Derivative of Functions as Slope of Tangent
XI & XII

Aim: To investigate the Derivative of a Quadratic Function as Slope of Tangent to the Curve
Material : GeoGebra file and Student activity sheet
Instructions: Interact with the applet and answer following:

In the GeoGebra file, describe shape of the path followed by the point A?
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2. As the point A moves, what happens to the slope of the tangent to the curve at the point A?
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3. In the interactive file, as the point A moves, describe the path followed by the trace of the slope of tangent to the curve at the point A
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4. Click the button and set the sliders to the following values: a = 1, b = 4 and c =1 Describe the graph of the resulting function.
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5. With the sliders at the above values, move the point A and note the shape of the path formed by the trace of the slope of the tangent to the curve at the point A.
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6. Click the check box on the interactive file and note the equation of the derivative of the function.
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7. Click the checkboxes to show the slope of the tangent to the curve at the point A and the value of the derivative of the function at the point A. As A moves around the curve, what do you notice about these?
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8. What do you notice the path followed by the trace of the slope of the tangent to the curve at the point A and the graph of the derivative of the function?
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9. Change some or all of the sliders a, b, and c. and move the point A as before. Is the relationship between the path followed by the trace of the slope and the graph of the derivative of the function the same as in Q8 above?
_____
Repeat this process at least five times and check if the relationship exists in all these cases.
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10. Given a quadratic function, what type of function do you expect the derivative to be?

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11. Given the slope of the tangent at a point, what can you conclude about the derivative of the function at that point?

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12. The diagram shows the graph of the function $f(x) = x^2 + 2x - 2,$ and its derivative. What is the equation of the line?