Problem Solving
Chapter 13 Quiz

Name Key

Mindy is mixing some sugary punch for tomorrow's fund-raiser. She took over for someone who goofed up. She knows that she already has 25 liters of an 18% punch mix and 45 liters of a 30% punch mix. How can she make both batches into a 25% mixture by mixing the existing punches and adding only water? How much water does she need to add once she mixes the two batches?

10 point
4 points for guess-and-check table (at least 3 guesses/checks), 4 points for algebra formula derived from the guess-and-check table (show your work to solve the equation), 2 points for final answer *please circle* (How much water does she need to add?).

amount of mix in 18% solution: $(0.18)(25) = 4.5$

Amount of mix in 30% solution: $(0.3)(45) = 13.5$

Amt mix	Amt 18% and 30% solutions	% of mix	x extra water	Total solution	% of mix
$4.5+13.5=18$	70	$18 \div 70 = 0.2571$	1	71	$18 \div 71 = 0.2535$
			2	72	$18 \div 72 = 0.25$

$$\%\ \text{solution} = \frac{\text{amt mix}}{\text{total amt of solution}}$$

Algebra $0.25 = \frac{18}{(70+x)}$

$0.25(70+x) = 18$

$70+x = \frac{18}{0.25}$

$x = \frac{18}{0.25} - 70$

$x = 2$ liters of water

Problem Solving
Chapter 13 Quiz

Name Key

Mindy is mixing some sugary punch for tomorrow's fund-raiser. She took over for someone who goofed up. She knows that she already has 20 liters of an 18% punch mix and 50 liters of a 30% punch mix. How can she make both batches into a 25% mixture by mixing the existing punches and adding only water? How much water does she need to add once she mixes the two batches?

10 point
4 points for guess-and-check table (at least 3 guesses/checks), 4 points for algebra formula derived from the guess-and-check table (show your work to solve the equation), 2 points for final answer *please circle* (How much water does she need to add?).

amt of mix in 18% solution
$(0.18)(20) = 3.6$

Amt of mix in 30% solution
$(0.3)(50) = 15$

Amt mix	Amt 18% and 30% solutions	% of mix	X extra water	total solution	% of mix
$3.6+15=18.6$	70	$18.6 \div 70 = 0.2657$	1	71	0.2620
			2	72	0.2583

$$\%\,\text{solution} = \frac{\text{amt mix}}{\text{total amt of solution}}$$

Algebra

$$0.25 = \frac{18.6}{(70+X)}$$

$$0.25(70+X) = 18.6$$

$$70+X = \frac{18.6}{0.25}$$

$$X = \frac{18.6}{0.25} - 70$$

$X = 4.4$ liters of water

Problem Solving
Chapter 12 Quiz

10

On the night our play-off was being held, a number of vehicles were in the east parking lot of the gym. Half of the white vehicles were neither cars nor buses. There were 8 buses in all, and only 1 of those was yellow. There were 16 other yellow vehicles, though, and 6 of those were cars. Of a total of 20 cars, 9 were not yellow or white. There were as many white buses as there were buses that were not white. Besides cars and buses, of course, there were vans and trucks. How many white vehicles were there?

10 points
4 points for detailed solution (draw the venn diagram), 4 points for an outline of your approach (list the clues in the order that you use them and show any mathematical calculations), 2 points for final answer *please circle* (How many white vehicles?).

CLUES

½ white vehicles ≠ (5) cars ≠ (4) buses

18 total buses (4 non-white, 4 white)

1 yellow bus

16 other yellow ~~buses~~ vehicles (6 were cars)

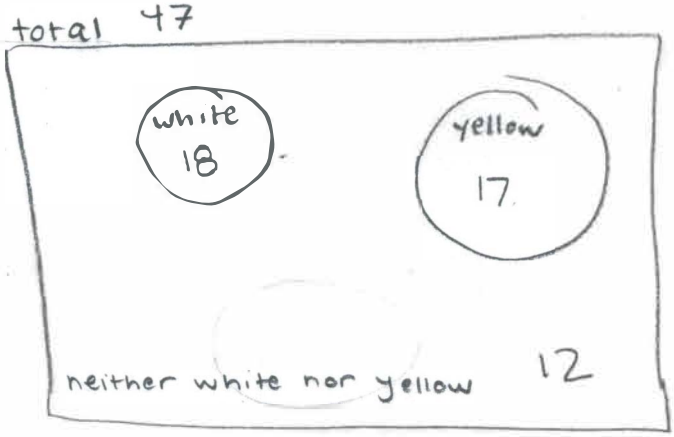
20 cars

↳ 9 were not yellow or white → (11 are yellow or white)

6 yellow → cars
5 white

white buses = # not white buses

½ vans + trucks (other)



9 white cars + buses
+ 9 white (others)
18 white vehicles

9 cars = neither
3 bus = neither
12 neither

18 white vehicles

First we wrote a list of the clues, then we determined how to make the # of non-white/white buses equal because there were 8 total → 4 non-white (1 was yellow) + 4 white → we know thatheres 5 white cars because 11 are yellow or white (and 6 are yellows) so we now know theres ½ of the white vehicles = 9 → so then multiply by 2 to find the # of total white vehicles.

10

Problem Solving
Chapter 12 Quiz

On the night our play-off was being held, a number of vehicles were in the east parking lot of the gym. Half of the white vehicles were neither cars nor buses. There were 8 buses in all, and only 1 of those was yellow. There were 16 other yellow vehicles, though, and 6 of those were cars. Of a total of 20 cars, 9 were not yellow or white. There were as many white buses as there were buses that were not white. Besides cars and buses, of course, there were vans and trucks. How many white vehicles were there?

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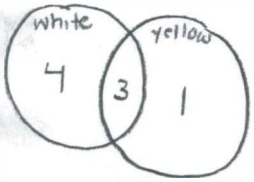
4 points for detailed solution (draw the venn diagram), 4 points for an outline of your approach (list the clues in the order that you use them and show any mathematical calculations), 2 points for final answer *please circle* (How many white vehicles?).

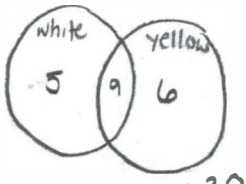
detailed solution

buses



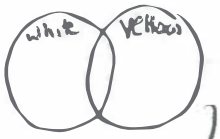
total : 8

cars

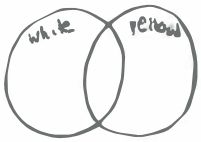


total : 20

trucks



vans



based on clues, there are 9 white so we did not have to complete.

outline/clues

- 1/2 of white were not cars or buses
- 8 total buses, 1 is a yellow bus
- 16 other vehicles, 6 were cars
- 20 total cars, 9 are not yellow or white
- white buses = not white

final answer

There were 18 white vehicles.

