -1, 2, 5, 8, 11 \}$$

How good is the  
guess?

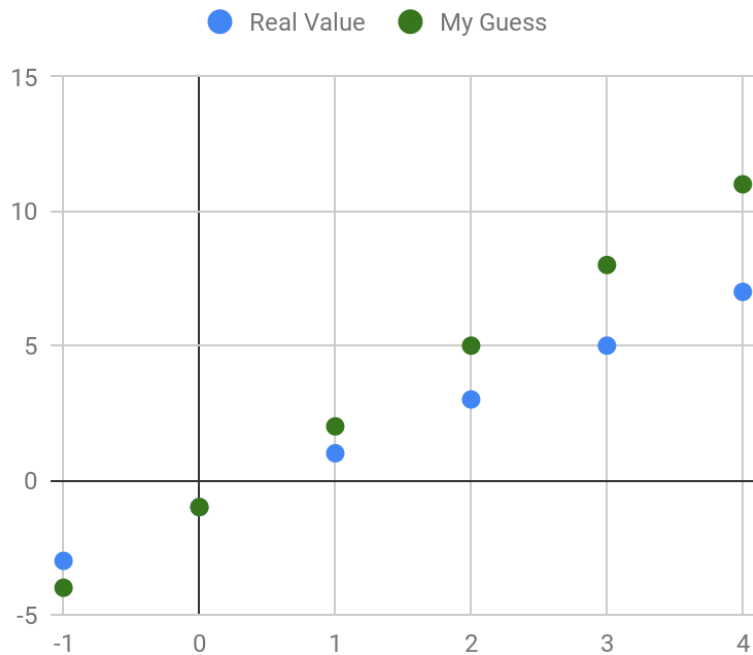
$$\mathbf{Y = 3X - 1}$$

$$X = \{ -1, 0, 1, 2, 3, 4 \}$$

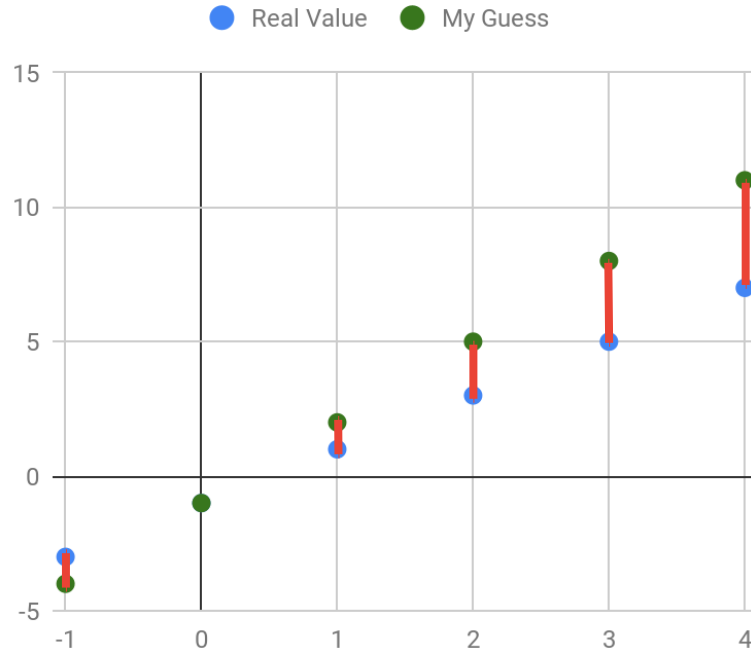
$$\text{My } Y = \{ -4, -1, 2, 5, 8, 11 \}$$

$$\text{Real } Y = \{ -3, -1, 1, 3, 5, 7 \}$$

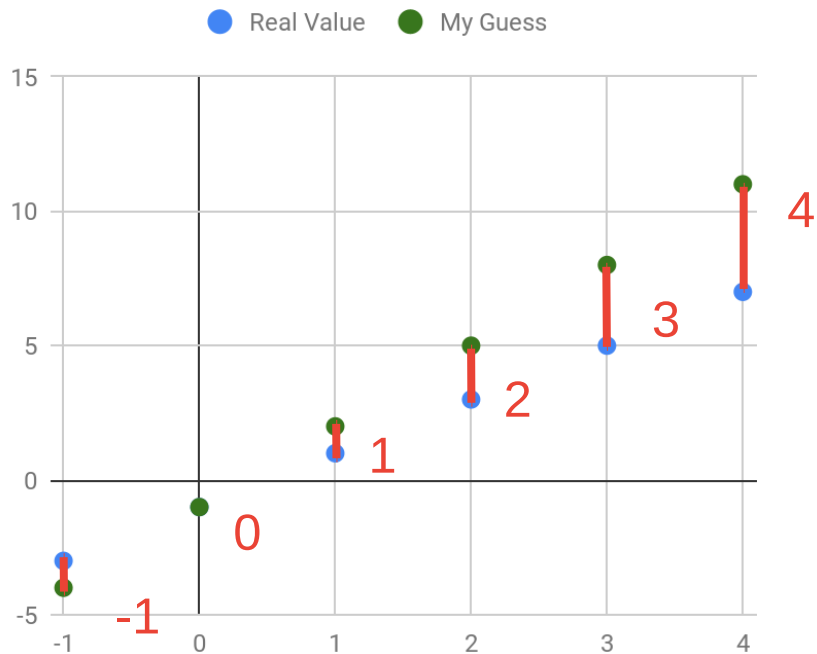
# Let's measure it!



