7.1 Word Problems

Name _____ Section _____ Date _____

Here are 2 word problems that are explained in your textbook on pages 429-430. Try to complete them yourself. Then go to the book and correct them.

① Read Problem + Write Key INFORMATION

EXAMPLE 3 **Standardized Test Practice**

The parks and recreation department in your town offers a season pass for $90.

- As a season pass holder, you pay $4 per session to use the town's tennis courts.
- Without the season pass, you pay $13 per session to use the tennis courts.

Which system of equations can be used to find the number x of sessions of tennis after which the total cost y with a season pass, including the cost of the pass, is the same as the total cost without a season pass?

② Define Variable(s) - remember units: (they are in problem)

X = # of tennis sessions

Y = TOTAL COST IN $'S

③ Define Equation(s): WRITE 2 EQUATIONS

Eq1: COST W/ PASS → $Y = 90 + 4X$

Eq2: COST NO PASS → $Y = 13X$

KI: PASS = $90 and pay $4/court
NO PASS - PAY $13/court

EX #3 HELPS You Remember To WRITE KI, define variables, and define EQUATIONS.

EXAMPLE 4 **Solve a multi-step problem**

RENTAL BUSINESS A business rents in-line skates and bicycles. During one day, the business has a total of 25 rentals and collects $450 for the rentals. Find the number of pairs of skates rented and the number of bicycles rented.

STEP 1 :

KI:

- INLINE SKATES $15/DAY
- BIKES $30/DAY
- 1 DAY SALES ARE 25 Rentals AND EARNED $450

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THE QUESTION HELPS DEFINE THE VARIABLES

Solution

STEP 2 Write a linear system. Let x be the number of pairs of skates rented, and let y be the number of bicycles rented.

STEP 3 EQ's

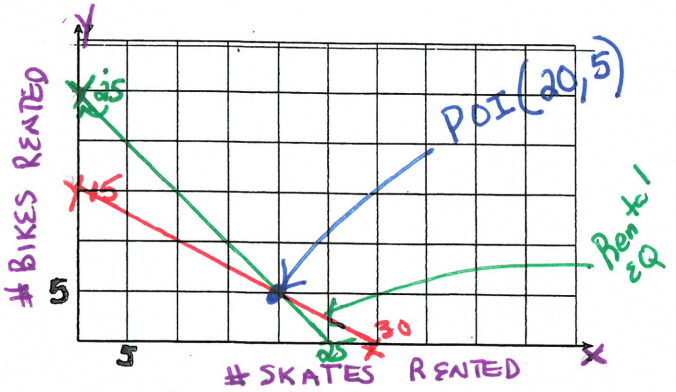
RENTALS: $X + Y = 25$

SALES: $15X + 30Y = 450$

STEP 4 Graph both equations. LABEL X+Y AXIS

STEP 5 Estimate the point of intersection. The two lines appear to intersect at (20, 5)

STEP 6 Check whether (20, 5) is a solution.



Rental EQ

$X + Y = 25$

$20 + 5 = 25$ ✓ (Skates, Bikes, Total Rentals)

SALES EQ:

$15X + 30Y = 450$

$15(20) + 30(5) = 450$

$300 + 150 = 450$ ✓ (Skate $'s, Bike $'s, Total $'s)

ALWAYS ASK YOURSELF. DOES THIS MAKE SENSE

Answer (in words) _____

→ They rented 20 skates and 5 bikes.

USE X+Y INTERCEPTS

Rental EQ

$X + Y = 25$

X: 25 Y: 25

SALES EQ

$15X + 30Y = 450$

X: 30 Y: 15

* LABEL X+Y AXIS

SOLVING PROBLEMS WITH GRAPHS

Solve each problem by writing and graphing a system of equations that models the situation.

Situation 1. ROCKET RIDE.

The Rocket Coaster has 10 cars, some that hold 4 people and some that hold 8 people. There is room for 56 people altogether. How many 4-passenger cars are there? How many 8-passenger cars are there?

