

Distance between two points using Pythagoras

Treat horizontal and vertical coordinate changes as the legs of a right triangle.



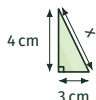
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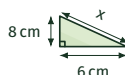
Diagram first

Use the right-angle mark to identify the hypotenuse. Show the equation, substitution, and conclusion with units where needed.

1. A(1, 2) to B(4, 6): find d . **Solution:** $d^2 = 3^2 + 4^2 = 25$; $d = 5$



2. C(-2, 1) to D(4, 9): find d . **Solution:** $d^2 = 6^2 + 8^2 = 100$; $d = 10$



3. E(5, -1) to F(-7, 4): find d . **Solution:** Changes: -12, 5; $d = 13$



4. G(-3, -4) to H(4, 20): find d . **Solution:** $d^2 = 7^2 + 24^2 = 625$; $d = 25$



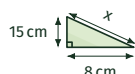
5. Horizontal change 3, vertical change 4: find d . **Solution:** $d^2 = 3^2 + 4^2 = 25$; $d = 5$



6. Horizontal change 5, vertical change 12: find d . **Solution:** $d^2 = 5^2 + 12^2 = 169$; $d = 13$



7. From (0, 0) to (8, 15): find d . **Solution:** $d^2 = 8^2 + 15^2 = 289$; $d = 17$



8. From (1, 2) to (10, 14): find d . **Solution:** $\Delta x = 9$, $\Delta y = 12$; $d^2 = 81 + 144 = 225$; $d = 15$



9. From (0, 0) to (9, 7): find d to 1 d.p. **Solution:** $d^2 = 9^2 + 7^2 = 130$; $d \approx 11.4$



Distance between two points using Pythagoras (continued)



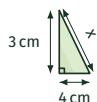
Apply the method to find distances between different pairs of points.

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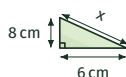
10. From (2, 3) to (6, 6): find d .

Solution: $\Delta x = 4, \Delta y = 3$;
 $d^2 = 16 + 9 = 25$; $d = 5$



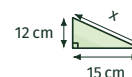
11. From (-1, 1) to (5, 9): find d .

Solution: $\Delta x = 6, \Delta y = 8$;
 $d^2 = 36 + 64 = 100$; $d = 10$



12. From (-3, -2) to (12, 10): find d .

Solution: $\Delta x = 15, \Delta y = 12$;
 $d^2 = 225 + 144 = 369$; $d \approx 19.2$



13. Horizontal change 10, vertical change 24: find d .

Solution: $d^2 = 100 + 576 = 676$; $d = 26$



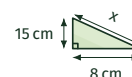
14. Distance is 13. Horizontal change is 5. Find vertical change.

Solution: $13^2 = 5^2 + v^2$; $169 = 25 + v^2$; $v = 12$



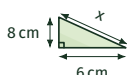
15. Distance is 17. Horizontal change is 8. Find vertical change.

Solution: $17^2 = 8^2 + v^2$; $289 = 64 + v^2$; $v = 15$



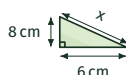
16. Signed changes: -6 and -8. Why is distance positive?

Solution: $d = \sqrt{(-6)^2 + (-8)^2} = \sqrt{100} = 10$. Squaring removes signs.



17. From (1, 1) to (7, 9): find d .

Solution: $\Delta x = 6, \Delta y = 8$;
 $d^2 = 36 + 64 = 100$; $d = 10$



18. From (5, -2) to (20, 18): find d .

Solution: $\Delta x = 15, \Delta y = 20$;
 $d^2 = 225 + 400 = 625$; $d = 25$

