Drawing Cubic Graphs from Value Tables: A Reliable Method

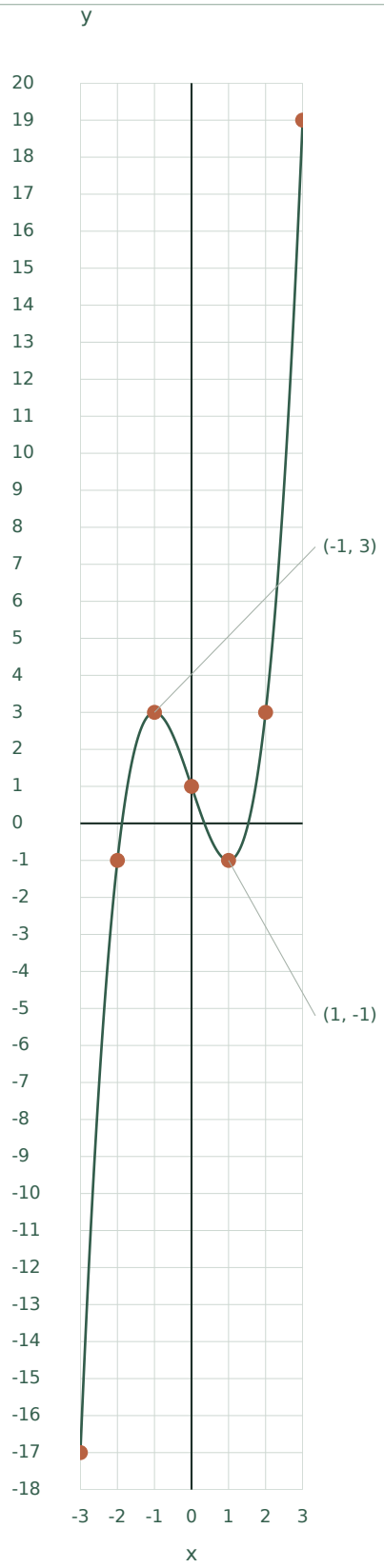
Original worked example / unchanged complete key

Prompt: Plot y = x^3 - 3x + 1 for x from -3 to 3 using a value table. Label any turning points approximately.

Answer: Table: x = -3, y = -17; x = -2, y = -1; x = -1, y = 3; x = 0, y = 1; x = 1, y = -1; x = 2, y = 3; x = 3, y = 19. Plot these points. For $y=x^3-3x+1$, the derivative is $y'=3x^2-3=3(x-1)(x+1)$, so the turning x-values are exactly -1 and 1. Substitution gives $y(-1)=3$ and $y(1)=-1$; the table includes both exact turning points. The curve rises to the local maximum $(-1,3)$, falls to the local minimum $(1,-1)$, then rises steeply. Check the values by substituting each listed x into the equation; the seven results match the table.

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Worked example: y = x^3 - 3x + 1 on -3 to 3



Worked reference: table points plotted, smooth cubic, turning points labelled. Coordinate labels sit outside the plot; thin grey leaders are annotations, not function curves.