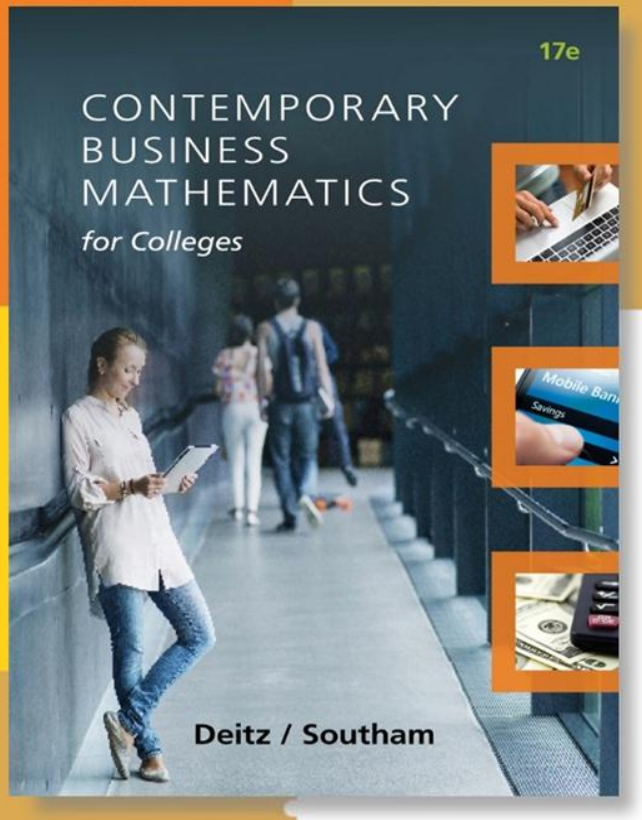

5

Percents

Prepared by Johnny Howard
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Learning Objectives

By studying this chapter and completing all assignments, you will be able to:

- Learning Objective 1 — Change percents to decimals.
- Learning Objective 2 — Change fractions and decimals to percents.
- Learning Objective 3 — Find Base, Rate, and Percentage.
- Learning Objective 4 — Use percents to measure increase and decrease.
- Learning Objective 5 — Use percents to allocate overhead expenses.

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STEPS to Change a Percent to a Decimal

1. If the percent has a fractional part, convert the fraction to its decimal equivalent.
2. Remove the percent symbol.
3. Move the decimal point two places to the left (insert zeros if needed).

Learning Objective 1

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EXAMPLE A

STEP 2 STEP 3

$45\% \longrightarrow 45 \longrightarrow .45. = 0.45$

EXAMPLE B

STEP 2 STEP 3

$175\% \longrightarrow 175 \longrightarrow 1.75. = 1.75$

EXAMPLE C

STEP 2 STEP 3

$4.5\% \longrightarrow 4.5 \longrightarrow .04.5 = 0.045$

EXAMPLE D

STEP 1 STEP 2 STEP 3

$1\frac{3}{4}\% = 1.75\% \longrightarrow 1.75 \longrightarrow .01.75 = 0.0175$

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STEPS to Change a Fraction or a Decimal to a Percent

1. If the number is a fraction, or a mixed number, convert it to its decimal equivalent.
2. Move the decimal point two places to the right (insert zeros if needed).
3. Write a percent symbol at the right end of the new number.

