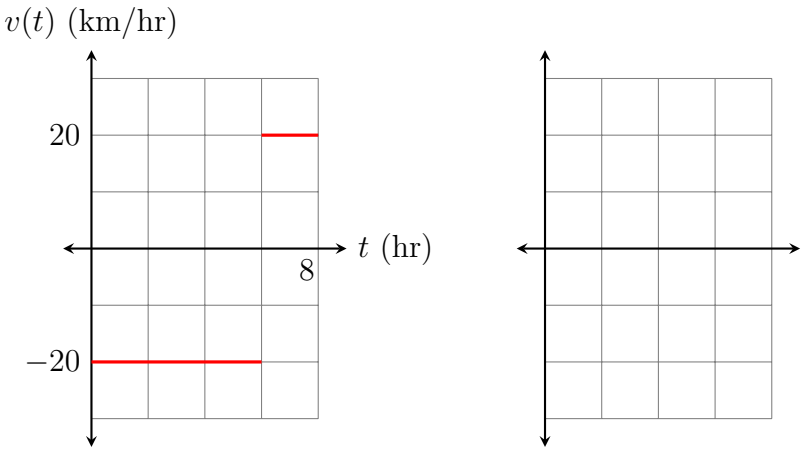
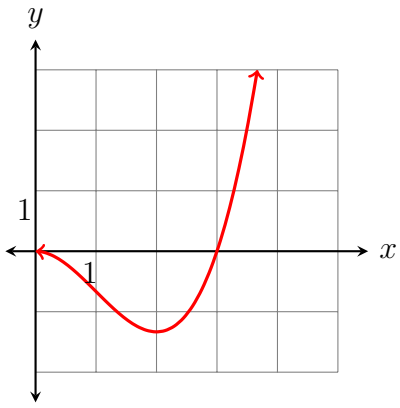
1. You are given a velocity graph below. Draw the corresponding displacement graph on the blank grid. Label axes carefully!



   Write a brief sentence describing this journey.

2. Below is a graph of the function $f(x) = \frac{1}{3}x^3 - x^2$. Find an equation of the tangent line in the form $y = mx + b$ at $x = 3$. You can use the graph to verify your answer, but you have to use calculus to find the equation.



3. Find the derivatives of the following functions.

   (a) $h(x) = -\dfrac{5}{x^4}$

   (b) $h(x) = x^2 \sin(x)$

   (c) $h(x) = \dfrac{x^2}{\cos(x)}$

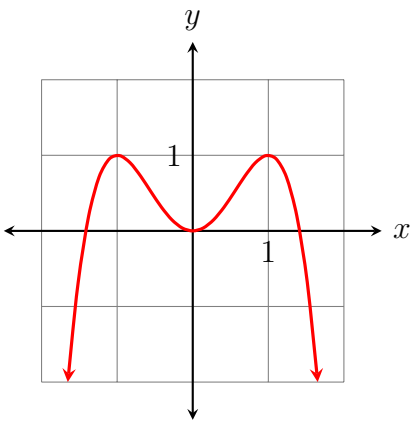
   (d) $h(x) = \tan(1 - x^2)$

4. Suppose a population of bacteria is modeled by $P(t) = 4000e^{0.02t}$, where P is the population at time t, which is given in hours. At what rate is the population increasing at 7 hours?

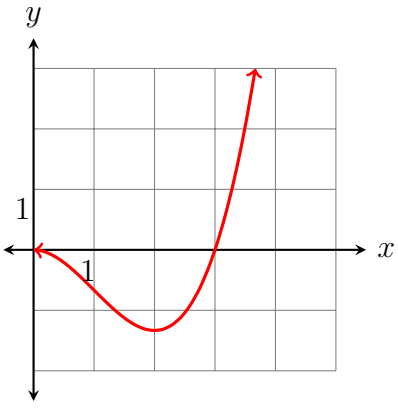
5. (a) If $h(x) = \ln(x^2 + \cos(x))$, find $h'(x)$.

   (b) Find $\dfrac{d}{dx} 3e^{(x^2+1)}$.

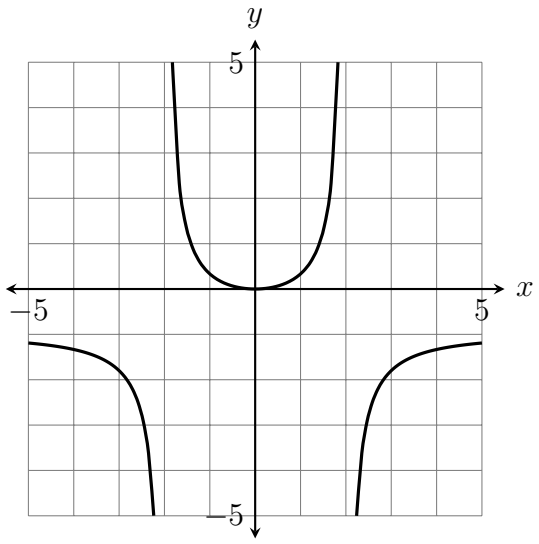
6. Find the local extrema for the function $f(x) = 2x^2 - x^4$. You *must* show the appropriate calculus for full credit. No partial credit will be given for just looking at the graph.



7. Find the global extrema for the function $f(x) = \dfrac{1}{3}x^3 - x^2$ on the closed interval $[0, 5]$. You *must* show the appropriate calculus for full credit. No partial credit will be given for just looking at the graph.



8. Below is a graph of $y = \dfrac{x^2}{4 - x^2}$. Find all asymptotes, sketch them on the graph, and label the behavior near the asymptotes using the appropriate limit notation.



9. (a) Find $\lim\limits_{x \to -\infty} \dfrac{e^x}{x^2}$.

   (b) Find $\lim\limits_{x \to \infty} \dfrac{e^x}{x^2}$.

10. Given the curve described by the equation $e^{xy} = x^3 + y^3$, find $\dfrac{dy}{dx}$.