

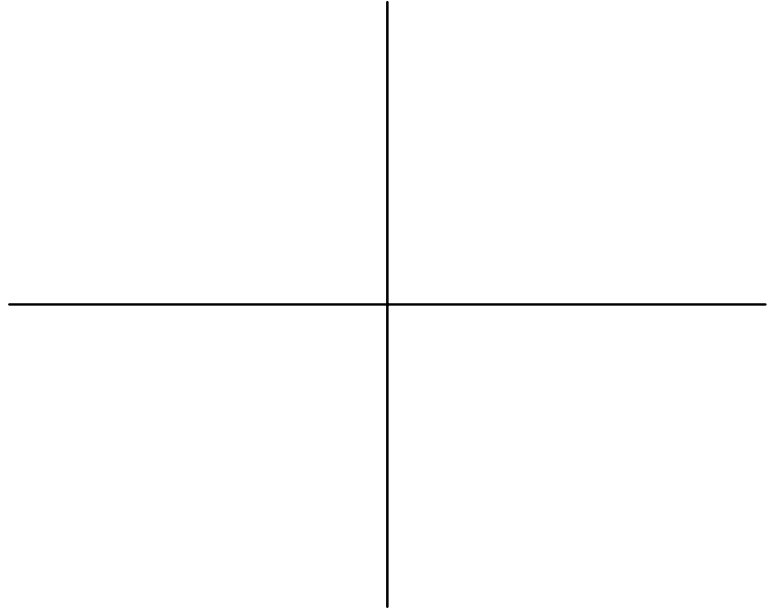
Name: _____ ID _____ List: _____

1. Find the linear approximation of $f(x) = \sqrt[3]{1+x}$ at $a = 0$ and use it to approximate $\sqrt[3]{1.1}$.

2. If $z^2 = x^2 + y^2$, $\frac{dx}{dt} = 2$ and $\frac{dy}{dt} = 3$, find $\frac{dz}{dt}$ when $x = 5$ and $y = 12$.

3. **The Mean Value Theorem:** $f(x) = e^{2x}$, $[0, 3]$.

4. Discuss, give all details and sketch the graph: $f(x) = e^{-x^2}$.



5. Find the intervals on which f is increasing or decreasing: $f(x) = e^{2x} + e^{-x}$.