Learning Objective 2

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EXAMPLE E

STEP 1 STEP 2 STEP 3

$\frac{4}{5} = 0.8 \longrightarrow 0.80. \longrightarrow 80\%$

EXAMPLE F

STEP 1 STEP 2 STEP 3

$1\frac{3}{8} = 1.375 \longrightarrow 1.37.5 \longrightarrow 137.5\%$

EXAMPLE G

STEP 2 STEP 3

$0.4 \longrightarrow 0.40. \longrightarrow 40\%$

EXAMPLE H

STEP 2 STEP 3

$1.1875 \longrightarrow 1.18.75 \longrightarrow 118.75\%$

EXAMPLE I

STEP 2 STEP 3

$2.5 \longrightarrow 2.50. \longrightarrow 250\%$

EXAMPLE J

STEP 2 STEP 3

$1 = 1. \longrightarrow 1.00. \longrightarrow 100\%$

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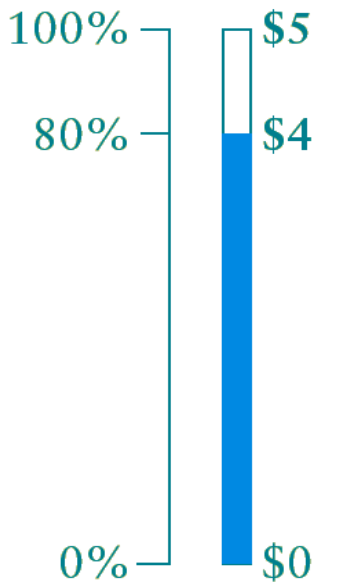
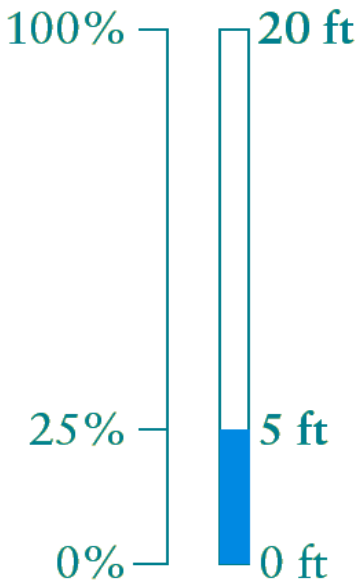
Figure 5.1 Finding Base, Rate, and Percentage



80% of $5 is $4

EXAMPLE K

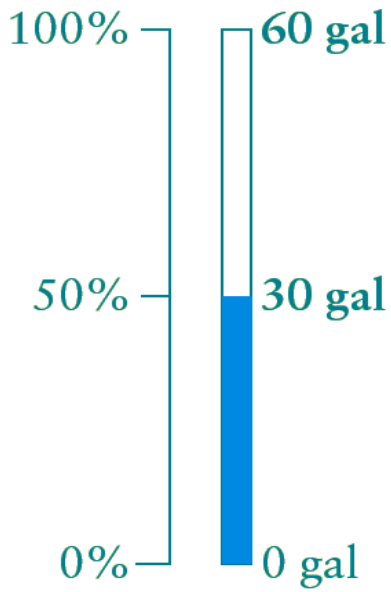
80% of $5 = $4
80% is the Rate
$5 is the Base
$4 is the Percentage



25% of 20 ft is 5 ft

EXAMPLE L

25% of 20 ft = 5 ft
25% is the Rate
20 ft is the Base
5 ft is the Percentage



50% of 60 gal is 30 gal

EXAMPLE M

50% of 60 gal = 30 gal
50% is the Rate
60 gal is the Base
30 gal is the Percentage

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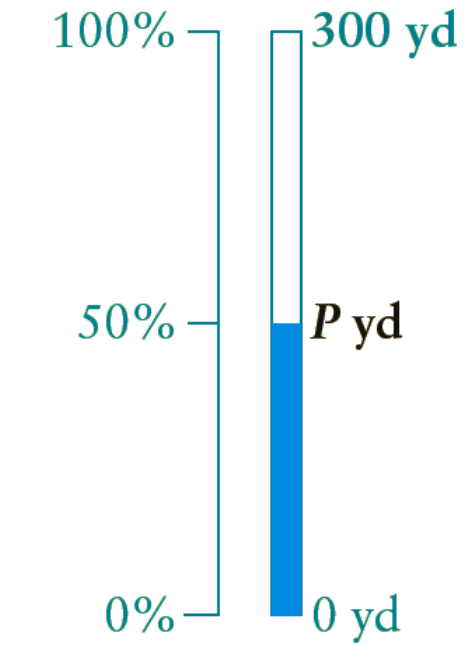
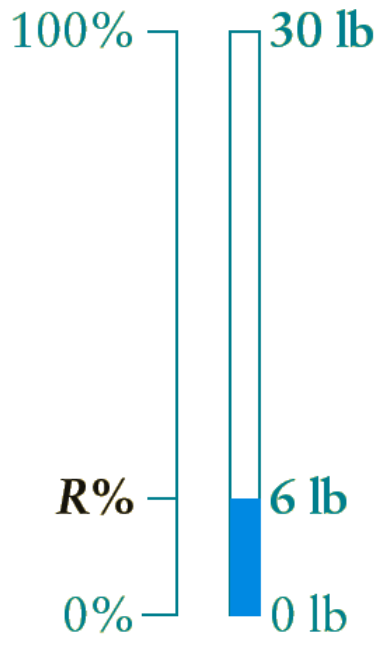
Figure 5.2 Finding Base, Rate, and Percentage