18

steps

First, our group read through the problem. Then, we wrote down each of the steps to keep our information organized. We then made 4 venn diagrams for each buses, cars, trucks and vans. We went through the clues and filled in what it gave us. We found that we did not have [illegible]

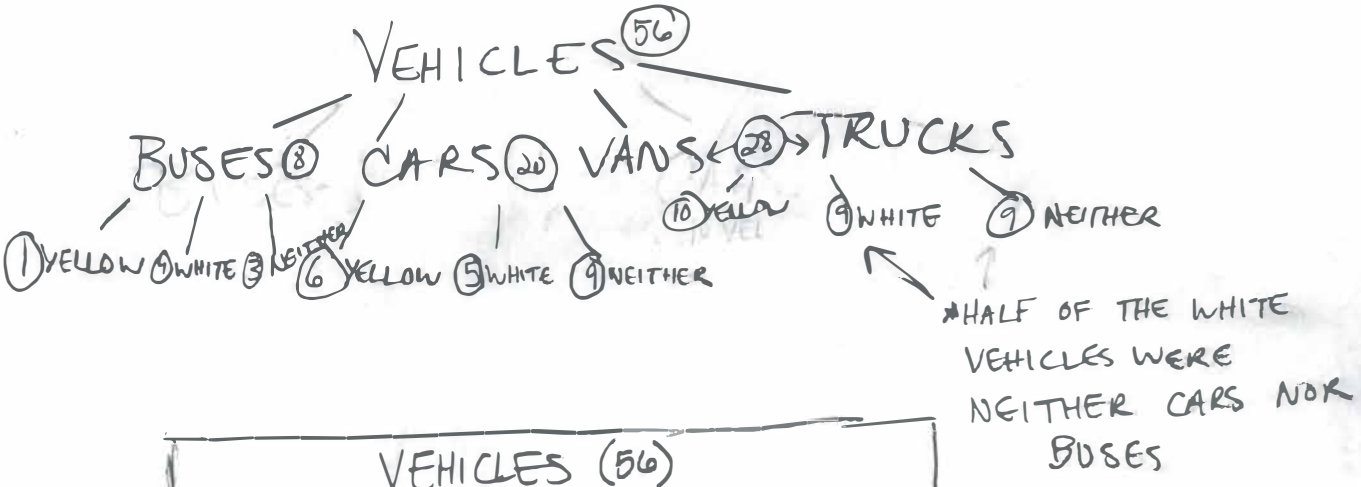
two venn diagrams because it said 1/2 of the white vehicles were not cars nor buses. And we knew there were 9 total white cars and buses. So we did 9×2 to get the total to get our answer of 18.

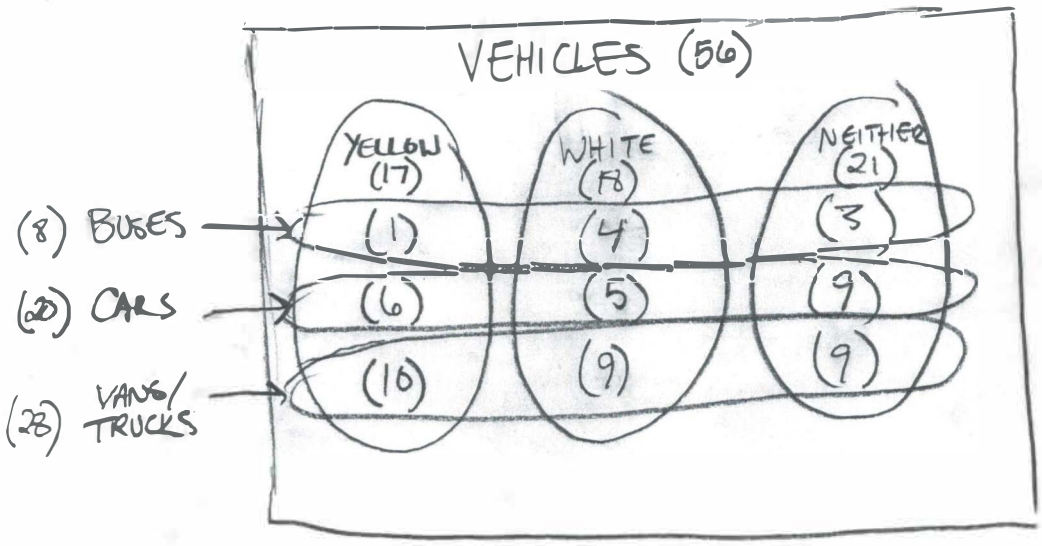
10

Problem Solving
Chapter 12 Quiz

On the night our play-off was being held, a number of vehicles were in the east parking lot of the gym. Half of the white vehicles were neither cars nor buses. There were 8 buses in all, and only 1 of those was yellow. There were 16 other yellow vehicles, though, and 6 of those were cars. Of a total of 20 cars, 9 were not yellow or white. There were as many white buses as there were buses that were not white. Besides cars and buses, of course, there were vans and trucks. How many white vehicles were there?

10 points
4 points for detailed solution (draw the venn diagram), 4 points for an outline of your approach (list the clues in the order that you use them and show any mathematical calculations), 2 points for final answer *please circle* (How many white vehicles?).





18 WHITE VEHICLES

Problem Solving
Chapter 12 Quiz

8

5 white cars

4 white buses

9 white cars or buses

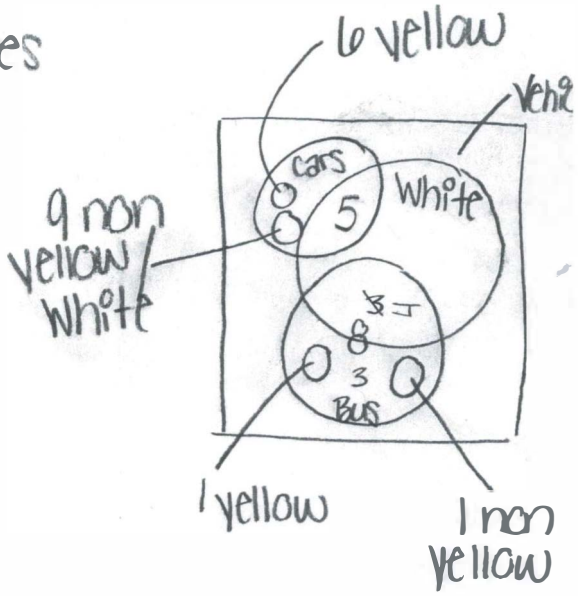
Half were neither cars nor buses so there were 9 white trucks or vans

for a total of 18 white vehicles. You were almost there.

On the night our play-off was being held, a number of vehicles were in the east parking lot of the gym. Half of the white vehicles were neither cars nor buses. There were 8 buses in all, and only 1 of those was yellow. There were 16 other yellow vehicles, though, and 6 of those were cars. Of a total of 20 cars, 9 were not yellow or white. There were as many white buses as there were buses that were not white. Besides cars and buses, of course, there were vans and trucks. How many white vehicles were there?

10 points
4 points for detailed solution (draw the venn diagram), 4 points for an outline of your approach (list the clues in the order that you use them and show any mathematical calculations), 2 points for final answer *please circle* (How many white vehicles?).

