1. [9 points] Use the following diagram to answer the questions for this problem. Give your answers in exact form in terms of $\sin$, $\cos$, $\tan$, and $\theta$. Do not assume $\theta$ is a specific value.

![Diagram with labels: $x$, $y$, $z$, $w$, $\theta$, $2$, $8$]

a. [2 points] Find the length of $x$.

$x = \sqrt{2^2 + 8^2} = \sqrt{68}$

b. [2 points] Find the length of $z$.

$z = \frac{8}{\sin(\theta)}$

c. [3 points] Find the length of $w$.

$w = \frac{8}{\tan(\theta)} - 4$

d. [2 points] Find the length of $y$ in terms of $w$.

$y = \sqrt{(w + 2)^2 + 8^2}$

2. [6 points] Determine whether the following functions are even, odd, or neither even nor odd. Circle your answer. You do no need to show any work for this problem.

a. [2 points] The function $x^2 + x + 1$ is

EVEN \hspace{1cm} ODD \hspace{1cm} NEITHER

b. [2 points] The function $\frac{x^4 + 1}{x^3 - x}$ is

EVEN \hspace{1cm} ODD \hspace{1cm} NEITHER

c. [2 points] The function $3x \sin(x)$ is

EVEN \hspace{1cm} ODD \hspace{1cm} NEITHER