Name: _____
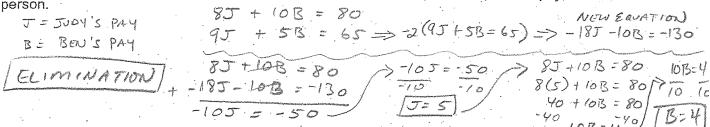
Worksheet: Solving word problems using systems of equations (part 2). Identify your variables, set up a system of equations, and solve for your variables.

1. The cost of 5 squash and 2 zucchini is $1.32. Three squash and 1 zucchini cost $0.75. Find the cost of each vegetable.

S = SQUASH
Z = zucchini

$5S + 2Z = 1.32$
$3S + Z = .75 \Rightarrow -2(3S + Z = .75) \Rightarrow -6S - 2Z = -1.50$ NEW EQUATION

ELIMINATION
$+ \dfrac{5S + 2Z = 1.32}{-6S - 2Z = -1.50}$
$\dfrac{-S = -.18}{S = .18}$

$3S + Z = .75$
$3(.18) + Z = .75$
$.54 + Z = .75$

$.54 + Z = .75$
$\dfrac{-.54 \quad -.54}{Z = .21}$

2. Judy worked 8 hours and Ben worked 10 hours. Their combined pay was $80. When Judy worked 9 hours and Ben worked 5 hours, their combined pay was $65. Find the hourly rate of pay for each person.

J = JUDY'S PAY
B = BEN'S PAY

$8J + 10B = 80$
$9J + 5B = 65 \Rightarrow -2(9J + 5B = 65) \Rightarrow -18J - 10B = -130$ NEW EQUATION

ELIMINATION
$+ \dfrac{8J + 10B = 80}{-18J - 10B = -130}$
$-10J = -50$

$\dfrac{-10J = -50}{-10 \quad -10}$
$J = 5$

$8J + 10B = 80$
$8(5) + 10B = 80$
$40 + 10B = 80$
$\dfrac{-40 \quad -40}{10B = 40}$

$\dfrac{10B = 40}{10 \quad 10}$
$B = 4$

3. Four baseball cards of Babe Ruth and 3 cards of Satchel Paige sold for $105 at a baseball card convention. Later that weekend, two Babe Ruth cards sold and 3 Satchel Paige cards sold for $63. Find the value of each card.

B = COST OF BABE RUTH CARD
S = COST OF SATCHEL PAIGE CARD

$4B + 3S = 105 \Rightarrow -1(4B + 3S = 105) \Rightarrow -4B - 3S = -105$ NEW EQUATION
$2B + 3S = 63$

ELIMINATION
$+ \dfrac{-4B - 3S = -105}{2B + 3S = 63}$
$-2B = -42$

$\dfrac{-2B = -42}{-2 \quad -2}$
$B = 21$

$4B + 3S = 105$
$4(21) + 3S = 105$
$84 + 3S = 105$
$\dfrac{-84 \quad -84}{3S = 21}$

$\dfrac{3S = 21}{3 \quad 3}$
$S = 7$

4. Students in a theatre class sold 160 adult and 340 student tickets for a play worth $1,480. If 80 adult tickets and 400 student tickets totaled $1200, how much did each ticket cost?

A = PRICE OF ADULT TICKET
S = PRICE OF STUDENT TICKET

$160A + 340S = 1480$
$80A + 400S = 1200$

ELIMINATION $\boxed{OMIT}$

5. The talent show committee sold a total of 530 tickets in advance. Student tickets cost $3 each and the adult tickets cost $4 each. If the total receipts were $1740, how many of each type of ticket were sold?

S = NUMBER OF STUDENT TICKETS SOLD
A = NUMBER OF ADULT TICKETS SOLD

$S + A = 530 \Rightarrow -3(S + A = 530)$
$3S + 4A = 1740$
$-3S + -3A = -1590$ ⟵ NEW EQUATION

$A = 150$

$S + A = 530$
$S + 150 = 530$
$\dfrac{-150 \quad -150}{S = 280}$

6. The length of a rectangle is 4cm longer than the width. The perimeter is 80 cm. Find the length and the width.

L = LENGTH

W = WIDTH

$L = 4 + W$

$80 = 2L + 2W$

SUBSTITUTION

$80 = 2(4+W) + 2W$

$80 = 8 + 2W + 2W$

$80 = 8 + 4W$

$-8 \quad -8$

$72 = 4W$

$\frac{72}{4} = \frac{4W}{4}$

$W = 18$

$L = 4 + W$

$L = 4 + (18)$

$L = 22$

7. A collection of nickels and quarters is worth $2.85. There are 3 more nickels than quarters. How many nickels and quarters are there?