1/2 White vehicles were cars not buses
8 buses
1 yellow bus
16 yellow vehicles, 6 were cars
20 total cars
9 were not yellow/White
= # of (non) yellow buses



Problem Solving
Chapter 12 Quiz

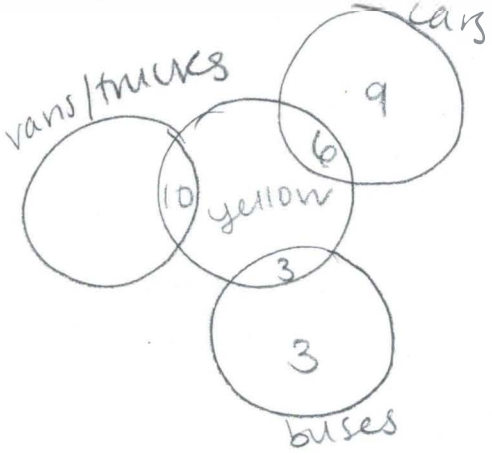
8

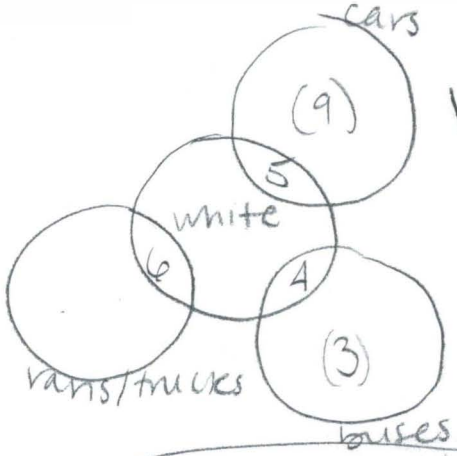
vans or trucks

On the night our play-off was being held, a number of vehicles were in the east parking lot of the gym. Half of the white vehicles were neither cars nor buses. There were 8 buses in all, and only 1 of those was yellow. There were 16 other yellow vehicles, though, and 6 of those were cars. Of a total of 20 cars, 9 were not yellow or white. There were as many white buses as there were buses that were not white. Besides cars and buses, of course, there were vans and trucks. How many white vehicles were there?

10 points
4 points for detailed solution (draw the venn diagram), 4 points for an outline of your approach (list the clues in the order that you use them and show any mathematical calculations), 2 points for final answer *please circle* (How many white vehicles?).

half white ≠ cars nor buses
8 buses in all
1 yellow bus
16 other yellow
6 yellow cars
20 cars
↳ 9 ≠ yellow or white
equal white bus to not white bus





15 white vehicles

Half of the white vehicles were neither buses nor cars so if there were 9 white buses/cars there were 18 total white vehicles

We first wrote down the clues and then made two diagrams to show the colors and vehicles we used the clues to narrow it down to figure out how many white cars there were in total. We totaled up the numbers we got from the narrow clue to get 15 as the final answer.

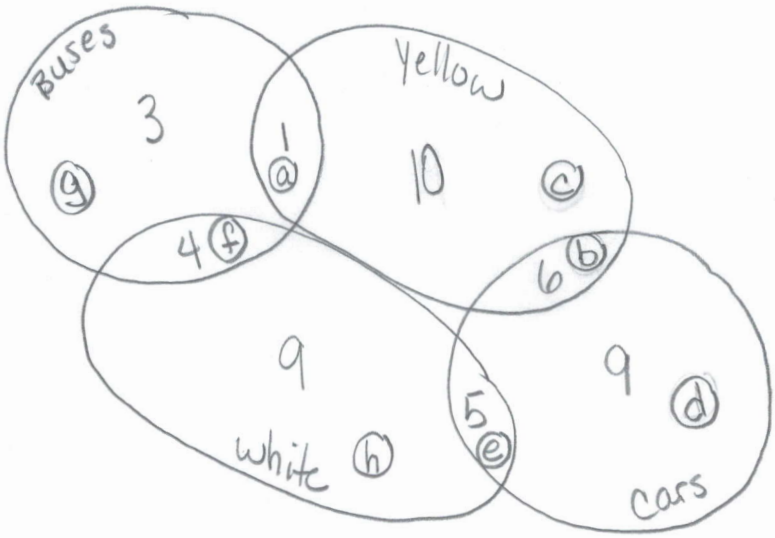
Problem Solving
Chapter 12 Quiz

Name Key

On the night our play-off was being held, a number of vehicles were in the east parking lot of the gym. Half of the white vehicles were neither cars nor buses. There were 8 buses in all, and only 1 of those was yellow. There were 16 other yellow vehicles, though, and 6 of those were cars. Of a total of 20 cars, 9 were not yellow or white. There were as many white buses as there were buses that were not white. Besides cars and buses, of course, there were vans and trucks. How many white vehicles were there?

10 points
4 points for detailed solution (draw the venn diagram), 4 points for an outline of your approach (list the clues in the order that you use them and show any mathematical calculations), 2 points for final answer *please circle* (How many white vehicles?).

vehicles in East Parking Lot



18 white vehicles

(a) of 8 buses, 1 was yellow
(b) 16 other yellow, 6 were cars
(c) 16 - 6 = 10
(d) 9 cars not yellow or white
(e) 20 - 9 - 6 = 5
(f) as many white buses as non-white so 4 white
(g) 4 non-white, 1 yellow so 3 not white or yellow
(h) half of the white vehicles were neither cars nor buses so with 4 white buses and 5 white cars, there are 9 white vehicles - trucks + vans

Problem Solving
Quiz Chapter 11

Name Key

My sister Allyndreth has really bad luck. She started a baseball card collection last year, but unfortunately, she can't seem to keep track of all of her cards. Recently she had a particularly bad string of luck. She took all of her cards with her on the bus to school. On the way there, some bullying sixth graders stole 1/4 of her cards. Then she dropped six cards in the gutter when she got off the bus. She went to class and lost 2/3 of her remaining cards during show-and-tell. Then she gave three cards to her best friend. The teacher, Mr. Devlin, was really interested in baseball, so Allyndreth gave 3/5 of her remaining cards to him. When she went to recess, she found eight cards on the playground. Then at lunch, she accidentally threw half of her remaining cards away in her lunch bag. When she came home, she only had ten cards left. How many cards did Allyndreth have when she left for school?

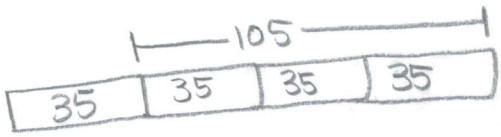
10 points

5 points for detailed solution (break the problem into steps of gaining, losing, and giving away baseball cards and include subtotals at each step), 3 points for a summary or outline of your approach, 2 points for final answer *please circle* (Number of cards Allyndreth started with).

