Ex. The graph of \( y = x(x-2)(x+2) \) is given. Show this graph is

a) symmetric about origin
b) NOT symmetric about the \( x \)-axis

\[
\text{Soln}
\]

a) Assume \((x, y)\) is on the graph. Want to show \((-x, -y)\) is also on graph.

Let \( x \) be \(-x\) & \( y \) be \(-y\) then plug into \( y = x(x-2)(x+2) \)

\[
\Rightarrow \quad (-y) = (-x)(-x-2)(-x+2)
\]

\[
\Rightarrow \quad -y = -x(-x-2)(-x+2) \Rightarrow y = x(-1)(x+2)(-x+2)
\]

(matches original equation)

\[
\Rightarrow \quad y = x(x+2)(x-2) \quad \text{TRUE}
\]

b) Assume \((x, y)\) is on graph. Show \((x, -y)\) NOT on graph

Let \( y \) be \(-y\), then plug into \( y = x(x-2)(x+2) \)

\[
\Rightarrow \quad (-y) = x(x-2)(x+2)
\]

\[
\Rightarrow \quad y = -x(x-2)(x+2) \quad \text{FALSE}
\]

(Doesn't match original equation)