50% of 300 yd is P yd

EXAMPLE N

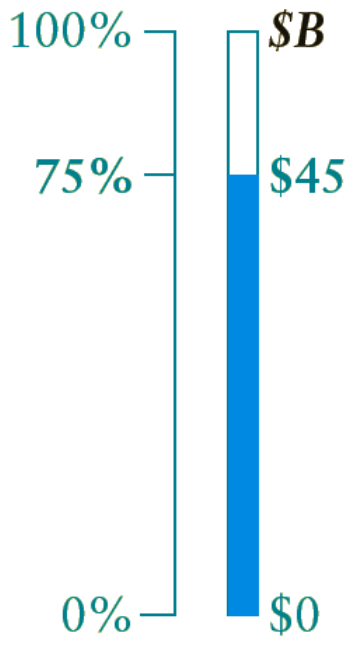
Find P when
$R = 50\%$ and $B = 300$ yd



$R\%$ of 30 lb is 6 lb

EXAMPLE O

Find R when
$B = 30$ lb and $P = 6$ lb



75% of $\$B$ is \$45

EXAMPLE P

Find B when
$P = \$45$ and $R = 75\%$

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EXAMPLE Q

Lena Hoover is a financial analyst. In December, she received a $600 bonus, which equaled 15% of her monthly salary. What was her monthly salary?

P = amount of bonus = $600
R = rate of bonus = 15%
B = monthly salary = ?
As $P \div R = B$,
$P \div R$ = $600 ÷ 15% = $600 ÷ 0.15 = $4,000 monthly salary

EXAMPLE R

Last year Empire Bakery had total expenses of $300,000. Of that total, $210,000 was the expense for employee salaries. Last year at Empire, the employee salary expense was what percent of total expenses?

P = employee salaries = $210,000
R = ?
B = total expenses = $300,000
Since $P \div B = R$,
$P \div B$ = $210,000 ÷ $300,000 = 0.70 = 70%

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STEPS to Compute the Amount and Rate (Increase or Decrease) of Change

1. Calculate the amount (*P*) of increase or decrease. (*P* = *Current* – *Base*)
2. Calculate the rate (*R*) of change (increase or decrease): *R* = *P* ÷ *B*

Learning Objective 4

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EXAMPLE S

Find the number of additional homes (P) that Joslin Realty sold this year.

$B = 135$ and $R = 40\%$. Since $P = R \times B$,

$P = 40\% \times 135 = 0.40 \times 135 = 54$ more homes this year

EXAMPLE T

Find the number of homes that Rossi & Shanley Real Estate sold last year (B).

$P = 25$ and $R = 20\%$. Since $B = P \div R$,

$B = 25 \div 20\% = 25 \div 0.20 = 125$ homes sold last year

EXAMPLE U

Find Silvia Jiminez' rate of decrease (R) from last year's sales.