140

1/4 of cards stolen

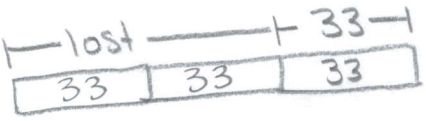
105



Dropped 6

99

Lost 2/3 of remaining

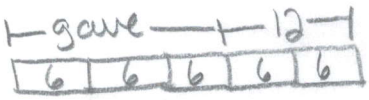


33

Gave 3 away

30

Gave 3/5 away



12

Found 8 cards

20

Threw away 1/2

10

Had 10 cards

She started with 140 cards.

Problem Solving
Quiz Chapter 11

Name Key

Triva went to the arcade at the state fair to win some goldfish. She already had some at home, but she wanted more. Right away, Triva won enough goldfish to double her stock. However, her mom made her give four to her cousin. She put her new ones in the fish tank with the others, but by the next morning, 1/2 of her goldfish had died. Triva's friend Keisha gave her six more. Unfortunately, the next morning 2/3 of her goldfish had died. Triva was left with two goldfish after having given one to a neighbor. How many goldfish did Triva start with?

10 points

5 points for detailed solution (break the problem into steps of gaining, losing, and giving away goldfish and include subtotals at each step), 3 points for a summary or outline of your approach, 2 points for final answer *please circle* (Number of goldfish Triva started with).

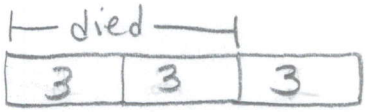
Doubled her stock of goldfish — 5

Gave 4 to cousin — 10

½ of all goldfish died — 6

Received 6 more — 3

2/3 of all goldfish died — 9



Gave 1 to neighbor — 3

Two left — 2

She started with 5 goldfish.

Problem Solving
Chapter 9 Quiz

Name Key

A sporting goods store bought a tent for a certain price and marked it up 75%. The tent didn't sell, so the store owner took 30% off the store's price and sold it at that price. What percent profit did the store make?

10 points

5 points for work and solution to an easier problem, 3 points for a summary of your approach (paragraph or outline format), 2 points for final answer *please circle* (the percent profit).

Extra Credit (1 pt): Write the final selling price of the tent in terms of the original purchase price before the mark up and mark down (use a variable to indicate this price).

set retail price = #100

wholesale price $(0.75)(100)+100 = \#175$

sale price $175-(0.3)(1.75) = 175-52.50 = 122.50$

profit $122.50-100 = 22.50$

percent profit $\frac{22.50}{100} = 0.225$ **22.5%**

In terms of x:

Selling price $= (0.75x+x)-(0.3)(0.75x+x)$

$= 0.75x+x-0.225x-0.3x$

$= 0.225x+x$

$= 1.225x$

percent profit $= 0.225 \approx 22.5\%$

Problem Solving
Chapter 9 Quiz

Name Key

A sporting goods store bought a tent for a certain price and marked it up 85%. The tent didn't sell, so the store owner took 40% off the store's price and sold it at that price. What percent profit did the store make?

10 points

5 points for work and solution to an easier problem, 3 points for a summary of your approach (paragraph or outline format), 2 points for final answer *please circle* (the percent profit).

Extra Credit (1 pt): Write the final selling price of the tent in terms of the original purchase price before the mark up and mark down (use a variable to indicate this price).

set retail price = \$100

wholesale price $(0.85)(100) + 100 = \$185$

sale price $\$185 - (0.40)(185) = \$111$

profit $\$111 - 100 = \$11$ percent profit $\frac{11}{100} = 0.11$

11%

In terms of x:

Selling price $= (0.85x + x) - (0.4)(0.85x + x)$

$= 0.85x + x - 0.34x - 0.4x$

$= 0.11x + x$

$= 1.11x$

percent profit $= 0.11 \approx 11\%$

Problem Solving
Chapter 8 Extra Credit

Name Key

The maximum points allowed are limited to 2 above a perfect quiz score. For example, if you earned a 7 out of 10 on the chapter 8 quiz, you can earn no more than 5 points from this extra credit opportunity. All points will be applied to the chapter 8 quiz, but a score of over 100% will indirectly help raise a low score on another quiz. **Include units in all of your steps and show cancelations. No summary needed.**

Duane, Jeff, and Glen drove from their home in Racine, Wisconsin, to Chicago to see the Cubs play the Braves at Wrigley Field. The distance was 90 miles, and they averaged 23 miles per gallon. They drove an average speed of 60 miles per hour and spent $15.85 on gas. Find each of the following: (1 mile = 5280 feet; 1 meter = 3.281 feet)

$\frac{60 \text{ miles}}{1 \text{ hour}}$ $\frac{1 \text{ hour}}{60 \text{ miles}}$

a) List each piece of given information as two different, yet equivalent, ratios (1 pt)

$\frac{90 \text{ miles}}{1 \text{ trip}}$ $\frac{1 \text{ trip}}{90 \text{ miles}}$ $\frac{23 \text{ miles}}{1 \text{ gallon}}$ $\frac{1 \text{ gallon}}{23 \text{ miles}}$ $\frac{\$15.85}{1 \text{ trip}}$ $\frac{1 \text{ trip}}{\$15.85}$

b) Gallons (1 pt) $\frac{1 \text{ gallon}}{23 \text{ miles}} \cdot \frac{90 \text{ miles}}{1 \text{ trip}} = 3.91 \text{ gallons}$

c) Hours (1 pt) $\frac{1 \text{ hr}}{60 \text{ miles}} \cdot \frac{90 \text{ miles}}{1 \text{ trip}} = 1.5 \text{ hours}$

d) Dollars per gallon (1 pt) $\frac{\$15.85}{1 \text{ trip}} \cdot \frac{1 \text{ trip}}{3.91 \text{ gallons}} = \$4.05 \text{ per gallon}$

e) Feet per second (1 pt)
$\frac{60 \text{ miles}}{1 \text{ hour}} \cdot \frac{5280 \text{ ft}}{1 \text{ mile}} \cdot \frac{1 \text{ hour}}{60 \text{ min}} \cdot \frac{1 \text{ hour}}{60 \text{ sec}} = 88 \text{ ft/sec}$

f) Cents per minute (1 pt)
$\frac{\$15.85}{1.5 \text{ hr}} \cdot \frac{1 \text{ hour}}{60 \text{ min}} \cdot \frac{100 \text{ cents}}{1 \text{ dollar}} = 17.61 \text{ cents/min}$

g) Kilometers traveled (1 pt)
$\frac{90 \text{ miles}}{1 \text{ trip}} \cdot \frac{5280 \text{ ft}}{1 \text{ mile}} \cdot \frac{1 \text{ meter}}{3.281 \text{ ft}} \cdot \frac{1 \text{ KM}}{1000 \text{ M}} = 144.83 \text{ KM}$

h) Passenger-miles (1 pt)
$\frac{3 \text{ passengers}}{1 \text{ trip}} \cdot \frac{90 \text{ miles}}{1 \text{ trip}} = 270 \text{ passenger-miles}$

i) Passenger-miles per gallon (1 pt)
$\frac{270 \text{ passenger-miles}}{3.91 \text{ gallons}} = 69 \text{ passenger-miles per gallon}$

j) Cents per passenger-mile (1 pt)
$\frac{\$15.85}{270 \text{ passenger-miles}} \cdot \frac{100 \text{ cents}}{1 \text{ dollar}} = 5.87 \text{ cents per passenger-mile}$

