

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

1. For each of the following relations ( $r$ ), determine the inverse of the relation ( $r^{-1}$ ), determine whether each of the relations are functions and if they have an inverse relation, and explain how you arrived at your answer.

1. Relation  $r$ :

$x$	$y$	$(x,y)$
8	-2	(8,-2)
7	10	(7,10)
3	-1	(3,-1)
-9	6	(-9,6)
-1	4	(-1,4)
1	-6	(1,-6)

2. Relation  $r$ :

$x$	$y$	$(x,y)$
-5	3	(-5,3)
4	-8	(4,-8)
7	-5	(7,-5)
2	-3	(2,-3)
8	1	(8,1)
-11	-7	(-11,-7)

3. Find the algebraic inverse of each of the following algebraic relations.

3.  $f(x) = \frac{1}{3}x^3 + 2$

4.  $f(x) = \sqrt{3x+6} - 9$

5.  $f(x) = \frac{2x-10}{18}$

6.  $f(x) = \frac{12}{x+3} - 4$

7. Find the inverse of each of the following relations and determine whether each relation is a function. If any inverse is not a function determine what restrictions can be placed on the domain of the original relation to make the inverse a function. (Graphing calculators can be used to help you graph the relations and determine whether or not they are functions.)

7.  $f(x) = -\frac{2}{3}x + 8$

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8.  $f(x) = -2x^2 - 18$

9.  $f(x) = (2x - 10)^2 + 8$

10.  $f(x) = \frac{9}{x-3} + 2$