Find the domain of each function.
Then state whether the function it is even, odd or neither.

$$f(x) = \sqrt{x^4 - 13x^2 + 36}$$

$$g(x) = 4x^3 - 24x^2 - x + 6$$

Find the x-intercepts of the g(x) function given above.

For what values of x is $g(x)<0$?

Key to review questions

$f(x) = \sqrt{x^4 - 13x^2 + 36}$

Factor: $(x^2 - 9)(x^2 - 4) = (x+3)(x-3)(x+2)(x-2)$

Domain $(x+3)(x-3)(x+2)(x-2) \geq 0$

Use number line analysis, the domain of $f(x)$ is $(-\infty, -3] \cup [-2, 2] \cup [3, \infty)$.

Test to determine even/odd/neither.

$f(-x) = \sqrt{(-x)^4 - 13(-x)^2 + 36}$

$f(-x) = \sqrt{x^4 - 13x^2 + 36}$; therefore since $f(-x) = f(x)$. The function is even.

$g(x)=4x^3-24x^2-x+6$

Domain is all real numbers (no work required).

Test to determine even/odd/neither

$g(-x)=4(-x)^3-24(-x)^2-(-x)+6$

Simplify:

$g(-x)=-4x^3-24x^2+x+6$

$-g(x)=-4x^3+24x^2+x-6$

Since $g(-x)\neq g(x)$ and $\text{g}(-x)\neq -g(x)$, the function is neither even or odd.

answer: <u>function is neither.</u>

$x-$intercepts: Set $g(x)=0$ and solve for x.

Factor $g(x)$ by grouping: $(4x^2-1)(x-6)=(2x+1)(2x-1)(x-6)$

Solve: $(2x+1)(2x-1)(x-6)=0$

Solution $x=\pm\frac{1}{2},6$ are the $x-$intercepts.

$g(x)<0$ Using number line analysis $g(x)<0$ in the intervals

$\left(-\infty,-\frac{1}{2}\right)\cup\left(\frac{1}{2},6\right)$