

# A tangent is ...

Teacher notes

## Why use this resource?

Counter example is an important tool in the proof armoury. Many students, when asked, are able to explain what a tangent is, in this resource are some common suggestions. Students are asked to identify examples where these “definitions” fail and try to come up with a better definition: the solution gives a detailed explanation of what a tangent really is.

## Preparation

- Printouts of, or facilities for displaying the solutions could be useful.
- Statements printed out or displayed on the board.

## Possible approach

- Each student decides which they think is the correct “definition.”
- Students then pair up and decide, discussing why if their original choices didn’t match and choosing one between them.
- Pairs join up and repeat the process of coming to a consensus opinion. Then, as a whole group, feed back which have been chosen.
- Challenge students to think of an example where their chosen definition would fail.
- Present refutation to the first choice. (Or a popular choice in the class.)

## Key questions

- Can you sketch a curve that would make your choice fail?
  - Can you improve on the definition?
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A version of this resource has been featured on the [NRICH website](https://undergroundmathematics.org/introducing-calculus/a-tangent-is). You might like to look at some students’ solutions that have been submitted there.