1 Consider the graph of

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

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:

$$
\begin{aligned}
(-y) & =\frac{-x^{3}}{x^{2}-9} \\
-y & =\frac{-x^{3}}{x^{2}-9} \\
y & =\frac{x^{3}}{x^{2}-9}
\end{aligned}
$$

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 $-x$ :

$$
\begin{aligned}
& y=\frac{-(-x)^{3}}{(-x)^{2}-9} \\
& y=\frac{x^{3}}{x^{2}-9}
\end{aligned}
$$

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:

$$
\begin{aligned}
(-y) & =\frac{-(-x)^{3}}{(-x)^{2}-9} \\
-y & =\frac{x^{3}}{x^{2}-9} \\
y & =\frac{-x^{3}}{x^{2}-9}
\end{aligned}
$$

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 $y=m x+b$, 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.)

