The first question is not argumentation, just observation. The next two questions can be argumentation. For the mystery function question, students can explain how each step narrowed down their answer. The last question, students need to explain that they two equations are the same based on their knowledge of the rules of exponents.

How are the graphs of these functions alike? How are they different?

$f(x)=10^{x-2}+1$ $g(x)=\log(x-2)+1$

Answer: Both shift right 2 and up 1. f(x) has a horizontal asymptote at y=1. g(x) has a vertical asymptote at x=2.

Mystery Function

1. My graph has a point at (-2, -5).
2. As x increases, y always decreases. could be reflection over x or y
3. There is a horizontal asymptote, but no vertical asymptote. (you can specify at y=-4 or y=-9)
4. There is a y-intercept at -8.

Answers could be: $y=-2^{x+2}-4$ or $y=2^{-x}-9$

Which expression represents a larger value? How do you know?

Answer: they are equal.

$(1/2)^x$ 2^{-x}