

Find the Distance from a Point to a Line Activity

Using TI-Nspire CAS

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Part 1 Specific Solution with no CAS

A. Using graph paper, find the distance from the point $(-1, -5)$ to the line $2x + 3y = 9$. Show as much work as you can graphically. Compute your answer in both exact mode and rounded to the nearest thousandth.

B. Using TI-Nspire CAS, graphically find the distance from the point $(-1, -5)$ to the line $2x + 3y = 9$. Use the page labeled Part 1B of the TI-Nspire document "Distance from a Point to a Line" that is supplied to you. Compute your answer to the nearest thousandth and compare the Nspire solution with your answer to Part A. These answers should be the same. If not, attempt to make them the same answer.

C. Using the graphical solution to assist you, find the distance from the point $(-1, -5)$ to the line $2x + 3y = 9$, but show all the parts of the solution algebraically. Do this "by hand", that is, do not use the CAS features of the TI-Nspire CAS to assist you. Compute your answer in both exact mode and rounded to the nearest thousandth.

Part 2 Specific Solution with CAS assistance

D. Using the knowledge and techniques learned from Parts A, B, and C (above), algebraically find the distance between the point $(1, -3)$ to the line $x - 2y = -4$. Use the CAS features of the TI-Nspire CAS to assist you as needed. Record intermediate results so that anyone can follow your reasoning. Keep your CAS steps in your TI-Nspire CAS document on the page labeled Part 2D. Compute your answer in both exact mode and rounded to the nearest thousandth.

E. Using TI-Nspire CAS, graphically find the distance from the point $(1, -3)$ to the line $x - 2y = -4$. Use the page labeled Part 2E. Compute your answer to the nearest thousandth and compare the Nspire solution with your answer to Part D. These answers should be the same. If not, attempt to make them the same answer.

Part 3 General Solution with CAS assistance

F. Using the knowledge and techniques learned from Parts D and E (above), algebraically find the distance between the point (x_1, y_1) to the line $a \cdot x + b \cdot y = c$. Use the CAS features of the TI-Nspire CAS to assist you as needed. Record intermediate results so that anyone can follow your reasoning. Keep your CAS steps in your TI-Nspire CAS document on the page labeled Part 3F.

G. Using whatever resources you have, find the actual formula for calculating the distance from a point to a line. Compare this to the answer you obtained in Part F above.