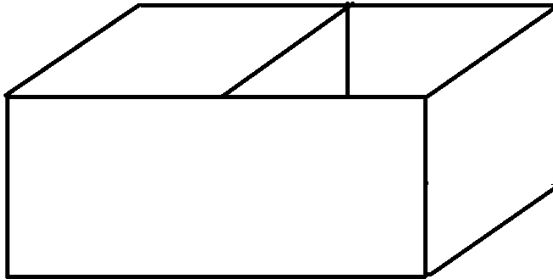


YOUR NAME: _____

George Voutsadakis

Read each problem **very carefully** before starting to solve it. Each problem is worth 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

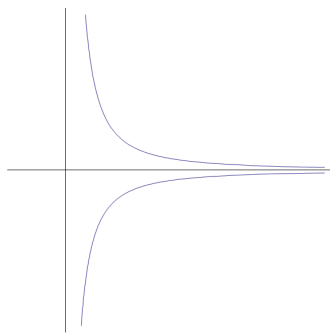
1. An open-top box is to be constructed with the requirement that it have a divider in the middle and that each of the two compartments have a square base and a volume of 28 in^3 . Find the dimensions of the box that require the least amount of material.



2. Find the equation of the tangent line to the graph of

$$x^3y^2 - xy = 12$$

at the point $(x, y) = (1, -3)$.



3. A police car is driving north shadowing a badly damaged truck traveling east, which is under suspicion of transporting the notorious ruthless gangster Jimmy O'Toole, his girlfriend Barbie and her poodle Dolly. The direct distance between the police vehicle and the truck stays constant at 1 mile. If the officer drives at a steady speed of 75 mph, how fast is the truck driver going, when the patrol car is half a mile from the intersection?

