Pre-Calculus Unit 1 Part #1 Practice Test

- ✓ Learning Target 1A—I can describe a set of numbers in a variety of ways.
- ✓ Learning Target 1B—I can identify functions from data tables, graphs, and descriptions of set relations.
- ✓ Learning Target 1C—I can identify increasing and decreasing functions and intervals.

For each of the following, fill in the missing type of interval or graph. Describe the interval.

1. Interval __ $(3, 7]$ __

    Inequality ____ $3 < x \le 7$ ____

    Graph

    $3 \qquad 7$

    Description ____ **Bounded, half-open** ____

2. Interval ___ $(3, \infty)$ ____

    Inequality ____ $x > 3$ ___

    Graph

    3

    Description ___ **Unbounded, open** ____

3. Interval _____ $(-\infty, 9]$ _____

    Inequality _____ $x \le 9$ ___

    Graph

    0 $\qquad$ **9**

    Description ___ **Unbounded, closed** _____

4. Describe the set of numbers using interval notation.
    $$x \ge 5 \text{ or } x < 11$$

    _____ $[5, 11)$ _____

5. Use the graph below to find the domain and range.
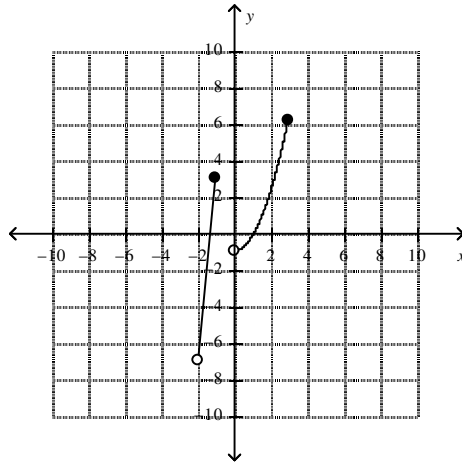
$\underline{\quad\quad\boldsymbol{D}: (-2, 1] \cup (0, 3]}$

$\underline{\quad R: (-7, 6.2]\ \boldsymbol{approx.}}$

6. For which interval(s) is the function $y = 2x^3 - 8x + 5$ increasing and decreasing?

$\underline{\quad\quad\textbf{Increasing: } (-\infty, -1.15), (1.15, \infty)}$

$\underline{\quad\quad\textbf{Decreasing: } (-1.15, 1.15)\quad}$

7. Find the minimum(s) and maximum(s) for $f(x) = -3x^3 + 8x^2 + 10x - 9$?

$\underline{\textbf{Minimum: }\quad (-.49, -11.6)\quad\quad\quad}$

$\underline{\quad\textbf{Maximum: } ((2.27, 19.8)\quad}$

8. Describe the end behavior of the graph of $g(x) = 4x^5 - 3x$.

$\underline{\quad\textbf{As } \boldsymbol{x \to \infty,\ y \to \infty}}$

$\underline{\quad\textbf{As } \boldsymbol{x \to -\infty,\ y \to -\infty}}$
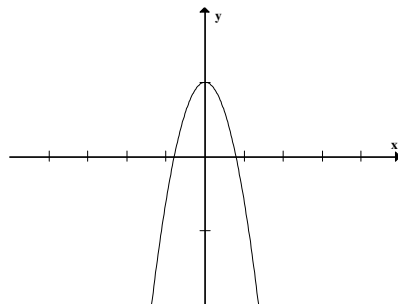
9. Describe the set of numbers using set-builder notation.
$\{-9, -8, -7, -6, -5, \dots\}$

$\underline{\quad\{x\colon\ x \geq -9,\ x \in \mathbb{Z}\}}$

10. Does the graph below represent a function? Explain.

$\underline{\textbf{Yes, it passes the vertical line test}}$

11. Find the domain and range of the relation $\{(-2, 4), (3, 5), (4, -2), (3, 8)\}$.

D: $\{-2, 3, 4\}$

R: $\{-2, 4, 5, 8\}$

12. Describe the domain and range of $y = \sqrt{x + 3}$ in interval notation.

D: $[-3, \infty)$

R: $[0, \infty)$

13. What are the types of discontinuity?

Infinite, Jump, Removable

14. Graph the function $y = x^4 + 2x^3 + 3x$ on your calculator. Find the x-value of any extrema to the nearest hundredth and describe what type of extrema it is.

Min: -1.75

15. Write an expression in interval notation that describes the following:
"The cost of pizza varies from $5 to $15.

$[5, 15]$

16. Describe the continuity, domain, range, increasing, decreasing, maximums, minimums, and end behavior for the function $y = \frac{x^2}{2-x^2}$. Also sketch a picture of the graph.

Domain	Range	Continuity	Increasing Intervals	Decreasing Intervals	Maximum or minimums	End Behavior
$(-\infty, -\sqrt{2})$ $\cup (-\sqrt{2}, \sqrt{2})$ $\cup (\sqrt{2}, \infty)$	$(-\infty, -1)$ $\cup [0, \infty)$	Infinite Discontinuity @ $x = \sqrt{2}$ and $x = -\sqrt{2}$	$(0, \sqrt{2})$, $(\sqrt{2}, \infty)$	$(-\infty, \sqrt{2})$, $(-\sqrt{2}, 0)$	Minimum at $(0, 0)$	As $x \to \infty, y \to -1$. as $x \to -\infty, y \to -1$