

Chapter 7 Practice Exercises (Solutions at www.789adam.com)

Follow the Seven Step Plan to Solve Word Problems.

Joe really likes to go to baseball games. He's hoping to go to 100 this year, and he tells you that he's only 23 games away from that goal. How many games has he been to?

j = number of games Joe's been to

Joe's number of games plus 23 will be 100

$$j + 23 = 100$$

$$j = 77 \quad \text{Joe's been to 77 games.}$$

Mary takes in revenue of \$7 for every apple pie she sells. How many pies does she have to sell to bring in \$105 of revenue?

n = number of pies

Revenue is price times number sold

Price times number sold is \$105

$$7n = 105$$

$$n = 15$$

Mary needs to sell 15 pies.

Last month Marcus started running 3 miles every day after school. He's kept a log so he knows that he has run a total of 27 miles so far. In how many more days will he reach 99 total miles of running?

d = days of running

Total distance today plus future running will be 99 miles
(daily dist \times # of days)

$$27 + 3d = 99$$

$$3d = 72$$

$$d = 24$$

more

In 24 days, Marcus will have run 99 miles

Melissa bought a box of assorted marbles—some big, some small. On the label, it says there are 50 in the box. Each big marble weighs 12 grams; each small marble weighs 7 grams. She weighs the box and finds out that it contains a total of 415 grams of marbles. How many of each size marble are in the box?

b = big marbles

l = little marbles

Total stuff: Big marbles plus little marbles is 50.

$$b + l = 50$$

Special stuff: mass of Bigs plus mass of littles is 415

$$12b + 7l = 415$$

$13 + l = 50$ Melissa has 13 big marbles

and 37 little marbles.

$$b + l = 50 \times 7$$

$$12b + 7l = 415 \times 1$$

$$7b + 7l = 350$$

$$-(12b + 7l = 415)$$

$$-5b = -65 \quad b = 13$$

$$l = 37$$

Pizzaville has a special dinner buffet on Tuesdays. That evening, adults can eat for \$5; kids are \$3. The manager at your neighborhood location counted 125 customers last Tuesday evening. On that night the total receipts were \$455. How many adults and kids came in that night?


$a =$ adults Total Staff: Adults plus Kids was 125
 $k =$ Kids $a + k = 125$

Special Staff: Revenue from adults plus revenue from Kids was \$455
 $5a + 3k = 455$

$$\begin{array}{r} a+k=125 \quad \times 3 \quad 3a+3k=375 \\ 5a+3k=455 \quad \times 1 \quad -(5a+3k=455) \\ \hline -2a = -80 \\ a = 40 \\ 40+k=125 \\ k = 85 \end{array}$$

There were 40 adults and 85 Kids.

Boston, Massachusetts, and San Diego, California are separated by about 3,000 miles. Flying from Boston to San Diego takes about 6 hours (fighting a headwind). Going back the other way only takes about 5 hours (with help from a tailwind). How fast can the plane fly in still air? How fast is the wind blowing?

SF. \xrightarrow{w}  • BOS with wind: speed is $p+w$
 against wind: speed is $p-w$

$p =$ plane's regular speed (mph) Constant velocity
 $w =$ wind speed (mph)

① speed with wind times hours is 3000 miles
 $(p+w) 5 = 3000$

② speed against wind times hours is 3000 miles
 $(p-w) 6 = 3000$

$$\begin{array}{r} 5p+5w=3000 \times 6 \quad 30p+30w=18000 \\ 6p-6w=3000 \times 5 \quad + (30p-30w=15000) \\ \hline 60p = 33,000 \quad p=550 \end{array}$$

$(550+w) 5 = 3000$ Plane speed is 550 mph
 $550+w = 600$ Wind speed is 50 mph
 $w = 50$

Identify each system as Independent, Dependent, or Inconsistent.

$$\begin{array}{r} 3 \times (3x-4y=11) \\ 9x-12y=37 \\ -(9x-12y=33) \\ \hline 0-0=4 \\ \text{False} \\ \text{Inconsistent} \end{array}$$

$$\begin{array}{r} q-2r=11 \\ -(2q-2r=4) \\ \hline -q=7 \end{array}$$

Independent

$$\begin{array}{r} 6m-2n=-14 \\ n=3m+7 \\ \text{Substitute} \end{array}$$

$$\begin{array}{r} 6m-2(3m+7)=-14 \\ 6m-6m-14=-14 \\ -14=-14 \\ \text{True} \\ \text{Dependent} \end{array}$$

$$\begin{array}{r} i-4j=73 \\ -(i-4j=37) \\ \hline 0-0=36 \\ \text{False} \end{array}$$

Inconsistent