NCEA Level 2 Mathematics (Homework)
1. Coordinate Geometry

Reading

> **Go and watch...**
>
> https://www.youtube.com/watch?v=X1E7I7_r3Cw

> **What's it good for?**
>
> People use coordinate geometry for...
> - Computer graphics: coordinate geometry is a compact, efficient, and simple way to store information about and manipulate complicated graphical data. Vector graphics programs, like Inkscape and Adobe Illustrator, store all their graphics as coordinate geometric objects as they take up less storage space, are easier to edit, and easier to scale and otherwise modify than storing objects pixel-by-pixel.
>
> - Coordinate systems are used by physicists, geographers, and other people who need to describe the positions of objects in space relative to each other.

Questions

[This is a sample Ministry of Education L2 assessment task for this standard.]

The *reflection* of a point A in a line L is the unique point A' such that (1) the line AA' is perpendicular to L, and (2) if I is the point of intersection between AA' and L, then $I = m(A, A')$. (In other words, A' is the unique point such that L is the perpendicular bisector of AA'.)

Develop a general method for finding the co-ordinates of the reflection of any point in the mirror line joining the points $(0, 9/4)$ and $(9/2, 0)$ by completing the following steps:

1. Reflect the point $(4, 1)$ in the mirror line joining the points $(0, 9/4)$ and $(9/2, 0)$ and find the co-ordinates of the reflection;

2. If (a, b) is any point not on the mirror line, reflect the point (a, b) in the mirror line and find the co-ordinates of the reflection.

The quality of your discussion and reasoning will determine the overall grade. Show your calculations. Use appropriate mathematical statements. Clearly communicate your strategy and method at each stage of the solution.