Let x = number of 4-passenger cars
Let y = number of 8-passenger cars

CARS *equation #1:* $x + y = 10$ (x: 10, y: 10)

PEOPLE *equation #2:* $4x + 8y = 56$ (x: 14, y: 7)

Solution: (6, 4)

6 4-passenger and 4 8-passenger cars

Situation 2. FUN, FUN, FUN.

The cost of admission to Funland Park was $70 for a group of 2 adults and 5 children. The admission was $84 for another group of 4 adults and 3 children. Find the admission price for each adult and each child.

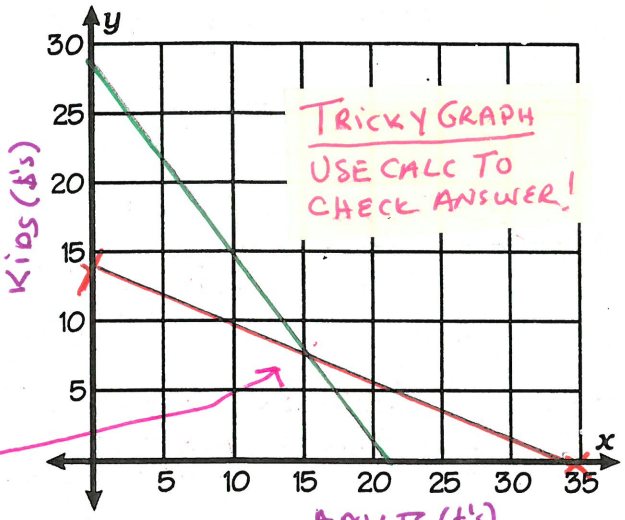
Let x = price of an adult's admission
Let y = price of a child's admission

GROUP 1 *equation #1:* $2x + 5y = 70$ (x: 35, y: 14)

GROUP 2 *equation #2:* $4x + 3y = 84$ (x: 21, y: 28)

Solution: (15, 8)

$15/Adult + $8/Kid



Situation 3. HOW ABOUT A KISS?

The number of calories in a chocolate kiss is 20 less than the number of calories in a caramel cluster. Three kisses plus four clusters together have 360 calories. How many calories are in each?

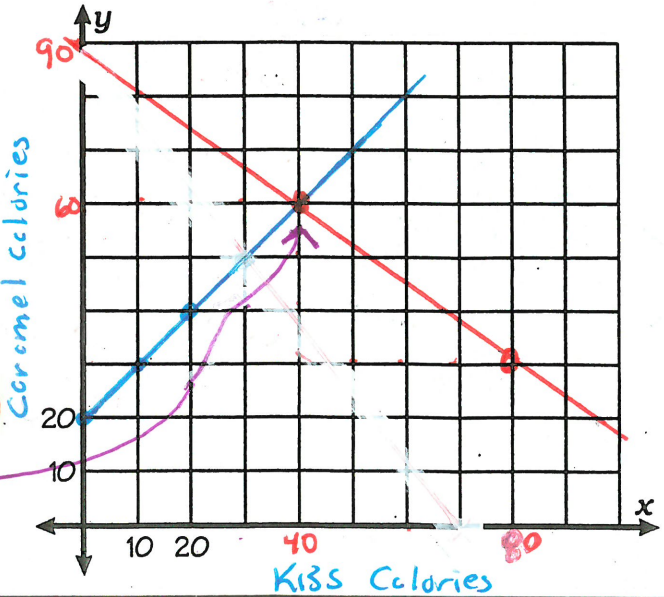
Let x = calories in a chocolate kiss
Let y = calories in a caramel cluster

equation #1: $x = y - 20 \rightarrow y = x + 20$

equation #2: $3x + 4y = 360$ $y = -\frac{3}{4}x + 90$

Solution: (40, 60)

40 CAL per CHOC. KISS AND 60 CAL PER CARAMEL CLUSTER



TO CHECK YOU'RE WORK... Add up the X and Y coordinates for the 3 solutions and they should sum to 133.