$P = 5$ and $B = 40$. Since $R = P \div B$,

$R = 5 \div 40 = 0.125 = 12.5\%$ decrease

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STEPS to Allocate an Overhead Expense Based on Total Floor Space (or Some Other Measurement)

1. Find the total square feet of floor space.
2. Divide the floor space of each department by total floor space, then change the quotients to percents.
3. Multiply each percent (in fractional or decimal form) by the total rent (or other overhead value).

Learning Objective 5

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EXAMPLE W

The total rent is $15,000.Using the floor space of each department as shown below, determine the amount of rent to allocate to each department of Cotton's.

STEP 1

Department	Floor Space
Women's	100 ft × 50 ft = 5,000 sq ft
Children's	50 ft × 60 ft = 3,000 sq ft
Men's	40 ft × 50 ft = 2,000 sq ft
	10,000 sq ft

STEP 2

Percent of Total
5,000 ÷ 10,000 = 50%
3,000 ÷ 10,000 = 30%
2,000 ÷ 10,000 = 20%

STEP 3

Distribution of Rent
0.5 × $15,000 = $ 7,500
0.3 × $15,000 = $ 4,500
0.2 × $15,000 = $ 3,000
$15,000

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Chapter Terms for Review

allocate
amount of decrease
amount of increase
Base (*B*)
overhead costs
percent
Percentage (*P*)
Rate (*R*)
rate of decrease
rate of increase

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Assignment 5.1: Base, Rate, and Percentage

A **Change the percents to decimals. Change the nonpercents to percents.**

1. $31\% = 0.31$
   $\underbrace{31\%}$
2. $100\% = 1$
   $\underbrace{100\%}$
3. $3\frac{1}{3}\% = 0.0333$
   $\underbrace{03\frac{1}{3}\%}$
4. $0.63 = 63\%$
   $\underbrace{0.63}$
5. $3 = 300\%$
   $\underbrace{3.00}$
6. $33\frac{2}{3}\% = 0.3367$
   $\underbrace{33\frac{2}{3}\%}$
7. $0.15 = 15\%$
   $\underbrace{0.15}$
8. $0.8 = 80\%$
   $\underbrace{0.80}$
9. $1\frac{3}{4} = 175\%$
   $\underbrace{1\frac{3}{4} = 1.75}$
10. $0.7\% = 0.007$
    $\underbrace{00.7\%}$
11. $224.5\% = 2.245$
    $\underbrace{224.5\%}$
12. $0.004\% = 0.00004$
    $\underbrace{00.004\%}$
13. $0.52 = 52\%$
    $\underbrace{0.52}$
14. $2\frac{1}{4}\% = 0.0225$
    $\underbrace{02\frac{1}{4}\%}$
15. $0.08\frac{1}{4} = 8.25\%$
    $\underbrace{0.0825}$
16. $\frac{3}{8} = 37.5\%$
    $\underbrace{\frac{3}{8} = 0.375}$
17. $4.0 = 400\%$
    $\underbrace{4.00}$
18. $0.000025 = 0.0025\%$
    $\underbrace{0.000025}$
19. $0.01\% = 0.0001$
    $\underbrace{00.01\%}$
20. $1{,}200\% = 12$
    $\underbrace{1200\%}$

Learning Objectives 1 2 3

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Assignment 5.1: Base, Rate, and Percentage

B **In the following problems, find each Percentage amount.**

21. 0.375% of 56 = 0.21
0.00375 × 56

22. 7.5% of 1,200 = 90
0.075 × 1,200

23. 100% of 11.17 = 11.17
1 × 11.17

24. 62.5% of 64 = 40
0.625 × 64

25. 40% of 0.85 = 0.34
0.40 × 0.85

26. $\frac{1}{2}$% of 8,000 = 40
0.005 × 8,000

27. 25% of $1.16 = $0.29
0.25 × $1.16

28. 150% of $84 = $126
1.5 × $84

29. 2.5% of $66 = $1.65
0.025 × $66

30. 12.5% of $160 = $20
0.125 × $160

31. 8% of 200 = 16
0.08 × 200

32. 50% of 0.36 = 0.18
0.5 × 0.36

33. 187.5% of 40 = 75
1.875 × 40

34. $3\frac{1}{2}$% of $600 = $21
0.035 × $600

35. 0.2% of 480 = 0.96
0.002 × 480

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Assignment 5.1: Base, Rate, and Percentage

