

$$\begin{aligned}
 3x + 5y &= 4 & (3x + 5y) - (2x - 3y) &= 4 - 9 \\
 (2x - 3y) - (3x + 5y) &= 9 - 4 & x + 8y &= -5 \\
 -x + 2y &= 5 & 2(-5 - 8y) - 3y &= 9 \\
 2y &= 5 - x & 5(-5 - 8y) + 2y &= 13 \\
 5x + 2(-1) &= 13 & 5x - 10 - 16y + 2y &= 13 \\
 5x &= 13 + 2 & 5x - 18y &= 13 \\
 x &= 3 & 5(3) - 18(-1) &= 13 \\
 & & 15 + 18 &= 13 \quad \checkmark \\
 & & 33 &= 13 \quad \checkmark
 \end{aligned}$$

5. VERIFY THE ANSWERS BY GRAPHING.

6. AN ARTICLE SELLS FOR \$12. THE PROFIT IS ONE THIRD OF THE COST. FIND ITS COST. THE PROFIT COSTS

$$A = \$12 \quad P = \frac{1}{3} \times \$12 = \frac{12}{3} = \$4 \quad \$4$$

7. ONE LOT IS WORTH \$400 MORE THAN ANOTHER LOT. THE TWO LOTS WERE SOLD FOR \$3200. WHAT IS THE PRICE OF EACH?

$$L_1 = \frac{3200}{2} + 400 \quad L_2 = \frac{3200}{2} - 400$$

$$L_1 = L_2 + \$400$$

$$L_1 + L_2 = \$3200 \quad L_1 = \$2000 \quad L_2 = \$1200$$

ONE LOT COSTS \$2000 WHILE THE OTHER ONE COSTS \$1200.

8. THE SUM OF TWO NUMBERS IS 28. TWICE ONE OF THE NUMBERS IS 17 TIMES GREATER THAN THE OTHER. FIND THE NUMBERS.

$$N_1 + N_2 = 28 \quad 2a = 17b \quad a = \frac{28}{19} \quad b = \frac{28}{19}$$

$$N_1 = a; N_2 = b; \quad 29 - (17b) + b \quad b = \frac{28}{18}$$

$$a = 8.5b \quad 8.5b + b = 28 \quad b = \frac{28}{9.5} \quad a = \frac{28}{9.5}$$

$$2a = 17b \quad a = 8.5b \quad b = \frac{28}{9.5} \quad a = \frac{28}{9.5}$$

## CHAPTER 2 THE GRAMMAR OF ALGEBRA. 19 INTRODUCTION

THE FIRST CHAPTERS STRESSED THE BASIC CONCEPTS OF ALGEBRA, BUT WERE LIMITED TO EQUATIONS WITH ONE OR TWO VARIABLES.

TO EXPRESS MORE COMPLEX AND SUBTLE IDEAS, WE

MUST LEARN THE GRAMMAR OF ALGEBRA.

### 20. FUNCTIONAL RELATIONSHIPS.

WHEN TWO QUANTITIES ARE SO RELATED THAT A CHANGE IN ONE PRODUCES A CORRESPONDING CHANGE IN THE OTHER, THE LATTER QUANTITY IS SAID TO BE A "FUNCTION" OF THE FORMER. EX.: THE AREA OF A SQUARE IS A FUNCTION OF THE LENGTH OF THE SIDE.

THAT IS, IF A VARIABLE  $y$  DEPENDS ON A VARIABLE  $x$ , THE FUNCTIONAL RELATION CAN BE EXPRESSED BY AN EQUATION.

$$\text{EX.: } y = 3x - 8, \quad x = 2$$

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