1. Find the intervals where the function $f$ is concave up and where it is concave down.

$$f(x) = e^{-x^2}$$

2. If the domain of $f(x)$ is all real numbers and

$$f''(x) = (x - 9)^2(x + 3)(x - 2)e^{2x^3 - 3x^2 + 6},$$

find the intervals where $f(x)$ is concave up/down and label the inflection values.

3. Give the asymptotes (vertical and horizontal) for these functions.

   (a) $y = \frac{(x - 3)(40x + 3)}{x^2 - 9}$

   (b) $y = \ln(70 - 3x)$