A tangent is ...

Problem

Here are some suggestions of how we could define a tangent to a curve at a point.

(1) "A tangent is a straight line which only meets the curve at that one point."

(2) "A tangent is a straight line which touches the curve at that point only."

(3) "A tangent is a straight line which meets the curve at that point, but the curve is all on one side of the line."

(4) "A tangent is a straight line which meets the curve at that point, but near that point, the curve is all on one side of the line."

Which, if any, of these proposed definitions works for a circle?

For each one, can you find or sketch an example to show that the proposed definition does not work for all curves?

Can you come up with a better definition? (You may like to think about the Zooming in resource when answering this question.)