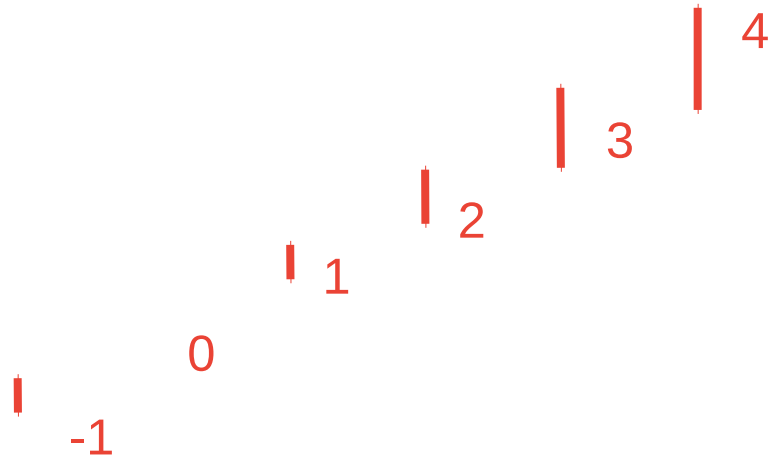
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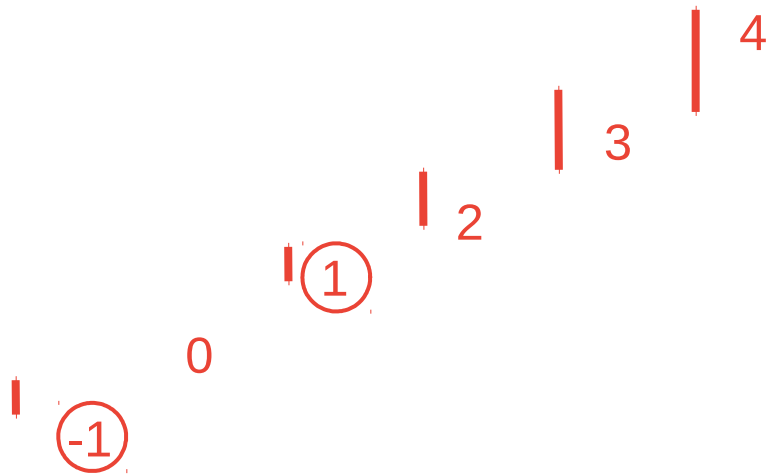


Let's measure it!

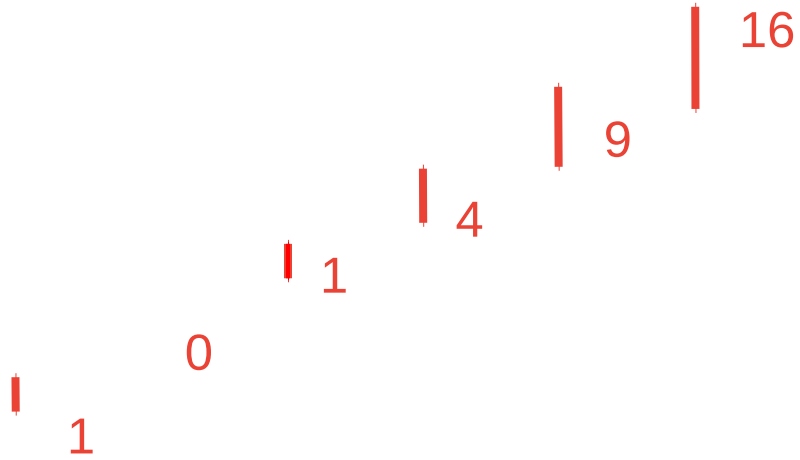




Houston, we have a  
problem!



What if we **square**<sup>2</sup>  
them?



Total that ( $\Sigma$ ) and take  
the square root  $\sqrt{\quad}$

$$\text{sqrt}(1 + 1 + 4 + 9 + 16)$$

$$= \text{sqrt}(31)$$

$$= 5.57$$



Make another guess!

$$\mathbf{Y = 2X - 2}$$

$$X = \{-1, 0, 1, 2, 3, 4\}$$

$$\text{My } Y = \{-4, -2, 0, 2, 4, 6\}$$

$$\text{Real } Y = \{-3, -1, 1, 3, 5, 7\}$$

$$\text{Diff}^2 = \{1, 1, 1, 1, 1\}$$



Get the same  
difference, repeat the  
same process.

$$\text{sqrt}(1 + 1 + 1 + 1 + 1)$$

$$= \text{sqrt}(5)$$

$$= 2.23$$



Make another guess!

$$Y = 2X - 1$$

$$X = \{-1, 0, 1, 2, 3, 4\}$$

$$\text{My } Y = \{-3, -1, 1, 3, 5, 7\}$$

$$\text{Real } Y = \{-3, -1, 1, 3, 5, 7\}$$

$$\text{Diff}^2 = \{0, 0, 0, 0, 0\}$$





Your turn!