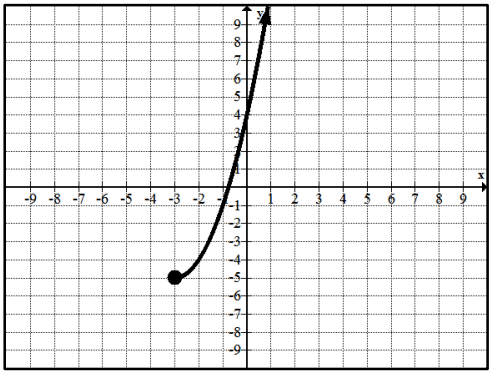
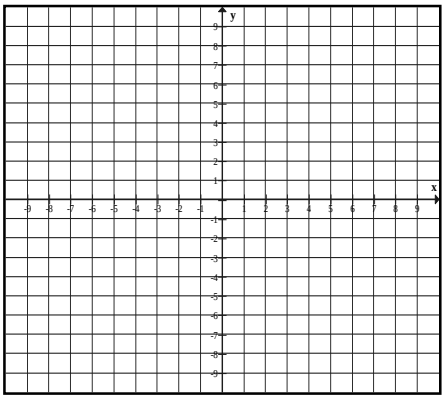
CBA 1 Review

1. List the domain and range of each of the following parent functions.
   - I. $f(x)=\sqrt{x}$
   - II. $f(x)=x^3$
   - III. $f(x)=\log x$
   - IV. $f(x)=2^x$

2. The graph of $f(x)$ is shown below. What is the range of $f^{-1}(x)$ and how does it compare to the domain of $f(x)$?



3. Sketch the graph of a function, $f(x)=x^{\frac{1}{n}}$, where n is a positive even integer.



4. The functions *k(x), f(x), g(x),* and *h(x)* are shown below.

$k(x)=x-5$ $\quad f(x)=x+5$ $\quad g(x)=x^2-8$ $\quad h(x)=\sqrt{x+8}$

Which pair of functions represents a commutative relationship?

A. *g(h(x))* and *h(g(x))*
B. *f(g(x))* and *g(f(x))*
C. *k(f(x))* and *f(k(x))*
D. *f(h(x))* and *h(f(x))*

5. Circle ALL of the true statements below.

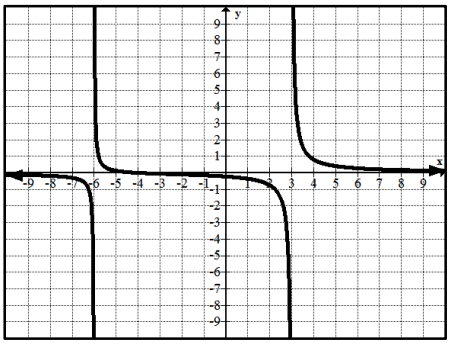
I. $y = x$ is an odd function because it is symmetric about the y-axis.

II. $y = x^2$ is an odd function because it is symmetric about the origin.

III. $y = x^3$ is an odd function because it is symmetric about the origin.

IV. $y = |x|$ is an even function because it is symmetric about the y-axis.

6. The graph of a rational function is shown below. Circle all of the key attributes that correctly describe the rational function.



I. The function is increasing in the interval $(3, \infty)$.

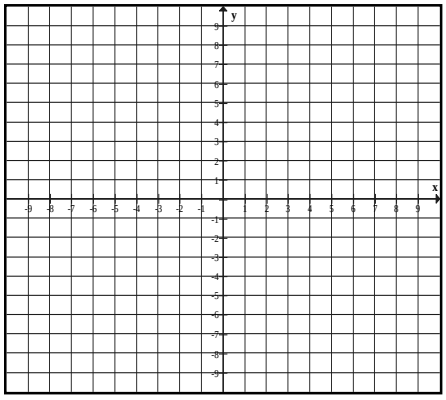
II. The function is decreasing on the interval $(-\infty, -6) \cup (-6, 3) \cup (3, \infty)$.

III. The function has vertical asymptotes at $x = -6$ and $x = 3$.

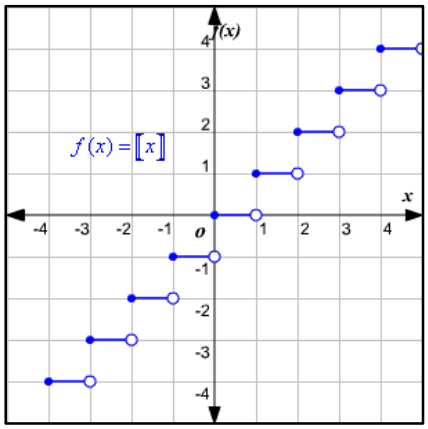
IV. The function has a horizontal asymptote at $y = 1$.