C **In each of the following problems, find the Percentage amount, the Rate, or the Base amount. Write rates as percents. Round dollars to the nearest cent.**

(*R*) (*B*) (*P*)

36. 35% of $200 = $70

$70 ÷ 0.35 = 200

37. 20% of $35 = $7

$7 ÷ $35 = 0.20

38. 125% of 1.12 = 1.4

1.4 ÷ 1.12 = 1.25

39. 200% of 14.2 = 28.4

28.4 ÷ 14.2 = 2.00

40. 2.5% of 600 = 15

15 ÷ 600 = 0.025

41. 80% of $1.20 = $0.96

$0.96 ÷ 0.80 = 1.20

42. 3.75% of 720 = 27

27 ÷ 0.0375 = 720

43. 150% of 80 = 120

120 ÷ 80 = 1.50

44. 15% of 0.092 = 0.0138

0.0138 ÷ 0.092 = 0.15

45. 175% of $48 = $84

$84 ÷ 1.75 = 48

46. 2.5% of $2,820 = $70.50

0.025 × $2,820 = 70.50

47. 0.25% of $8,000 = $20

$20 ÷ 0.0025 = 8,000

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Assignment 5.1: Base, Rate, and Percentage

C

48. 45% of \$128 = \$57.60

\$57.60 ÷ \$128 = 0.45

49. 62.5% of 56 = 35

35 ÷ 0.625 = 56

50. 0.025% of \$16,400 = \$4.10

0.00025 × \$16,400 = 4.10

51. 140% of 480 = 672

672 ÷ 1.4 = 480

52. 200% of \$37.50 = \$75

\$75 ÷ 2 = 37.50

53. 40% of 5.4 = 2.16

2.16 ÷ 5.4 = 0.40

54. 680% of \$1,480 = \$10,064

\$10,064 ÷ \$1,480 = 6.80

55. 15% of \$140 = \$21.00

0.15 × \$140 = 21

56. 110% of \$200 = \$220

1.10 × \$200 = 220

57. 160% of 85 = 136

136 ÷ 85 = 1.60

58. $1\frac{1}{4}$% of \$660 = \$8.25

\$8.25 ÷ .0125 = 660

59. 12% of 25 = 3

3 ÷ 0.12 = 25

60. 31% of 400 = 124

124 ÷ 400 = 0.31

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Assignment 5.2: Rate of Increase and Rate of Decrease

A **Calculate the missing values.**

1. Decreasing the base value of 280 by 25% gives the new value 210.

$0.25 \times 280 = 70$

$280 - 70 = 210$

2. Increasing the base value of 240 by 40% gives the new value 336.

$0.40 \times 240 = 96$

$240 + 96 = 336$

3. Start with 75, decrease it by 60%, and end up with 30.

$0.60 \times 75 = 45$

$75 - 45 = 30$

4. Start with 96, increase it by 15%, and end up with 110.4.

$0.15 \times 96 = 14.4$

$96 + 14.4 = 110.4$

5. Sales were \$8,000 last month and increased by 4% this month. Sales were \$8,320 this month.

$0.04 \times \$8{,}000 = \$320$

$\$8{,}000 + \$320 = \$8{,}320$

6. Profits were \$72,600 last month, but decreased by 5% this month. Profits were \$68,970 this month.

$0.05 \times \$72{,}600 = \$3{,}630$

$\$72{,}600 - \$3{,}630 = \$68{,}970$

7. Base value = 272; increase = 100%; new (final) value = 544

$1.00 \times 272 = 272$

$272 + 272 = 544$

8. Base value = 240; decrease = 50%; new (final) value = 120

$0.50 \times 240 = 120$

$240 - 120 = 120$

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Assignment 5.2: Rate of Increase and Rate of Decrease