Problem Solving
Chapter 8 Extra Credit

Name key

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Duane, Jeff, and Glen drove from their home in Racine, Wisconsin, to Chicago to see the Cubs play the Braves at Wrigley Field. The distance was 75 miles, and they averaged 20 miles per gallon. They drove an average speed of 50 miles per hour and spent $14.85 on gas. Find each of the following: (1 mile = 5280 feet; 1 meter = 3.281 feet)

$\frac{1 \text{ hour}}{50 \text{ miles}}$

$\frac{50 \text{ miles}}{1 \text{ hour}}$

a) List each piece of given information as two different, yet equivalent, ratios (1 pt)

$\frac{75 \text{ miles}}{1 \text{ trip}}$ $\frac{1 \text{ trip}}{75 \text{ miles}}$ $\frac{20 \text{ miles}}{1 \text{ gallon}}$ $\frac{1 \text{ gallon}}{20 \text{ miles}}$ $\frac{\$14.85}{1 \text{ trip}}$ $\frac{1 \text{ trip}}{\$14.85}$

b) Gallons (1 pt)

$\frac{1 \text{ gallon}}{20 \text{ miles}} \cdot \frac{75 \text{ miles}}{1 \text{ trip}} = 3.75 \text{ gallons}$

c) Hours (1 pt)

$\frac{1 \text{ hour}}{50 \text{ miles}} \cdot \frac{75 \text{ miles}}{1 \text{ trip}} = 1.5 \text{ hours}$

d) Dollars per gallon (1 pt)

$\frac{\$14.85}{1 \text{ trip}} \cdot \frac{1 \text{ trip}}{3.75 \text{ gallons}} = \$3.96 \text{ per gallon}$

e) Feet per second (1 pt)

$\frac{50 \text{ miles}}{1 \text{ hour}} \cdot \frac{5280 \text{ ft}}{1 \text{ mile}} \cdot \frac{1 \text{ hr}}{60 \text{ min}} \cdot \frac{1 \text{ min}}{60 \text{ sec}} = 73.33 \text{ ft/sec}$

f) Cents per minute (1 pt)

$\frac{\$14.85}{1.5 \text{ hours}} \cdot \frac{100 \text{ cents}}{1 \text{ dollar}} \cdot \frac{1 \text{ hour}}{60 \text{ min}} = 16.5 \text{ cents/min}$

g) Kilometers traveled (1 pt)

$\frac{75 \text{ miles}}{1 \text{ trip}} \cdot \frac{5280 \text{ ft}}{1 \text{ mile}} \cdot \frac{1 \text{ meter}}{3.281 \text{ ft}} \cdot \frac{1 \text{ Km}}{1000 \text{ m}} = 120.7 \text{ Km}$

h) Passenger-miles (1 pt)

$\frac{75 \text{ miles}}{1 \text{ trip}} \cdot \frac{3 \text{ passengers}}{1 \text{ trip}} = 225 \text{ passenger-miles}$

i) Passenger-miles per gallon (1 pt)

$\frac{225 \text{ passenger-miles}}{1 \text{ trip}} \cdot \frac{1 \text{ trip}}{3.75 \text{ gallons}} = 60 \text{ passenger-miles/gallon}$

j) Cents per passenger-mile (1 pt)

$\frac{\$14.85}{1 \text{ trip}} \cdot \frac{1 \text{ trip}}{225 \text{ passenger-miles}} \cdot \frac{100 \text{ cents}}{1 \text{ dollar}} = \frac{1485 \text{ cents}}{225 \text{ passenger-miles}}$

$= 6.6 \text{ cents/passenger-mile}$

Problem Solving
Quiz Chapter 8

Name Key

A machine puts tennis balls into tennis ball cans. The machine is normally able to do 500 cases of tennis balls per hour. There are 24 cans in one case. There are 3 balls in one can. Today, the machine is running a little slower than usual so that it takes 0.1 seconds longer to load one tennis ball into a can than it normally does. What is the machine's new rate in cases of tennis balls per hour?

10 points

5 points for detailed solution (all steps to change units), 3 points for a summary of your approach, 2 points for final answer *please circle* (Machine's new rate in cases of tennis balls per hour).

Facts-past performance

$\frac{500 \text{ cases}}{1 \text{ hr}}$ $\frac{1 \text{ hr}}{500 \text{ cases}}$

$\frac{24 \text{ cans}}{1 \text{ case}}$ $\frac{1 \text{ case}}{24 \text{ cans}}$

$\frac{3 \text{ balls}}{1 \text{ can}}$ $\frac{1 \text{ can}}{3 \text{ balls}}$

Facts - today's performance

Today it takes the machine 0.1 more second to load one ball into a can.

① Convert cases/hr to seconds/ball

$\frac{1 \text{ hr}}{500 \text{ cases}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} \cdot \frac{60 \text{ sec}}{1 \text{ min}} \cdot \frac{1 \text{ case}}{24 \text{ cans}} \cdot \frac{1 \text{ can}}{3 \text{ balls}} = \frac{3600 \text{ sec}}{36000 \text{ balls}} = 0.1 \text{ sec/ball}$

② Add 0.1 sec to ① to get the new rate in sec/ball → 0.2 sec/ball

③ Convert new rate 0.2 sec/ball to cases per hour.

$\frac{1 \text{ ball}}{0.2 \text{ sec}} \cdot \frac{1 \text{ can}}{3 \text{ balls}} \cdot \frac{1 \text{ case}}{24 \text{ cans}} \cdot \frac{60 \text{ sec}}{1 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} = \frac{3600 \text{ cases}}{14.4 \text{ hr}}$

$= 250 \text{ cases/hr}$

Problem Solving
Quiz Chapter 8

Name Key

A machine puts golf balls into boxes and then loads the boxes into cases. The machine is normally able to load 25 cases of golf balls per hour. There are 20 boxes in one case. There are 12 balls in one box. Today, the machine is running a little faster than usual so that it takes 0.2 seconds less time to load one golf ball into a box than it normally does. What is the machine's new rate in cases of golf balls per hour?

10 points

5 points for detailed solution (all steps to change units), 3 points for a summary of your approach, 2 points for final answer *please circle* (Machine's new rate in cases of golf balls per hour).

Facts - past performance

$\frac{25 \text{ cases}}{1 \text{ hr}}$ $\frac{1 \text{ hr}}{25 \text{ cases}}$

$\frac{20 \text{ boxes}}{1 \text{ case}}$ $\frac{1 \text{ case}}{20 \text{ boxes}}$

$\frac{12 \text{ balls}}{1 \text{ box}}$ $\frac{1 \text{ box}}{12 \text{ balls}}$

Facts - today's performance

Today it takes the machine 0.2 fewer seconds to load one golf ball into a box.

