WHAT DOES THE GRAPH LOOK LIKE?

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TARGET AUDIENCE: FET Phase

DURATION: Two hours

MAXIMUM NO. OF PARTICIPANTS: 30

MOTIVATION

The purpose of this workshop is two-fold: how to use *Autograph* and how to illustrate different and difficult concepts using graphs. A mathematics educator, when faced with a difficult problem, often says "What does the graph look like?" We have laptops loaded with user friendly software called *Autograph* in our classrooms so this is a technique that we often use. Our worksheet has a series of questions, each of which can use a graph to explain and clarify a particular concept. We work in rural schools and find that using this approach has changed the atmosphere in our classrooms as well as making them much more interactive.

CONTENT

Part 1: 30 minutes Discussion and demonstration:

We assume that the workshop participants are new to *Autograph*. It was written for maths teachers by a maths teacher so it is simple to learn and use. We demonstrate its use. We hand out notes for *Autograph*.

Next we take some questions from the worksheet and show how drawing a graph can explain a concept clearly. The first example

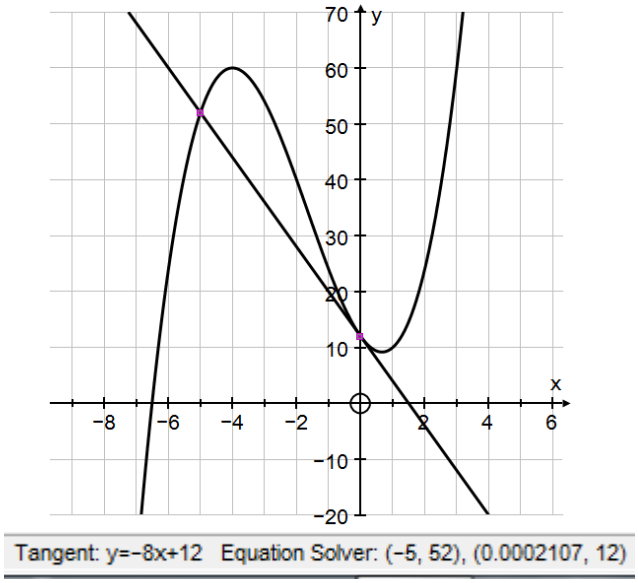
1.	Find the equation of the tangent to the graph of $y = x^3 + 5x^2 - 8x + 12$ at its y-intercept. Hence find the point at which this tangent cuts the curve again.

Educators find this question straightforward. Learners struggle with it. Once they have seen the picture, they are much happier and will answer the question, and hence similar questions, from an understanding point of view rather than by rote learning.

The detailed instructions for this question suggest the following approach:

- Draw the cubic graph
- Put a point on to the graph
- Construct a tangent at this point
- Move the point until it is at the y-intercept of the cubic
- Read off the equation of the tangent at this point
- Write down the coordinates of the other point where the tangent and cubic intersect

Khumalo, J.J. & Mthethwe, D. (2013). What does the graph look like? In Z. Davis & S. Jaffer (Eds.), *Proceedings of the 19th Annual Congress of the Association for Mathematics Education of South Africa*, Vol. 2. (pp. 34 – 35). Cape Town: AMESA.



Part 2: 90 minutes **Practice:**

We suggest that participants work in pairs. This makes for interesting discussions. They use the printed worksheet which contains carefully chosen questions and includes hints on what technique to use.

ABSTRACT

Participants in this workshop will use the software called *Autograph* to find the answers to an interesting and fairly difficult Grade 12 calculus worksheet. The approach is innovative and fun: both educators as well as learners enjoy reading accurate answers from graphs rather than finding them through written calculations. Participants need not be familiar with *Autograph*: the first part of the workshop is a demonstration of how to use it and some of its features.