A **Calculate the missing values. (cont'd)**

9. A $17 increase is 10% of the base value of $170.

$17 ÷ 0.10 = $170

10. A decrease of 60 units is 25% of the base value of 240 units.

60 ÷ 0.25 = 240

11. The price decreased from $450 to $378; the percent decrease was 16%.

$450 − $378 = $72

$72 ÷ $450 = 0.16

12. Production increased from 8,000 units to 10,400 units; the percent increase was 30%.

10,400 − 8,000 = 2,400 increase

2,400 ÷ 8,000 = 0.30

13. $300 is what percent less than $400? 25%

$400 − $300 = $100

$100 ÷ $400 = 0.25

14. 480 is what percent greater than 160? 200%

480 − 160 = 320

320 ÷ 160 = 2.00

15. Sales were $500,000 in June but only $400,000 in July. The rate of decrease was 20%.

$500,000 − $400,000 = $100,000

$100,000 ÷ $500,000 = 0.20

16. Profits were $10,368 last month and $9,600 the previous month. The rate of increase was 8%.

$10,368 − $9,600 = $768

$768 ÷ $9,600 = 0.08

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Assignment 5.2: Rate of Increase and Rate of Decrease

B **The following table shows the volumes of various items sold by Clyde's Auto Parts during the past two years. Compute the amount of change and the rate of change between this year and last year. Compute the rates to the nearest tenth of a percent. If the amount and rate are increases, write a + in front of them; if they are decreases, enclose them in parentheses ().**

Clyde's Auto Parts
Volume Sold (number of units)

	Description of Item	This Year	Last Year	Amount of Change	Rate of Change
17.	Batteries	516	541	(25)	(4.6%)
18.	Brake fluid (pints)	1,504	1,747	(243)	(13.9%)
19.	Coolant (gallons)	2,045	1,815	+230	+12.7%
20.	Headlight lamps	5,829	5,294	+535	+10.1%
21.	Oil (quarts)	13,428	14,746	(1,318)	(8.9%)
22.	Mufflers	709	813	(104)	(12.8%)
23.	Shock absorbers	1,224	1,068	+156	+14.6%
24.	Tires, auto	6,742	5,866	+876	+14.9%
25.	Tires, truck	2,115	1,805	+310	+17.2%
26.	Wiper blades	2,472	2,238	+234	+10.5%

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Assignment 5.2: Rate of Increase and Rate of Decrease

C **During May and June, Kalman's Paint Store had sales in the amounts shown in the following table. Compute the amount of change and the rate of change between May and June. Compute the rates of change to the nearest tenth of a percent. If the amount and rate are increases, write a + in front of them; if they are decreases, enclose them in parentheses ().**

Kalman's Paint Store
Volume Sold (in dollars)

	Description of Item	June	May	Amount of Change	Rate of Change
27.	Brush, 2″ wide	$ 611.14	$ 674.67	($63.53)	(9.4%)
28.	Brush, 3″ wide	581.92	617.15	(35.23)	(5.7%)
29.	Brush, 4″ wide	429.87	374.27	+55.60	+14.9%
30.	Drop cloth, 9 × 12	143.50	175.66	(32.16)	(18.3%)
31.	Drop cloth, 12 × 15	174.29	151.55	+22.74	+15.0%
32.	Paint, latex (gal)	48,756.16	46,209.61	+2,546.55	+5.5%
33.	Paint, latex (qt)	5,072.35	4,878.96	+193.39	+4.0%
34.	Paint, oil (gal)	7,308.44	7,564.27	(255.83)	(3.4%)
35.	Paint, oil (qt)	4,724.68	4,465.67	+259.01	+5.8%
36.	Paint scraper	97.52	127.09	(29.57)	(23.3%)

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Assignment 5.3: Business Applications

A **Solve the following problems. Round dollar amounts to the nearest cent. Round other amounts to the nearest tenth. Write rates as percents to the nearest tenth of a percent.**

