CHAPTER

6 Percent

Solve. Show your work.

1. Evan listens to music on his MP3 player while doing his chores. When he first turns on his MP3 player, it has $\frac{3}{5}$ of its battery life left. When Evan finishes the chores, it has 35% of its battery life left. How much time does Evan spend doing chores if his MP3 player has 2 hours of battery life when fully charged?

2. Maya goes to the mall to buy shoes. The shoes that she wants usually cost $42, but they are on sale for 40% less. There is a 5% sales tax, and Maya pays for the shoes with a $50 bill. How much change does Maya receive?

3. Quality Cleaners decides to raise the price of dry cleaning a vest from $5 to $6. The same percent increase is applied to dry cleaning a dress. The old cost of dry cleaning a dress is $12. What is the new cost of dry cleaning a dress?

4. At a fitness center, the number of male members increases by 20% to 96 and the number of female members decreases by 30% to 84. Find the overall increase or decrease in the total number of members.

5. The amount of sales at a toy store increases by 30% from May to June and decreases by 10% from June to July. The difference in the amount of sales between May and July is $7,650. What is the difference in the amount of sales between June and July?

6. Of the animals on a farm, 60% are cows and the rest are sheep. When 260 more cows and sheep are added to the farm, the percent of cows increases by 20% and the number of sheep doubles. Find the number of sheep originally on the farm.

7. Tom has 2,000 plants at his plant nursery. Of these plants, 65% are orchids and the rest are roses. After he sells some orchids and buys more roses, 45% of all the plants at his nursery are orchids. Given that Tom buys 125 roses, how many orchids does he sell?

8. Of the people at a park, 60% are men and 75% of the women wear jeans. The number of men is 140 more than the number of women who do not wear jeans. After more women come to the park, 65% of the people at the park are women. How many more women come to the park?

9. Brain @ Work

The perimeter of Square P is 20% less than the perimeter of Square Q.
The sum of the perimeters of the two squares is 54 centimeters.
What percent of the area of Square Q is the area of Square P?

10. Brain @ Work

Piper wants to invest $10,000 for two years. The savings plans of ABC Bank
and XYZ Bank are shown below. The interest received at the end of the first
year will be added to the $10,000 to calculate the interest received at the
end of the second year. Which bank pays more interest in total over two
years? How much more?

ABC Bank	XYZ Bank
2 Year Savings Plan	2 Year Savings Plan
6.1% interest for 1st year 4.2% interest for 2nd year	5.2% interest per year

Chapter 6

1. 2 h = 120 min

$\dfrac{3}{5} \times 120$ min = 72 min

35% × 120 min = $\dfrac{35}{100} \times 120$ min

= 42 min

72 min − 42 min = 30 min

Evan does chores for 30 minutes.

2. 100% − 40% = 60%

60% × $42 = $\dfrac{60}{100} \times \$42$

= $25.20

5% × $25.20 = $\dfrac{5}{100} \times \$25.20$

= $1.26

$25.20 + $1.26 = $26.46

$50.00 − $26.46 = $23.54

Maya receives $23.54 in change.

3. $6 − $5 = $1

$\dfrac{1}{5} \times 100\% = 20\%$

20% × $12 = $\dfrac{20}{100} \times \$12$

= $2.40

$12 + $2.40 = $14.40

The new cost of dry cleaning a dress is $14.40.

4. Male members:

100% + 20% = 120%

120% ➞ 96

1% ➞ $\dfrac{96}{120}$

100% ➞ $\dfrac{96}{120} \times 100 = 80$

Female members:

100% − 30% = 70%

70% ➞ 84

1% ➞ $\dfrac{84}{70}$

100% ➞ $\dfrac{84}{70} \times 100 = 120$

Male and female members:

80 + 120 = 200

96 + 84 = 180

200 − 180 = 20

There is an overall decrease of 20 members.

5.

May	June	July
100%	130%	90% × 130% = 117%

117% − 100% = 17%

130% − 117% = 13%

17% ➞ $7,650

1% ➞ $7,650 ÷ 17 = $450

13% ➞ 13 × $450 = $5,850

The difference in the amount of sales is $5,850.

6.

Animals	Cows	Sheep
Original	60%	40%
Increase	20% × 60% = 12%	40%
Final	72%	80%

12% + 40% = 52%

52% ➞ 260

1% ➞ 260 ÷ 52 = 5

40% ➞ 40 × 5 = 200

There were 200 sheep originally on the farm.

