MATH 34A SOLVING EQUATIONS & INVERSE FUNCTIONS

I. Solving Equations

1. Linear equation: Solve for x.

$$2(bx + 2)^{-1} = (x - a)^{-1}$$

2. Quadratic equation: Solve for x.

$$(2x - 1)(4x + 1) = (x + 3)(4x - 1)$$

3. System of equations: Solve for x and y.

$$
\begin{aligned}
3x + 2y &= 3a \\
x + y &= 2a - b
\end{aligned}
$$

II. Inverse Function

4. Let $f(x) = 4x + 1$. What is $f^{-1}(5)$? What is $f^{-1}(y)$?

5. Let $f(x) = 3x^3$. What is $f^{-1}(24)$? What is the inverse function of $f(x)$?

III. Some Word Problems

6. Suppose you have two pipes. It takes the bigger pipe 30minutes and the smalles pipe 1hour to fill 100L of water. How many minutes will it take for both pipes together to fill 200L of water?

7. A rectangular field is to have an area of 1000m^2 and is to be surrounded by a fence. The cost of the fence is \$20 per meter of length. Express the total cost of the fence in terms of the width of the field.

8. I have three numbers. The biggest one is twice the middle one, and the biggest one plus the middle on is four times the smallest one. The smallest one plus the middle one is two less than the biggest one. What are the numbers?

9. What number gives the same result when you subtract 5 as when you divide by 5?

10. Let R be a rectangle whose area is four times its perimeter. Express its width in terms of its length.

11. Find two numbers whose sum is 5 and whose product is 9/4.