

I. Find the solution set of the following

1. Absolute Value Equalities and Inequalities

- (a)  $|3x + 1| + |3 - 2x| = 11$
- (b)  $|-3x + 7| - 3 = 0$
- (c)  $\left| \frac{3x - 4}{2x + 3} \right| = 1$
- (d)  $\left| \frac{4}{x} + 1 \right| \leq 3$
- (e)  $3|8 - x| + 2 < 7 - 2|x - 8|$
- (f)  $0 < ||x - 5|| < 2$
- (g)  $|3x + 1| - 2|x - 2| - |x + 1| + 4|x + 3| = 4$
- (h)  $|x - 3| < 2x + 1$
- (i)  $|3x + 1| < 2|x - 6|$

2. Systems of equalities for 2 variables

- (a) 
$$\begin{cases} x^2 + y^2 - 2x = 3 \\ y - 3x + 1 = 0 \end{cases}$$
- (b) 
$$\begin{cases} xy = 1 \\ 3y - 5x + 1 = 2 \end{cases}$$
- (c) 
$$\begin{cases} (x - 2)^2 + y^2 = 5 \\ x^2 + (y - 1)^2 = 10 \end{cases}$$
- (d) 
$$\begin{cases} x^2 + y^2 = 36 \\ x^2 - 14x + y^2 + 4y + 49 = 0 \end{cases}$$
- (e) 
$$\begin{cases} x^2 - 2x + y^2 + 2y = 7 \\ x - y = -1 \end{cases}$$
- (f) 
$$\begin{cases} 2x - 5y = 4 \\ 3x - 2y = -5 \\ -3x + 4y = 1 \end{cases}$$
- (g) 
$$\begin{cases} 4x^2 - 5xy + 3y^2 = 24 \\ 2x^2 - 3xy + 2y^2 = 16 \end{cases}$$

3. Systems of equalities for 3 variables

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

$$(d) \begin{cases} x - 3z = -1 \\ y - x = 1 \\ z - y = 2 \end{cases}$$

II. Word Problems. Find what is being asked.

1. By mixing chocolate worth P336/kg with chocolate worth P44.80/kg, Welly Wanka found out that the resulting mixture which weighs 50 kg should be sold for P132.16. How many kilograms of each chocolate were combined?
2. A man has P16,00 to invest. He can invest part of it at 8% and the other at 12%. How much should he invest at each rate to earn an income of 9% of his investment?
3. If a four digit number is read from left to right, then its first three digits form decreasing consecutive integers. The units digit is  $\frac{1}{3}$  of the sum of the other digits. If the number is divided by its thousands digit, then the quotient is 1080 and the remainder is 3. What is the number?
4. Find all the quadratic equations of the form  $ax^2 + bx + c = 0$  whose roots have ratio 1 : 2 and such that  $a - b - c = -1$  and  $b + c = 2$
5. To save on board and lodging, a group of students rent an apartment for P8,000 per month. If there were 3 more students in the group, it would cost each student P600 less for the monthly rent. How many students are actually in the group?
6. Leo and Van are riding bicycles on perpendicular roads. Leo is 9 km from the intersection and riding towards it at 20 kph, while Van is 7 km from the intersection and riding away from it at 25 kph. How many hours will they be 13 km apart?
7. Ban and Ben are running towards each other at 7 m/s and 5 m/s respectively. When they are 60 meters apart, Kuting, Ben's dog, runs towards Ban at a rate of 7.8 m/s. When Kuting reaches Ban, it goes back to Ben and continues back and forth until Ban and Ben meet. What is the total distance travelled by Kuting when the two finally meet?
8. Groups A of workers can do a job in 8 days. After Group A has worked for 3 days, another group B joins A and together they complete the job in 3 more days. In how many days could group B have done the job alone?