

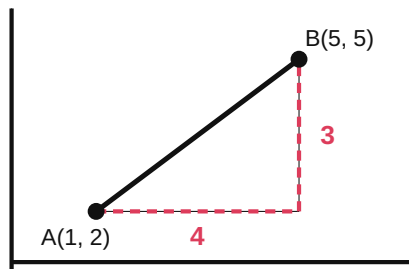
Boost Free Lessons - Year 10 Maths

Lesson 11: Length of an Interval

Name: _____ Grade: _____ Date: _____

Worked Example 1

Find the distance between A(1, 2) and B(5, 5).



1. The distance formula comes straight from Pythagoras' theorem.
2. Horizontal change: $5 - 1 = 4$. Vertical change: $5 - 2 = 3$.
3. These are the two shorter sides of a right-angled triangle, and the interval AB is the hypotenuse.
4. $d = \sqrt{4^2 + 3^2} = \sqrt{16 + 9} = \sqrt{25}$.

d = 5 units

Worked Example 2

Find the exact distance between P(-2, 1) and Q(3, 4).

1. Horizontal change: $3 - (-2) = 5$.
2. Vertical change: $4 - 1 = 3$.
3. $d = \sqrt{5^2 + 3^2} = \sqrt{25 + 9} = \sqrt{34}$.
4. 34 has no perfect square factors, so leave the answer as a surd. Squaring removes negatives, so the order of the points does not matter.

d = $\sqrt{34}$ units

Remember: $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$. Squaring removes any negatives, so it does not matter which point you call first.



Question 1: Find the distance between each pair of points.

1. $(0, 0)$ and $(3, 4)$
2. $(1, 1)$ and $(4, 5)$
3. $(0, 0)$ and $(6, 8)$
4. $(2, 3)$ and $(5, 7)$
5. $(-1, 0)$ and $(2, 4)$
6. $(0, 0)$ and $(5, 12)$
7. $(1, 2)$ and $(9, 8)$
8. $(-3, -4)$ and $(0, 0)$



Question 2: Find the exact distance, giving your answer as a simplified surd.

1. $(0, 0)$ and $(1, 2)$

2. $(1, 1)$ and $(3, 4)$

3. $(2, 0)$ and $(5, 3)$

4. $(-1, 2)$ and $(1, 6)$

5. $(0, 0)$ and $(2, 2)$

6. $(2, 1)$ and $(5, 7)$



Question 3: Answer the following questions.

1. Find the distance between $(0, 0)$ and $(7, 24)$.
2. A triangle has vertices $(0, 0)$, $(4, 0)$ and $(4, 3)$. Find its perimeter.
3. Find the exact distance between $(-2, -1)$ and $(2, 2)$.
4. Find the length of the interval joining $(1, 5)$ and $(7, 13)$.
5. A square has vertices $(0, 0)$, $(4, 0)$, $(4, 4)$ and $(0, 4)$. Find the exact length of its diagonal.





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Answers: Length of an Interval

Question 1

- | | |
|-------|-------|
| 1. 5 | 5. 5 |
| 2. 5 | 6. 13 |
| 3. 10 | 7. 10 |
| 4. 5 | 8. 5 |

Question 2

- | | |
|----------------|----------------|
| 1. $\sqrt{5}$ | 4. $2\sqrt{5}$ |
| 2. $\sqrt{13}$ | 5. $2\sqrt{2}$ |
| 3. $3\sqrt{2}$ | 6. $3\sqrt{5}$ |

Question 3

1. 25
2. 12 units
3. 5
4. 10
5. $4\sqrt{2}$ units

