Exercise 31

In Exercises 29–40, test for symmetry with respect to each axis and to the origin.

$$y^2 = x^3 - 8x$$

Solution

Replacing x with $-x$ changes the equation, so there's no symmetry with respect to the y-axis.

$$y^2 = (-x)^3 - 8(-x) = -x^3 + 8x$$

Replacing y with $-y$ does not change the equation, so there is symmetry with respect to the x-axis.

$$(-y)^2 = x^3 - 8x \quad \rightarrow \quad y^2 = x^3 - 8x$$

Replacing x with $-x$ and y with $-y$ changes the equation, so there's no symmetry with respect to the origin.

$$(-y)^2 = (-x)^3 - 8(-x) \quad \rightarrow \quad y^2 = -x^3 + 8x$$