

MATH1003
QUIZ 4

*This quiz has three questions, with each question worth 5 marks.
The quiz lasts for thirty minutes. No calculator, textbooks, or other notes are allowed.*

1. Find the derivative of $y = 2^{3x^2}$.
2. The graph of $2y^3 + y^2 - y^5 = x^4 - 2x^3 + x^2$ is given in Figure 1. For what values of x is the tangent line to the graph parallel to the x -axis?

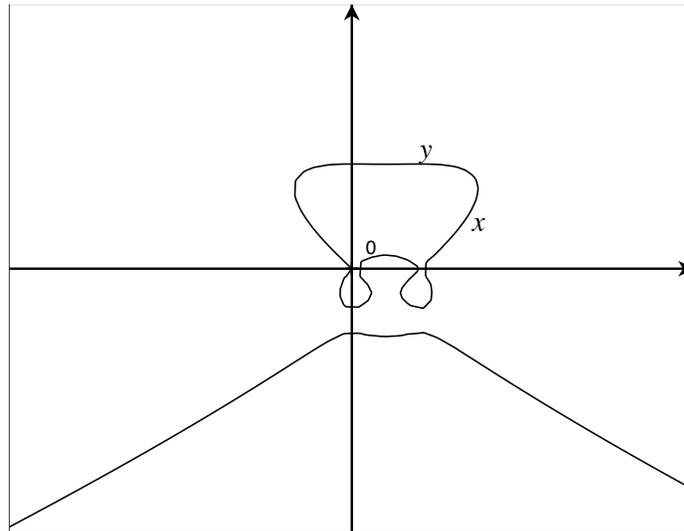


FIGURE 1. A bouncing wagon: the graph of $2y^3 + y^2 - y^5 = x^4 - 2x^3 + x^2$.

3. Find equations of both tangent lines to the ellipse $x^2 + 4y^2 = 36$ that pass through the point $(12, 3)$. (Hint: Depending on how you solve this problem, you might find it useful to know that $\sqrt{576} = 24$.)