1. List the domain and range of each of the following parent functions.
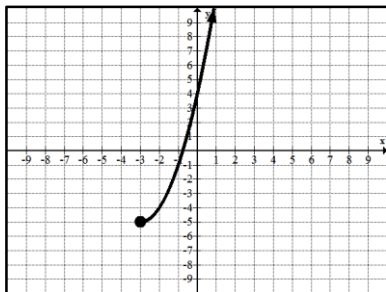
  I. $f(x) = \sqrt{x}$

  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. 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.

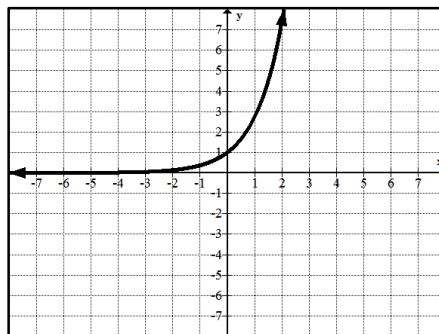 IV. $y = |x|$ is an even function because it is symmetric about the y-axis.

4. 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?

5. Find the end behavior for each of the graphs.
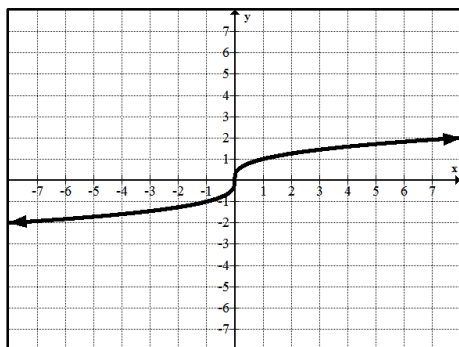
As $x \to \infty, y \to$ _____

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

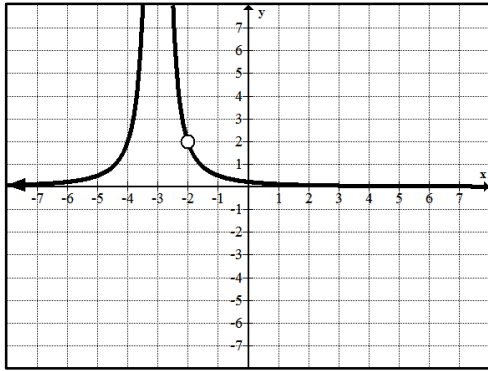

As $x \to \infty, y \to$ _____

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

6. Given the function, $f(x) = 4x^3 - 3x^2 - 25x - 6$, on what intervals is $f(x) \le 0$? (Be careful - this question is not asking when is the graph increasing/decreasing!!)

7. 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 on the interval $(-\infty, -3)$
II. The domain is $(0, \infty)$
III. The function has vertical asymptotes at $x = -3$.
IV. The function has a horizontal asymptote at $y = 2$
V.   The function has a removable discontinuity at $x = -2$.

8. The volume of a box can be found with the function V, where x is the length of the shorted edge of the box.

$$V(x) = 8x^3 + 32x^2 + 30x$$

What is the length of the shortest edge of the box if it has a volume of 11500 cubic units?

9. List the transformations of the function $-0.3 f(x + 4) - 5$, when $f(x) = x^7$.

Vertical shift:

Horizontal shift:

Vertical stretch/compression:

Horizontal stretch/compression:

Reflections:

10. Graph the function $f(x) = 4x^3 - 3x^2 - 25x - 6$ in your calculator. Circle the statements that are **not** true about the graph.

I.   The function has a zero at (-3,0)
II. The function has a zero at (-2,0)
III. The function is increasing on $(0, \infty)$
IV. The function has a domain of all real numbers.
V.   The function has one complex root.

11. 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 $h(x) = x^2 - 4$

12. The population of a town from 2010 to 2015 can be represented using the function $f(x) = .35x^4 + 3.1x^3 + 250.5x^2 - 1100x + 15000$, where x represents the number of years since 2010. Approximately when will the population reach 70,000?

A. About 2011
B. About 2020
C. About 2024
D. About 2015