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Systems of Equations – Story Problems

1. Fordson is selling tickets to the talent show. On the first day of sales, they sold 4 student tickets and 5 guest tickets for a total of $102. The second day, they earned $126 from 7 student tickets and 5 guest tickets. What are the prices each of one student ticket and one guest ticket?

x = price of student
y = price of guest

$(4x + 5y = 102) \cdot -1$
$7x + 5y = 126$
$-4x - 5y = -102$
$\frac{3x}{3} = \frac{24}{3}$
$x = 8$

$4(8) + 5y = 102$
$32 + 5y = 102$
$5y = 70$
$y = 14$

The price of a student ticket was $8 and a guest was $14.

2. Mariam and Aya are selling cookies and cupcakes for a school fundraiser. Mariam sold 10 cookies and 9 cupcakes for a total of $37. Aya sold 6 cookies and 18 cupcakes for a total of $60. What was the cost of one cookie and the cost of one cupcake?

x = cost of cookie
y = cost of cupcake

$(10x + 9y = 37) \cdot -2$
$6x + 18y = 60$
$-20x - 18y = -74$
$-14x = -14$
$x = 1$

$10(1) + 9y = 37$
$9y = 27$
$y = 3$

A cookie cost $1 and a cupcake cost $3.

3. Reem is selling snacks at a basketball game. A slice of pizza is $3 and a bag of chips is $2 and she earned $160. She also sold 62 snacks in total. How many slices of pizza and bags of chips did she sell?

x = # pizza slices
y = # bags of chips

pizza = $3, chips = $2, total = $160 } money equation
62 snacks — # items equation

$3x + 2y = 160$
$(x + y = 62) \cdot -2$
$-2x - 2y = -124$
$x = 36$

$36 + y = 62$
$y = 26$

Reem sold 36 slices of pizza and 26 bags of chip

4. Starbucks sells lattes for $5 and scones for $4. One Saturday, they earned $650 by selling 144 items in total. How many lattes and how many scones did they sell?

latte = $5, scone = $4, total = $650 } money
144 items

$5x + 4y = 650$
$(x + y = 144) \cdot -4$
$-4x - 4y = -576$
$x = 74$

$74 + y = 144$
$y = 70$

x = # of lattes
y = # of scones

They sold 74 lattes and 70 scones.

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5. A group of 31 UM students are going on a ski trip up north. Five people are willing to drive so they're going to rent 5 vans or cars. The vans seat 7 people and the cars seat 5 people. How many vans and how many cars do they need to rent to drive everyone up north?

GIVEN
31 students
5 drivers (vehicles)
vans : 7 people
cars : 5 people

UNKNOWN
x = # vans
y = # cars

# of people → $7x + 5y = 31$

$(x + y = 5) \cdot -5$

$-5x - 5y = -25$

$2x = 6$

$x = 3$

$3 + y = 5$

$y = 2$

They will rent 3 vans and 2 cars

6. Ahmed bought 4 notebooks and 3 binders for the new school year and spent $33. Abdullah bought 5 notebooks and 2 binders for a total of $29. How much did a notebook cost and a binder cost?

x = cost of notebook
y = cost of binder

$(4x + 3y = \$33) \cdot 2 \rightarrow 8x + 6y = 66$

$(5x + 2y = 29) \cdot -3 \rightarrow -15x - 6y = -87$

$-7x = -21$

$x = 3$

$5(3) + 2y = 29$

$15 + 2y = 29$

$2y = 14$

$y = 7$

A notebook cost $3 and a binder cost $7.

7. A vending machine accepts only $1 and $5 bills because its coin slot is broken. One day, it gathered 156 bills for a total of $244. How many $1 and $5 bills were put in the machine that day?

GIVEN
$1 worth 1
$5 worth 5
$244 total
156 bills
} money

x = $1 bills
y = $5 bills

$(1x + 5y = 244) \cdot -1$

$x + y = 156$

$-x - 5y = -244$

$-4y = -88$

$y = 22$

$x + 22 = 156$

$x = 134$

134 $1 bills and 22 $5 bills were put in the machine

8. (SAT EXAMPLE) A food truck sells salads for $6.50 each and drinks for $2 each. The food truck's revenue from selling a total of 290 salads and drinks in one day was $836.50. How many salads were sold that day?

A) 57
B) 73
C) 99
D) 233

x = # of salads
y = # of drinks

$6.5x + 2y = \$836.50$

$(x + y = 290) \cdot -2$

$6.5x + 2y = \$836.50$

$-2x - 2y = -580$

$4.5x = 256.5$

$x = 57$ = # of salads