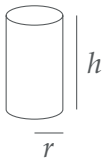
Math 141 Midterm 2.1

Name: _____

1. A can has the shape of a right cylinder of radius r and height h. The surface area of the can (including the top and bottom) needs to be 1. Find the radius of the cylinder as to maximize its volume.



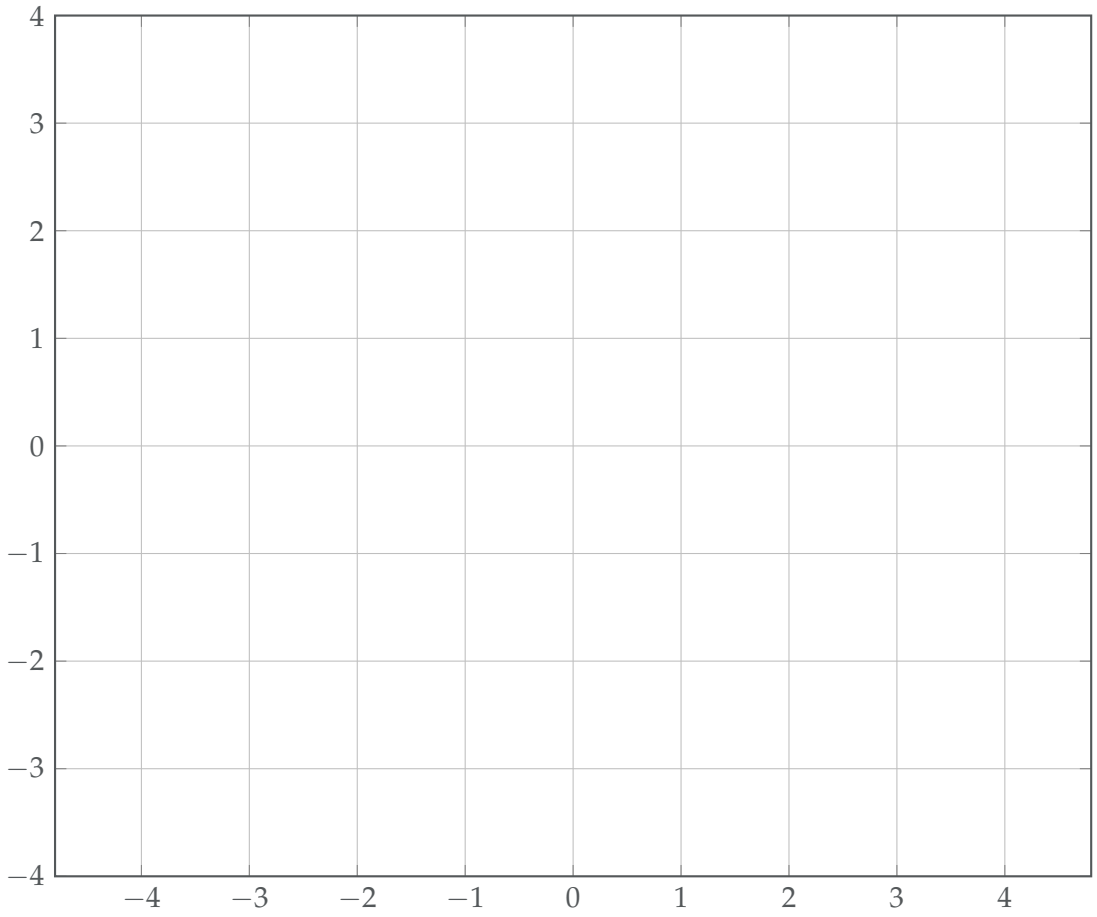
2. Let $f(x) = \dfrac{x}{x^2+1}$:

a. Find $\lim_{x\to-\infty} f(x)$ and $\lim_{x\to\infty} f(x)$,

b. Find where $f(x)$ is increasing.

c. Find where $f(x)$ is concave up.

d. Sketch the graph of $f(x)$.



3. Find $\dfrac{d}{dx}\displaystyle\int_{-x}^{x^4} \frac{1}{2+\sin t}\,dt.$

4. Evaluate $\int_0^2 \left(\sqrt{4-x^2}+4x^2+2\right)\,dx$