

I. Do as indicated.

- Let $f(x) = \frac{1 - 3x}{4x - 2}$.
 - Find the domain of f .
 - Find the inverse function of f .
 - Find the range of f .
- The polynomial $p(x) = 2x^4 - 3x^3 + ax - 1$ has a remainder of 1 when divided by $x + 1$. What is the value of a ?
- Suppose x varies inversely as the cube of a and varies jointly as b and the square of c . When $a = 4$, $b = 3$ and $c = 8$, then $x = 5$. What is the value of x when $a = 2$, $b = 12$ and $c = 1$?
- The third term of a geometric sequence is 9 and its sixth term is $-\frac{1}{3}$ what is its first term?
- Find the value of x and y such that $3^{3x+y}, 3^{x-2y}, 3^{1-4y}$ form a geometric progression with common ratio 81.

II. Solve for x .

- $9^{x+1} = 27^{1-x}$
- $5^{2x+1} + 4(5^x) = 1$
- $3x^4 - 7x^3 + 2x^2 + 3x - 1 = 0$
- $$\begin{cases} 2x + y - 3 = 0 \\ y = x^2 - 2x + 2 \end{cases}$$
- $$\begin{cases} \frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 0 \\ \frac{3}{x} - \frac{1}{y} + \frac{2}{z} = 6 \\ \frac{1}{x} + \frac{2}{y} - \frac{3}{z} = 7 \end{cases}$$

III. World Problems

- Old McDonald, a farmer (in the world), has a rectangular plot whose perimeter is 24 meters. If he increases the width by 2 meters and decreases the length by 1 meter, the area of the new plot would be 42 square meters. What are the dimensions of the original plot?
- A certain politician (in the world) received a total of 20 bills, whose denominations are either 200 pesos or 500 pesos. If he received a total of 7300 pesos, how many 500-peso bills did he receive?
- Each day, a certain city (in the world) produces 2kg of garbage more than what they produced the previous day. If on March 1, the city produced 310kg worth of garbage, how many kilograms of garbage is it expected to produce for the month of March¹?

¹March has 31 days