n = NUMBER OF NICKELS

Q = NUMBER OF QUARTERS

SUBSTITUTION

$.05n + .25Q = 2.85$

$n = 3 + Q$

$.05(3+Q) + .25Q = 2.85$

$.15 + .05Q + .25Q = 2.85$

$.15 + .30Q = 2.85$

$-.15 \qquad -.15$

$.30Q = 2.70$

$\frac{.30Q}{.30} = \frac{2.70}{.30}$

$Q = 9$

$n = 3 + Q$

$n = 3 + (9)$

$n = 12$

8. Ann and Betty together have $60. Ann has $9 more than twice Betty's amount. How much money does each have?

A = ANN'S MONEY

B = BETTY'S MONEY

SUBSTITUTION

$A + B = 60$

$A = 9 + 2B$

$(9 + 2B) + B = 60$

$9 + 3B = 60$

$-9 \qquad -9$

$3B = 51$

$\frac{3B}{3} = \frac{51}{3}$

$B = 17$

$A = 9 + 2B$

$A = 9 + 2(17)$

$A = 9 + 34$

$A = 43$

9. A bowl contained 13 red and brown M&M's. There was one more red M&M's than brown M&M's. How many of each color are in the bowl?

R = RED m+m's

B = BROWN m+m's

SUBSTITUTION

$R + B = 13$

$R = 1 + B$

$(1+B) + B = 13$

$1 + 2B = 13$

$1 + 2B = 13$

$-1 \qquad -1$

$\frac{2B}{2} = \frac{12}{2}$

$B = 6$

$R = 1 + B$

$R = 1 + (6)$

$R = 7$

10. A movie theater charges $5 for an adult's ticket and $2 for a child's ticket. One Saturday, the theater sold 785 tickets for $3280. How many of each type of ticket were sold?

A = # of ADULT TICKETS

C = # of CHILD TICKETS

ELIMINATION

$5A + 2C = 3280$

$A + C = 785 \Rightarrow -5(A+C = 785)$

$-5A + -5C = -3925$ NEW EQUATION

$+ 5A + 2C = 3280$

$-3C = -645$

$\frac{-3C}{-3} = \frac{-645}{-3}$

$C = 215$

$A + C = 785$

$A + 215 = 785$

$-215 \quad -215$

$A = 570$

11. Jason bought a total of 7 postcards for $1.80. If the small postcards cost $0.20 and the larger ones cost $0.30 each, how many postcards of each size did he buy?

$L = \#$ of LARGE POSTCARDS

$S = \#$ of SMALL POSTCARDS

$L + S = 7$

$.20S + .30L = 1.80$

ELIMINATION

12. Victor earns $4.25 an hour working after school and $5 an hour working on Saturdays. Last week he earned $67.50, working a total of 15 hours. How many hours did he work on Saturday?

$A =$ AFTER SCHOOL HOURS

$S =$ SATURDAY HOURS

$A + S = 15$

$4.25A + 5S = 67.50$

ELIMINATION

13. The length of a rectangle is 5 cm less than three times its width If the perimeter is 70 cm, find the dimensions.

$L =$ LENGTH

$W =$ WIDTH

$L = 3W - 5$

$70 = 2L + 2W$

$P = 2L + 2W$

SUBSTITUTION

14. Thirty students bought pennants for the football game. Plain pennants cost $4 each and fancy ones cost $8 each. If the total sales were $168, how many students bought fancy pennants?

$P =$ PLAIN PENNANTS BOUGHT

$F =$ FANCY PENANTS BOUGHT

$P + F = 30$

$4P + 8F = 168$

ELIMINATION

15. A pear has 15 more calories than a grapefruit. Twenty pears and ten grapefruits have a total of 1800 calories. How many calories are in each type of fruit?

$P =$ CALORIES IN A PEAR

$G =$ CALORIES IN A GF

$P = 15 + G$

$20P + 10G = 1800$

SUBSTITUTION