Exponential and Logarithmic Functions

Part 1 - Create a table of values and then sketch the graph of the function in the coordinate plane $f(x) = 4^x - 2$. Next find the inverse of the function algebraically. Call the inverse g(x).
$g(x) = \log_4(x+2)$ Then create a table of values and sketch the graph of the inverse in the same coordinate plane.

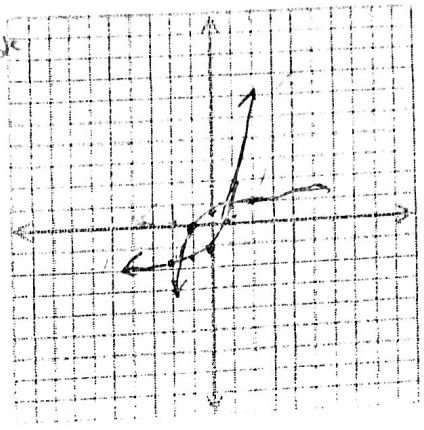
$f(x) = 4^x - 2$

x	f(x)
-2	-1.9375
-1	-1.75
0	-1
1	2
2	14
3	62

x	g(x)
-2	Error
-1	0
0	.5
1	.79
2	1
3	1.16

14 2

← asymptote



For the inverse switch x and y values and solve

$y = 4^x - 2$
$x = 4^y - 2$
$x + 2 = 4^y$
$y = \log_4(x+2)$

Next give the requested information for each graph.

f(x): domain $(-\infty, \infty)$ range $(-2, \infty)$ x-intercept $(\frac{1}{2}, 0)$
y-intercept $(0, -1)$ horizontal asymptote $y = -2$

g(x): domain $(-2, \infty)$ range $(-\infty, \infty)$ x-intercept $(-1, 0)$
y-intercept $(0, .5)$ vertical asymptote $x = -2$

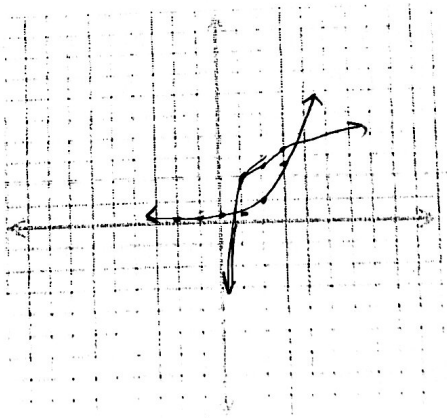
What did you notice?

Part 2 - Create a table of values and then sketch the graph of the function in the coordinate plane $f(x) = e^{x-2}$. Next find the inverse of the function algebraically. Call the inverse g(x).
$g(x) = \ln(x) + 2$ Then create a table of values and sketch the graph of the inverse in the same coordinate plane.

$f(x) = e^{x-2}$

x	f(x)
-2	.018
-1	.05
0	.135
1	.368
2	1
3	2.72

x	g(x)
-2	Error
-1	Error
0	Error
1	2
2	2.69
3	3.1



$y = e^{x-2}$
$x = e^{y-2}$
$y - 2 = \ln x$
$+2 \quad +2$
$y = \ln(x) + 2$

Next give the requested information for each graph.

f(x): domain $(-\infty, \infty)$ range $(0, \infty)$ x-intercept None
y-intercept $(0, .135)$ horizontal asymptote $y = 0$

g(x): domain $(0, \infty)$ range $(-\infty, \infty)$ x-intercept $(.14, 0)$
y-intercept None vertical asymptote $x = 0$