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1.2: Properties of Functions

1. Find the domain of the following:

a. $h(x) = \frac{\sqrt{x^2 - 4}}{x + 3}$

b. $f(x) = \sqrt{4 - 3x}$

c. $g(x) = \frac{x - 1}{x^2 - 7x + 10}$

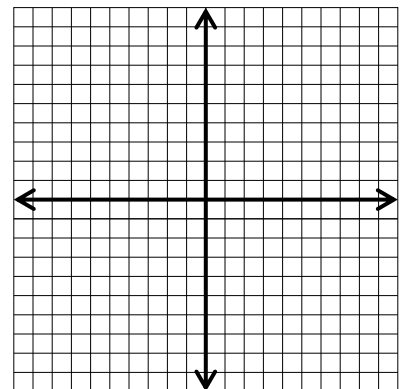
2. Find all local and absolute maxima and minima of the function: $h(x) = x^4 - 3x^3 + 2x - 3$. Then, find the intervals where the function is increasing, decreasing and constant.**

1.3: The 11 Basic Functions (and Piecewise)

3. Which of the eleven basic functions are bounded below?

4. Which of the 11 basic functions are even? Odd?

5. Graph the function $f(x) = \begin{cases} -x^2 + 5, & x \leq 2 \\ 2x - 5, & x > 2 \end{cases}$ and determine its domain and range.



1.4: Function Composition

6. If $f(x) = x^2 - 1$ and $g(x) = \sqrt{3x}$, find each of the following and specify the domain.

a) $f + g$

b) $f - g$

7. If $f(x) = x^2 - 9$ and $g(x) = \sqrt{x}$, find each of the following and specify the domain.

a) $f(g(x))$

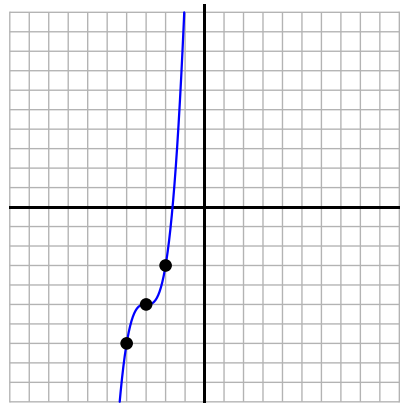
b) $g(f(x))$

1.5: Inverse of Functions

8. Find the inverse of $f(x) = \sqrt{5 - 2x}$ algebraically. State the domain of the inverse including any restrictions inherited from the original function.

9. Confirm algebraically that the following two functions are inverses: $f(x) = 2x^3 - 5$ and $g(x) = \sqrt[3]{\frac{x+5}{2}}$.

10. Graph the inverse of the following cubic function. Then, find the rule (equation) to match the graphs.



11. Is the function in #10 one-to-one? (A graph is one-to-one if both the original and inverse are functions.) How can you tell?

1.6: Graphical Transformations

12. Identify the parent function and the transformations taking place (*in order*): $f(x) = -4(x+2)^3 - 7$.

13. Describe the transformations applied to $f(x) = |x|$ to get the function $g(x) = -|2x+3|$.

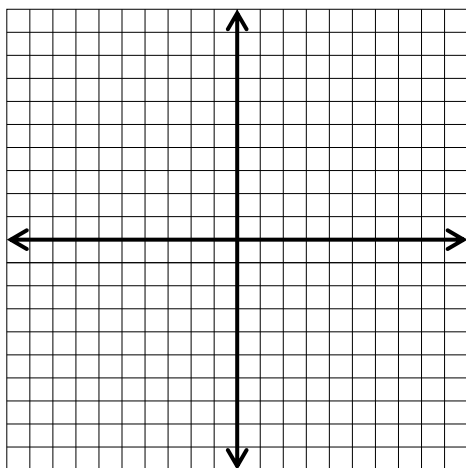
14. If $f(x) = x^3$, write a function rule for each of the following transformations.

a. A horizontal stretch by a factor of 3 and a vertical translation up 1 unit.

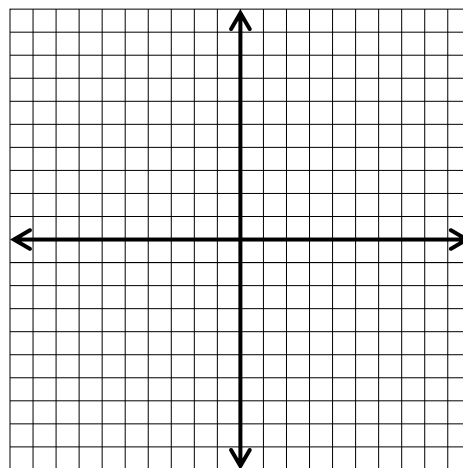
b. A vertical stretch by a factor of 2, and a horizontal translation left 1 unit.

15. Identify the parent function and the transformations taking place (in order). Then, graph the function.

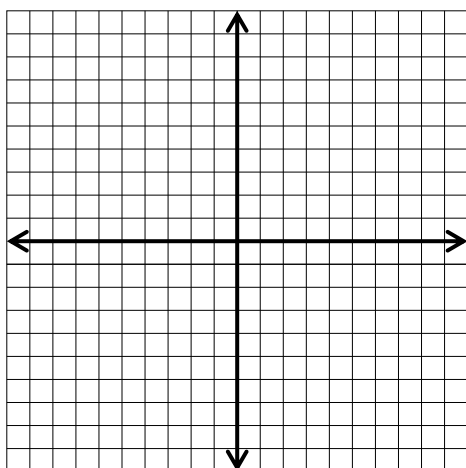
a. $h(x) = 2\sqrt{-x} + 4$



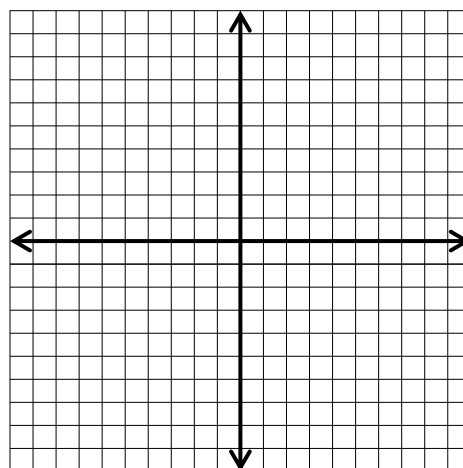
b. $j(x) = -3|x+1|$



c. $f(x) = e^{-x-1}$



d. $g(x) = \frac{1}{2}\left(\frac{1}{2}x\right)^3 + 1$



A {quick} refresh of topics that COULD be included on the Chapter 1 Test

1.2: Properties of Functions

- Function vs. Relation (graphically, from equation)
- Domain (graphically, algebraically)
- Range (graphically)
- Increasing/Decreasing/Constant
- Boundedness
- Extrema
- Even/Odd/Neither

1.3: 11 Basic Functions

- Properties & Graphs of all 11 functions
- Piecewise Functions

1.4: Function Composition

- Adding, Subtracting Functions (and the resulting domain)
- Composing Functions (and the resulting domain)

1.5: Inverses of Functions

- Finding the inverse of a function:
 - Graphically
 - Algebraically
- Proving two functions are inverses

1.6: Graphical Transformations

- Identifying transformations on a parent function, in order
- Writing an equation from a transformation
- Graphing transformations of a parent funct