7. 65% × 2,000 = $\dfrac{65}{100} \times 2{,}000$

= 1,300

2,000 − 1,300 = 700

700 + 125 = 825

100% − 45% = 55%

55% ➞ 825

1% ➞ 825 ÷ 55 = 15

45% ➞ 45 × 15 = 675

1,300 − 675 = 625

He sells 625 orchids.

8. 75% × 40% = $\dfrac{75}{100} \times 40\%$

= 30%

40% − 30% = 10%

60% − 10% = 50%

50% ➞ 140

1% ➞ $\dfrac{140}{50}$

60% ➞ 60 × $\dfrac{140}{50}$ = 168

40% ➞ 40 × $\dfrac{140}{40}$ = 112

100% − 65% = 35%

$35\% \longrightarrow 168$

$1\% \longrightarrow \dfrac{168}{35}$

$65\% \longrightarrow 65 \times \dfrac{168}{35} = 312$

$312 - 112 = 200$

200 more women come to the park.

9. $100\% + 80\% = 180\%$

$180\% \longrightarrow 54$

$10\% \longrightarrow 54 \div 18 = 3$

Square	P	Q
Perimeter (cm)	$8 \times 3 = 24$	$10 \times 3 = 30$
Side Length (cm)	$24 \div 4 = 6$	$30 \div 4 = 7.5$
Area (cm²)	$6 \times 6 = 36$	7.5×7.5 $= 56.25$

$\dfrac{36}{56.25} \times 100\% = 64\%$

The area of Square P is 64% of the area of Square Q.

10. ABC Bank:

$6.1\% \times \$10,000 = \dfrac{6.1}{100} \times \$10,000$

$\qquad\qquad\qquad = \$610$

$\$10,000 + \$610 = \$10,610$

$4.2\% \times \$10,610 = \dfrac{4.2}{100} \times \$10,610$

$\qquad\qquad\qquad = \$445.62$

$\$610 + \$445.62 = \$1,055.62$

XYZ Bank:

$5.2\% \times \$10,000 = \dfrac{5.2}{100} \times \$10,000$

$\qquad\qquad\qquad = \$520$

$\$10,000 + \$520 = \$10,520$

$5.2\% \times \$10,520 = \dfrac{5.2}{100} \times \$10,520$

$\qquad\qquad\qquad = \$547.04$

$\$520 + \$547.04 = \$1,067.04$

$\$1,067.04 - \$1,055.62 = \$11.42$

XYZ Bank pays $11.42 more interest over two years.

1. a) $(n + 1) + (n + 3) = 2n + 4$

  b) $2n + 4 = 2(19) + 4$

$\qquad\qquad\quad = 42$

2. a) 54 days $\longrightarrow$ 12 workers

$\qquad$ 1 day $\longrightarrow 12 \times 54 = 648$ workers

$\qquad$ t days $\longrightarrow \dfrac{648}{t}$ workers

$\qquad$ The number of workers needed is $\dfrac{648}{t}$.

  b) $\dfrac{648}{t} = \dfrac{648}{36}$

$\qquad\quad = 18$

$\qquad$ $18 - 12 = 6$

$\qquad$ 6 more workers are needed.

3. Perimeter of *ABCD*

$= 4(a + 2)$

$= (4a + 8)$ in.

Perimeter of *PQRS*

$= 2(a + 5) + 2(a - 1)$

$= 2a + 10 + 2a - 2$

$= (4a + 8)$ in.

The perimeters of *ABCD* and *PQRS* are equal.

4. a)

Name	3 Years Ago	Present Day	2 Years' Time
Sharon	$8 + b$	$3 + 8 + b$ $= 11 + b$	
Nora	$2b - 1$	$3 + 2b - 1$ $= 2 + 2b$	
Lupe		$3b - 2$	$3b$

$11 + b + 2 + 2b + 3b - 2$

$= 6b + 11$

The present day sum of their ages is $(6b + 11)$ years.

  b) $11 + b = 11 + 6 = 17$

$\qquad$ Sharon is 17 years old.

$\qquad$ $2 + 2b = 2 + 2(6) = 14$

$\qquad$ Nora is 14 years old.

$\qquad$ $3b - 2 = 3(6) - 2 = 16$

$\qquad$ Lupe is 16 years old.

$\qquad$ Nora is the youngest.