① convert cases/hr to seconds/ball

$$\frac{1 \text{ hr}}{25 \text{ cases}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} \cdot \frac{60 \text{ sec}}{1 \text{ min}} \cdot \frac{1 \text{ case}}{20 \text{ boxes}} \cdot \frac{1 \text{ box}}{12 \text{ balls}} = \frac{3600 \text{ sec}}{6000 \text{ ball}}$$

$$= 0.6 \text{ sec/ball}$$

② Subtract 0.2 seconds from ① to get the new rate in sec/ball $0.6 - 0.2 = 0.4 \text{ sec/ball}$

③ convert new rate 0.4 sec/ball to cases per hour

$$\frac{1 \text{ ball}}{0.4 \text{ sec}} \cdot \frac{60 \text{ sec}}{1 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} \cdot \frac{1 \text{ box}}{12 \text{ balls}} \cdot \frac{1 \text{ case}}{20 \text{ boxes}} = \frac{3600 \text{ cases}}{96 \text{ hour}}$$

$$= 37.5 \text{ cases/hr}$$

Problem Solving
Quiz Chapter 7

Name Key

Shelly has again decided to host her annual Halloween party. For last year's party she spent $90 on sodas and she bought 30 mini pumpkins. This year she plans to buy only half as many sodas. The price of soda this year is 10% less than it was last year. She also decided she needs twice as many mini pumpkins as last year, because the "bobbing for mini pumpkins" table was so successful last year. Unfortunately she has to buy her mini pumpkins from the grocery store this year (last year she bought them from the local farmer's market), and the grocery store charges 70% more than the $.50 per-pumpkin price she paid last year. She has $80 to spend on this year's party. Does she have enough money, or does she have to borrow money from her husband?

10 points

5 points for breaking the problem into subproblems with questions written in words, 3 points for detailed numeric solution for each question, 2 points for final answer *circled*.

Last year
$90 on soda
Soda
mini pumpkins 30

This Year
half as many sodas
price of soda 10% less
mini pumpkins 60
price of pumpkins 70% more than $0.50
$80 to spend

1. How much did she spend on pumpkins last year?
   $30 \cdot 0.5 = \$15.00$

2. How much will half as many sodas cost w/ 10% price reduction?
   $(1/2)(90) = \$45$ is half the soda cost
   $(0.1)(45) = \$4.50$ less
   $45 - 4.50 =$ **$40.50 on soda**

3. How much will 60 pumpkins be with 70% price increase?
   $(0.7)(0.5) = 0.35$ pumpkins now cost $0.85 each
   $(0.85)(60) =$ **$51 on pumpkins**

5. How much over her budget? $\$80 - \$51 - 40.50 =$ **Borrow (11.50)**

Problem Solving
Quiz Chapter 7

Name Key

It's that time again, time for April to host a huge April Fool party. For last year's party she spent $60 on sodas and she bought 50 pounds of bananas. This year she plans to buy only half as many sodas. The price of soda this year is 20% more than it was last year. She also decided she needs three times as many bananas as last year, because the "pretend your banana is a phone and walk around the mall for 30 minutes" prank was so successful last year. Unfortunately the price of bananas is 75% more than the $.48 per-pound price she paid last year. She has $170 to spend on this year's party. Does she have enough money, or does she need to borrow money from her roommate?

10 points

5 points for breaking the problem into subproblems with questions written in words, 3 points for detailed numeric solution for each question, 2 points for final answer *circled*.

Last year
$60 on soda
50 lbs bananas
$0.48/lb

This year $170 to spend
Half the soda at 20% price ↑
Three times the bananas 150 lbs
at 75% price ↑

1. How much are bananas/lb this year? How much for 150 lbs?

($0.48)(0.75) = 0.36 0.48+0.36 = $0.84

(150)(0.84) = **$126 on bananas**

2. How much will the soda cost with the 20% price increase?

Half the cost of soda last year would have been $30
with a 20% increase... (30)(0.2) = 6
So half the **soda costs $36**

3. What is her total and how much is she short?

126 + 36 = $162

She will have **$8 in change - she will not need to borrow money.**

Quiz 5
Problem Solving

Name key

Yale Record Club made me an offer I couldn't refuse. For their low prices I could buy millions of records, tapes, and compact discs (CDs) and save millions of dollars. Well, anyway, I joined. The first month I bought 3 CDs, and the cost was $24.84. The second month I ordered 5 for a total of $38.82. Did I mention that the cost covered the CDs and the shipping and handling? Anyway, for $31.83 I bought 4 CDs the next month. I paid $17.85 for 2 discs the next month. I looked through their catalog and picked out 38 more CDs that I wanted to buy sometime. If I buy all 38 at once, then I pay the shipping and handling fee only once. On the other hand, if I buy them in smaller groups, well . . . What I really need to know is, how much would it cost to buy all 38 CDs as one order?

10 points

5 points for detailed solution (drawing and/or list), 3 points for a summary of your approach, 2 points for final answer *please circle* (how much are 38 CDs all at once).

3 CDs $24.84
5 CDs $38.82
4 CDs $31.83
2 CDs $17.85

(5) (4)
CDs cost $38.82 − 31.83
$6.99 each

Shipping and Handling costs

2 · 6.99 = cost of 2 CDs w/o S+H

$13.98

So $17.85 − 13.98 = S+H

S+H = $3.87

38 CDs will cost

= $6.99 (38) + 3.87

= 269.49

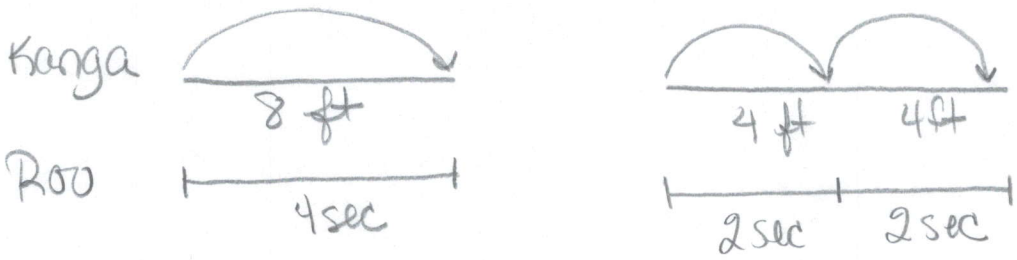
Quiz 5
Problem Solving

Name Key

Kanga and Roo decided to have a race. Kanga jumps 8 feet with every jump and makes one jump every 4 seconds. Roo, on the other hand, jumps twice as fast (one jump every 2 seconds) but jumps only 4 feet with each jump. The racecourse was 100 feet long, with the race being up and back. (So that's 200 feet total.) Who won and by how far?

10 points

5 points for detailed solution (drawing and/or list), 3 points for a summary of your approach, 2 points for final answer *please circle* (who won and by how much).