7. Graph the following piecewise function.

$$f(x) = \begin{cases} 2x + 1, x < 2 \\ -x + 4, x \geq 3 \end{cases}$$



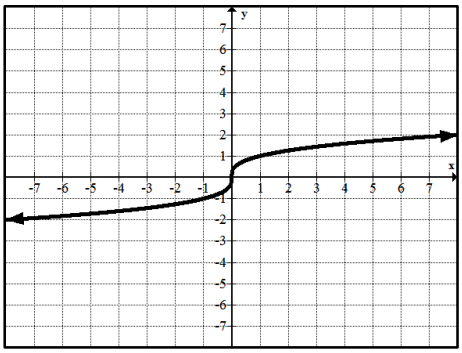
8. The graph of a step function is shown below. Circle the key attributes that describe the function.



I. The function is symmetric to the y-axis.
II. The function is symmetric to the origin.
III. The function is decreasing.
IV. The function is increasing.
V. The domain of the function is $\{x : x \in \Re\}$.
VI. The range of the function is $\{y : y \in \Re\}$.

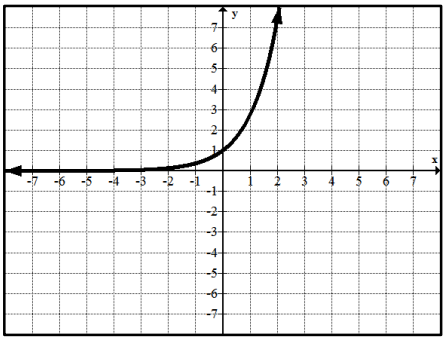
9. The cost of the salt used to fill up the salt shakers on the tables in a restaurant is given by the function $f(x) = 8x - 2$, where x represents the number of quarts of salt used and f(x) represents the cost. If $f(5a) = 90$, what is the value of a?

10. Find the end behavior for each of the graphs.



As $x \to \infty, y \to$ _____

As $x \to -\infty, y \to$ _____



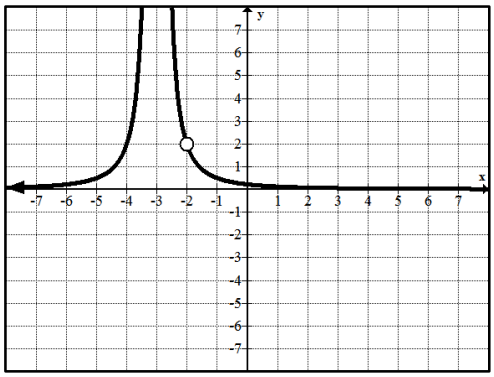
As $x \to \infty, y \to$ _____

As $x \to -\infty, y \to$ _____

11. Find an x-value where the following function is discontinuous.

$$f(x)=\frac{3x^2-2x-5}{x+6}$$

12. Describe the following behavior.



- Right side behavior as $x \to -2,\ f(x) \to$ _____
- Left side behavior as $x \to -2,\ f(x) \to$ _____

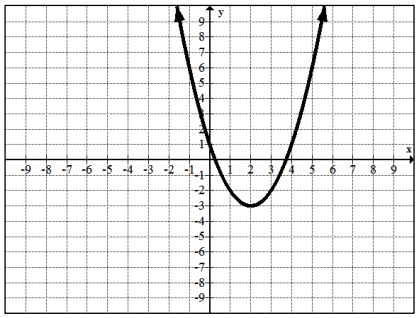
13. Given the function $g(x)=(2x+1)^2-4$ and $g(x)=f(h(x))$, which pair of functions could represent $f(x)$ and $h(x)$?

I. $f(x)=x-4$ and $h(x)=(2x+1)^2$

II. $f(x)=x^2-4$ and $h(x)=2x+1$

III. $f(x)=x-4$ and $h(x)=x^2-4$

14. Given the function, *f(x)*, shown below, determine the algebraic representation for $f^{-1}(x)$, and any domain restrictions applicable on *f(x)*, when determining an inverse function.



$f(x)=$ _____

$f^{-1}(x)=$ _____

Domain Restriction on $f(x)$ _____