Quiz 2

1 Consider the graph of

$$y = \frac{-x^3}{x^2 - 9}$$

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and answer the following questions about it. (Either show what equations you use to answer these questions or draw a graph in which the answers can clearly be seen.)

a Is the graph symmetric with respect to the x-axis?

I change y to -y, simplify, and compare with the original:

$$(-y) = \frac{-x^3}{x^2 - 9};$$
$$-y = \frac{-x^3}{x^2 - 9};$$
$$y = \frac{x^3}{x^2 - 9}.$$

This is different from the original, so the graph is **not symmetric** with respect to the x-axis.

b Is the graph symmetric with respect to the y-axis?

This time I change x to -x:

$$y = \frac{-(-x)^3}{(-x)^2 - 9};$$
$$y = \frac{x^3}{x^2 - 9}.$$

This is the different from the original, so the graph is **not symmetric** with respect to the *y*-axis.

c Is the graph symmetric with respect to the origin? This time I change both:

$$(-y) = \frac{-(-x)^3}{(-x)^2 - 9};$$
$$-y = \frac{x^3}{x^2 - 9};$$
$$y = \frac{-x^3}{x^2 - 9}.$$

This is the same as the original, so the graph is symmetric with respect to the origin.

- **2** Consider the line through the points (1,3) and (-1,2).
- a What is the slope of this line?

The rise is the change in the second coordinate: (2) - (3) = -1; the run is the change in the first coordinate: (-1) - (1) = -2. Then the slope is the rise divided by the run: (-1)/(-2) = 1/2. In summary, the slope is

$$\frac{(2) - (3)}{(-1) - (1)} = \frac{-1}{-2} = \frac{1}{2}$$

b Write down an equation in for this line in the variables x and y.

In general, the equation is y = mx + b, where m is the slope. I know that m = 1/2; at one point, x = 1 and y = 3. This means that 3 = (1/2)(1) + b, so b = 5/2. Therefore, the equation is

$$y = \frac{1}{2}x + \frac{5}{2}$$

(There are at least five other ways that you could do this problem; all would give the same equation when solved for y and simplified.)

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