Name: _____ Class: _____ Date: _____ ID: A

## Lesson #7 E: Understanding Inverses and Finding the Inverse of Relations, Functions and Applications (Reference: Lesson #50 in book)

**Problem**

1. **Find the algebraic inverse of each of the following algebraic relations.**

   1. $f(x) = -\frac{1}{3}\sqrt[5]{x+1} + 9$

2. $f(x) = 2x^4 - 10$

3. $f(x) = (2x-2)^3 - 3$

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

5. $f(x) = \frac{21}{x+4} - 6$

6. **Find the inverse of each of the following relations and determine whether each inverse is a function or not a function. (Use Desmos to graph the relations and determine whether or not the inverse is a function.)**

   6. $f(x) = \frac{2}{3}x - 12$

7. $f(x) = \frac{1}{4}\sqrt{x} - 5$

8. $f(x) = \frac{\sqrt{x+4}}{3} - 1$

9. $f(x) = (3x-9)^2 + 6$

10. $f(x) = \frac{8}{x-3} + 7$

11. **Use what you have learned about inverses to help you solve each of the following inverse application problems.**

    11. The distance traveled by a car over a period of time on an interstate highway is modeled through the function $d = \frac{1}{3}t^2 + 4$, where $d$ is the distance traveled in miles and $t$ is the time in hours. First find the inverse of the formula, then determine long it would take for the car to travel 436 miles on in the highway?

12. The volume of a spherical cone sector is given by $v = 3\pi r^2 h$. A manufacturer wants the spherical cone sector to have a volume of 3,619 cubic inches, and a height of 6 inches. Find the inverse function in terms of $r$, and then find the required radius to the nearest tenth that allows them to stay within these restrictions.