

MATHEMATICAL JOURNAL

WEEK 4

- 1a. Describe the difference between the notation $f^{-1}(x)$ and $[f(x)^{-1}]$. Create a function to illustrate the difference.
- b. Describe the difference in definitions between a function and a relation. Give an example of each using an equation, and sketch the respective graphs for each.
- c. Define the vertical and horizontal lines tests and explain what they each determine. Then give an example of each using an equation that does not pass each respective test and sketch each graph.
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- 2a. Consider the rational function $f(x) = \frac{x+2}{x^2+3x+2}$. Explain how to find the zeros (if none exist explain why), domain, range, asymptotes, and holes.
- b. Sketch a graph of the function in part a.
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- 3a. If a graph has symmetry to both the x and y axes, what other symmetry must it have? Can a graph that has symmetry to the x-axis be the graph of a function? Explain in words and supplement with an example and a sketch for each.
- b. Why are even and odd functions so appropriately named? Describe their respective symmetries and explain why this makes sense.
- c. A function can be named, odd, even, or neither. Explain why a function cannot be both even and odd. Give an example using an equation and a sketch.
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4. Consider the functions $f(x) = \frac{1}{1-3x}$ and $g(x) = x^2 + 3$.
- a. Explain in complete sentences how to find $f(g(x))$ and how to find the domain of $f(g(x))$.
- b. Explain in complete sentences how to find $g(f(x))$ and how to find the domain of $g(f(x))$.
- c. Give a mathematical justification for your responses in parts a and b.