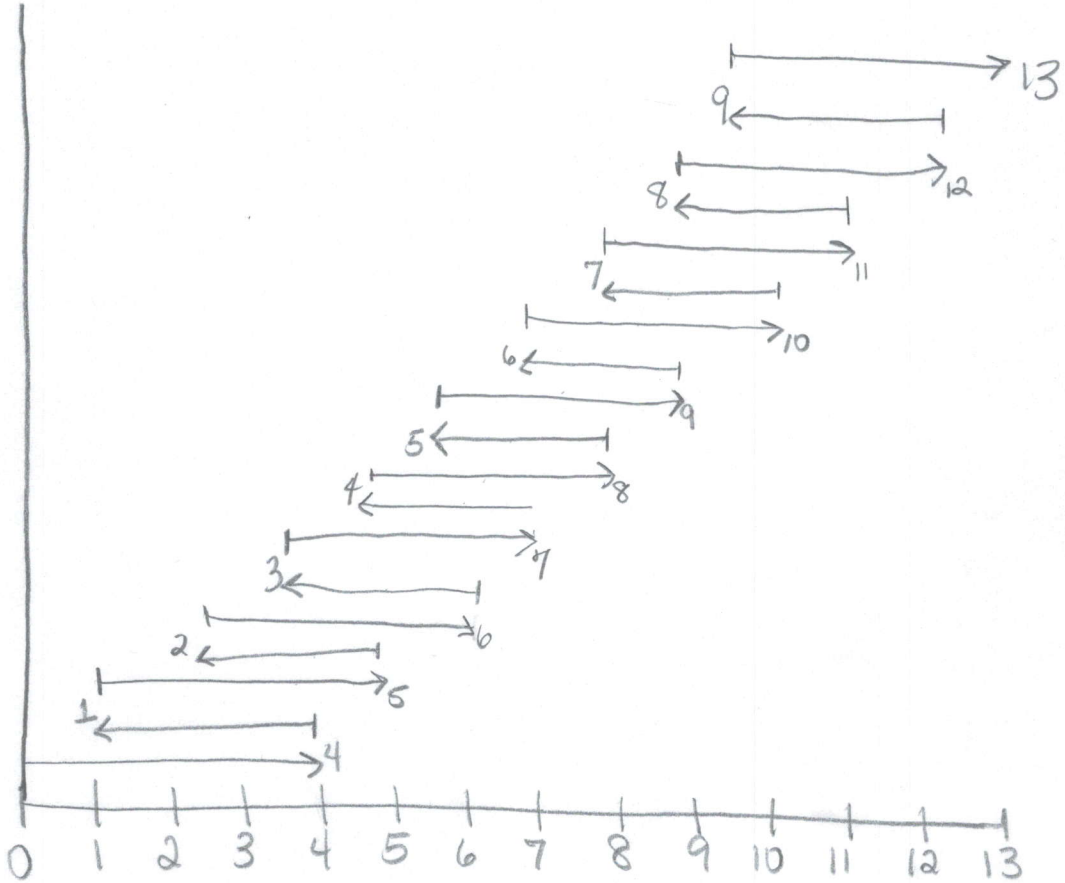


Roo wins by 8 feet

Problem Solving with Creative Math
Quiz Chapter 1

Name Key

1. The gearshift on Maxine's rototiller was malfunctioning. She found that it would travel forward 4 feet in one minute, but then shift into reverse and go back 3 feet before the shift would allow her to put it back in forward. The backwards part also took about a minute to complete. How long would it take her to till a 13-foot-long section of her garden with this rototiller?



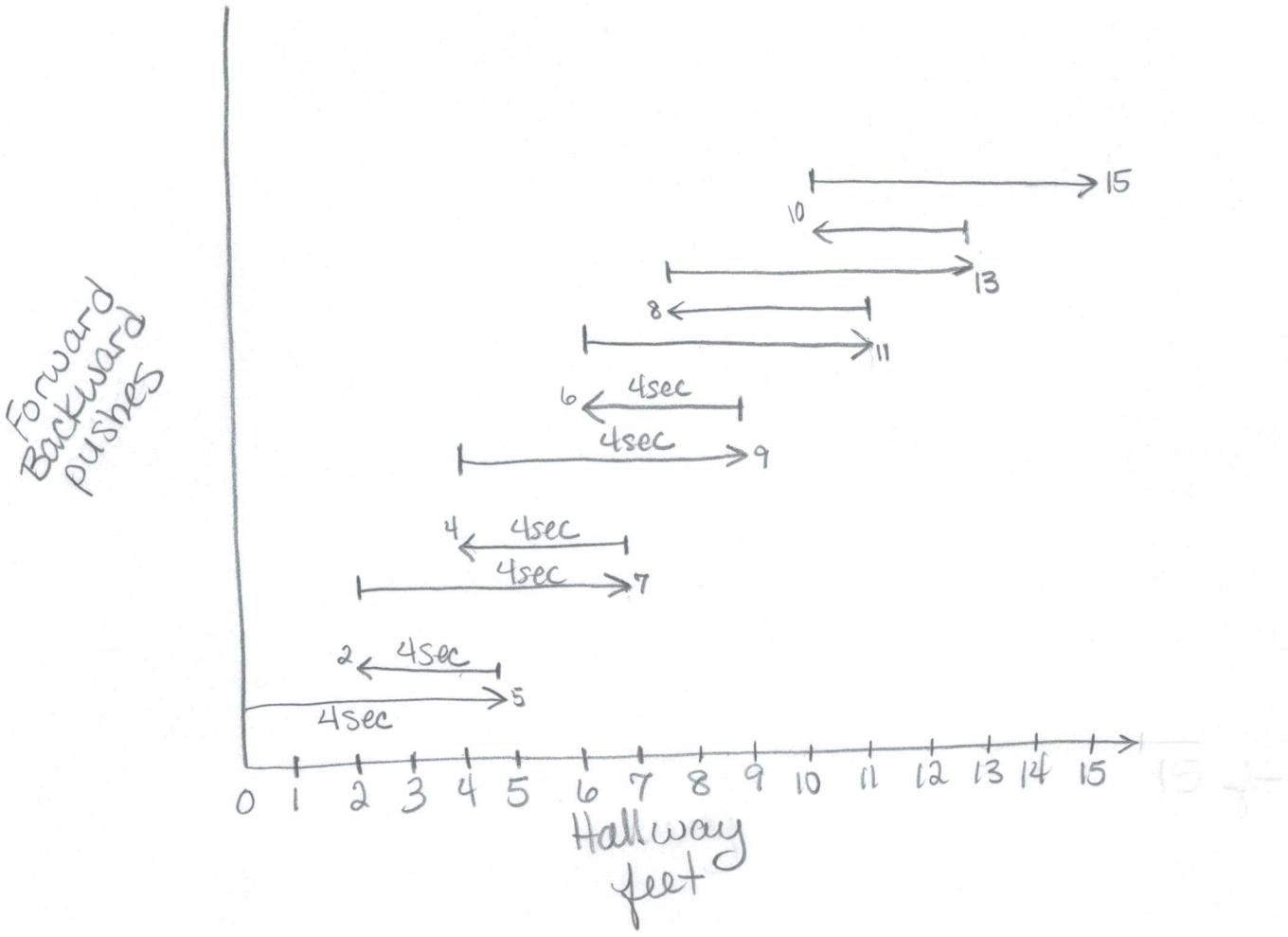
19 minutes

Maxine gains 1 foot for every 4 she tills because of the malfuncting rototiller. After reaching 9 feet, she is able to till the final 4 feet and complete the job before the machine kicks into reverse.

