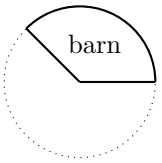
OSH 5
Math 104 - Section 107

Question 1 *(2 points)* Let $f(x) = e^{\sin x}$. Find the inflection points of $f(x)$ on the interval $[0, 2\pi]$.

Question 2 *(2 points)* A rancher wants to use 100 meters of fence to build a barn shaped as circular sector (see the picture). What is the maximal possible area of such a barn?



Question 3 *(2 points)* Of all points on the parabola $y = x^2 + x$, which one is the closest to the point $(1, -1)$? (Hint: $(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$.)

Question 4 *(4 points)* Do the following for each of the functions below:

- Find increasing and decreasing intervals.
- Find local extremities.
- Final concaving up and concaving down intervals.
- Find inflection points.
- Find all asymptotes (horizontal, vertical and oblique).
- Draw a graph of the function, indicating all previous information.

The functions:

1. $f(x) = \frac{2x}{x^2+1}$
2. $f(x) = \frac{1}{x^3-3x}$