Problem Solving with Creative Math
Quiz Chapter 1

Name Key

1. Janae was vacuuming the narrow hallway in her house. She went 5 feet forwards in the first 4 seconds, then went 3 feet backwards in the next 4 seconds. She continued to do this, forwards 5 feet in 4 seconds and backwards 3 feet in 4 seconds. If she continues in this way, how many seconds will it take her to reach the end of her hallway, which is 15 feet long?



11 4 second pushes, 44 seconds

Janae gains two feet each push for 5 back and forth strokes to reach 10 feet after which she pushes 5 feet in one last stroke to reach the end. It takes her 44 seconds to reach the end.

Problem Solving
Quiz Chapter 2

Name key

The corner convenience store sells candy in 20¢, 30¢, and 50¢ packages.
How many ways can Waylon spend exactly $3.00 on candy?

10 points
5 points for detailed solution (make the list), 3 points for written summary (3-5 sentences explaining your approach), 2 points for final answer (number of ways).

21 ways

50¢	30¢	20¢
6	0	0
5	1	1
4	2	2
4	0	5
3	5	0 ← maximum 30¢ for 150 is 5
3	3	3
3	1	6
2	6	1
2	4	4
2	2	7
2	0	10
1	7	2
1	5	5
1	3	8
1	1	11
0	10	0

Then move down by 2s for 30¢ because 60¢ is a multiple of 20.

6 × 30¢ = 1.80
plus 20¢ is 2.00
Then move down by 2s for 30¢ and up by 3s for 20¢.

16

Problem Solving
Quiz Chapter 2

Name Key

How many ways are there to make change for 70 cents, using quarters, dimes, and nickels? Note: No pennies!

10 points
5 points for detailed solution (make the list), 3 points for written summary (3-5 sentences explaining your approach), 2 points for final answer (number of ways).

25¢	10¢	5¢
2	2	0
2	1	2
2	0	4
1	4	1
1	3	3
1	2	5
1	1	7
1	0	9
0	7	0
0	6	2
0	5	4
0	4	6
0	3	8
0	2	10
0	1	12
0	0	14

16 ways

I started with the maximum number of quarters possible and worked all possible combinations of 20¢ with dimes and nickels. I then went to one quarter and worked out combinations of dimes and nickels that summed to 45¢. I kept track of dimes and

Quiz 3

programs < 100

4 : r3
5 : r3
7 : r6
3 : r2

①	②	③	④
20	→ 23		17
40	→ 43		37
60	→ 63	X	57
80	→ 83		77 ⑤

83

① List numbers divisble by 4 and 5
② Add 3 - one of these numbers work
③ Cross off anything divisible by 7 or 3
④ Subtract 6 and list what are divisible by 7
⑤ 83 has a remainder of 6 when divided by 7
⑥ Check $83 \div 3 = 27 : r2$

$$3 \overline{)\,81}\ 27,\quad 6,\quad 21$$

Quiz 4

Key

Elaine, Leisa, Brittney, and Consuelo each have a hobby: model railroading, building model airplanes, rocketry, or raising tropical fish. Match each woman to her hobby by using the clues below.

1. Leisa has never met the person who does rocketry.
2. Elaine is a pilot and, ironically, has a hobby that has nothing to do with aeronautics.
3. The rocketry hobbyist, the railroader, and Brittney are friends.
4. Leisa's hobby involves public transportation.

	Railroad	Airplanes	Rocketry	Fish
Elaine	O5	X2	X2	X5
Leisa	X5	O5	X1	X5
Brittney	X3	X5	X3	O5
Consuelo	X3	X3	O3	X3

1. Leisa ≠ rocketry
2. Elaine ≠ rocketry ≠ airplanes
3. rocketry ≠ Brittney
   railroad ≠ Brittney
   Consuelo = rocketry
4. Leisa = airplanes or railroad
5. From (1) if rocketry + railroader are friends, then Leisa ≠ railroad
   Leisa = airplanes
   Elaine = railroad
   Brittany = fish

Quiz 4

Key

Amaya, Ostergard, Blue Cloud, and Katricz are the last names of Timothy, Diana, Mack, and Sherry. They are all playing in a mixed doubles tennis tournament. Two people are on each team. There is one man and one woman on each team. Determine the full name of each player by using the clues below.

1. Mack is a better player than Ostergard.
2. Timothy is Diana's partner.
3. Sherry and Katricz are on the same team.
4. Amaya is known for his wicked serve.
5. Katricz is an opponent of Ostergard.
6. Blue Cloud is an opponent of Amaya.

	Mark	Tim	Sherry	Diana
Amaya	X7	O8	X8	X8
Ostergard	X1	X8	X8	O9
Blue Cloud	X7	X8	O9	X9
Katricz	O7	X7	X3	X7

1. Mark ≠ Ostergard
2. Tim is Diana's partner *
3. Sherry ≠ Katricz
4. Amaya = Mark or Tim "his"
5. Katricz is an opponent of Ostergard *
6. Blue Cloud is an opponent of Amaya
7. From Teams Adjunct List: Tim ≠ Katricz, Diana ≠ Katricz, Mark = Katricz
8. From (5): Sherry ≠ Ostergard, From (4) Tim = Amaya
9. Sherry = Blue Cloud, Diana = Ostergard

Teams

Tim + Diana

Sherry + Katricz

Mark + Sherry

Quiz 4

Key

Four friends—LaTisha, Zack, Steve, and Michelle—are working in summer jobs. The jobs they have found this summer include food server, lifeguard, construction worker, and clerk at a grocery store. Determine who is working which job by using the clues below.

1. The person doing the food-serving job really likes his work.
2. Zack and the lifeguard have known each other for years.
3. Both Michelle and the lifeguard are outside most of the time, and the other two are inside most of the time.
4. LaTisha and the person working construction met on their job last summer.
5. Neither Zack nor the food server worked last summer.

	server	LifeGuard	Construction	clerk
LaTisha	X5	O7	X3,4	X7
Zack	X5	X2	X3	O7
Steve	O6	X6	X3	X4
michelle	X3	X3	O3	X3

1. server likes "his" work
   server = zack or Steve
2. zack ≠ lifeguard
3. michelle "outside" michelle = construction
   michelle ≠ lifeguard
4. LaTisha & construction met on job last summer
   LaTisha ≠ construction
5. Zack ≠ server, LaTisha ≠ server
   neither worked last summer
6. Steve = Server
7. LaTisha = lifeguard
   Zack = clerk