1. Horton Mfg. shipped 5,500 portable generators in May. Clients eventually returned 4% of the generators. How many of the generators shipped in May were eventually returned? 220
   $P = R \times B = 0.04 \times 5{,}500 = 220$
2. Julie Horton, CEO of Horton Mfg., wants the company to reduce the percent of generators that customers return. In June, the company shipped 6,400 generators, and 144 were eventually returned. What percent of the June shipment was eventually returned? 2.25%
   $R = P \div B = 144 \div 6{,}400 = 0.0225$ or 2.25%
3. By July of the following year, Horton Mfg. had reduced the percent of generators returned to 2% of the number shipped. If 130 generators were returned from that month's shipment, how many had been shipped? 6,500
   $B = P \div R = 130 \div 0.02 = 6{,}500$
4. A European food importer, Mateski Products, imports 25% of its vinegars from France, 40% from Italy, and the rest from Spain. The total value of all the vinegars that it imports is $1,118,000. What is the value of the vinegars that are imported from Spain? $391,300
   $25\% + 40\% = 65\%$; $100\% - 65\% = 35\%$
   $P = R \times B = 0.35 \times \$1{,}118{,}000 = \$391{,}300$
5. Next year, Mateski is planning to import $462,000 worth of vinegars from France, $532,000 worth of vinegars from Italy, and $406,000 worth of vinegars from Spain. If next year's imports occur as currently being planned, what percent of the total imports will be from Italy? 38%
   $\$462{,}000 + \$532{,}000 + \$406{,}000 = \$1{,}400{,}000$
   $R = P \div B = \$532{,}000 \div \$1{,}400{,}000 = 0.38$, or 38%

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Assignment 5.3: Business Applications

A **Solve the following problems. Round dollar amounts to the nearest cent. Round other amounts to the nearest tenth. Write rates as percents to the nearest tenth of a percent.**

6. Rigik Parka Products, Inc., manufactures only parkas for adults and children. Last year, Rigik manufactured all its children's parkas in Asia. Those children's parkas represented 35% of all the Rigik production. If the company made a total of 240,000 parkas, how many children's parkas did it produce? 84,000

$P = R \times B = 0.35 \times 240{,}000 = 84{,}000$

7. This year, Rigik again plans to manufacture all its children's parkas in Asia, and Rigik will expand the children's product line to 40% of the total number of parkas produced. If Rigik plans to produce 112,000 children's parkas, how many parkas does the company plan to produce in total? 280,000

$B = P \div R = 112{,}000 \div 0.40 = 280{,}000$

8. Next year, Rigik plans to keep the percent of children's parkas at 40% but increase the number of children's parkas produced to 136,000. How many parkas does the company plan to produce for adults? (*Hint:* First you need to calculate the total number of all parkas to be produced next year.) 204,000

$B = P \div R = 136{,}000 \div 0.40 = 340{,}000$ total

$340{,}000 - 136{,}000 = 204{,}000$ for adults

9. Ricardo Castíllo is a single father. He tries to save 15% of his monthly salary for his son's education. In August, Ricardo's salary was \$4,800. How much should he save to meet his objective? \$720

$P = R \times B = 0.15 \times \$4{,}800 = \$720$

10. In September, Ricardo Castíllo got a promotion and a raise. Because his monthly expenses did not increase very much, Ricardo was able to save more dollars. He saved \$1,120, which was 20% of his new salary. How much was Ricardo's new salary? \$5,600

$B = P \div R = \$1{,}120 \div 0.20 = \$5{,}600$

Score for A (50)

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Assignment 5.3: Business Applications

B **Solve the following problems. Round dollar amounts to the nearest cent. Round other amounts to the nearest tenth. Write rates as percents to the nearest tenth of a percent.**

11. Norman Brewer, a paralegal, will receive a 4% salary increase this month. Hence he will receive $130 more salary this month than he received last month. What was Norman's salary last month? $3,250

$B = P \div R = \$130 \div 0.04 = \$3,250$

12. Roberta Coke works in the marketing research department of a soft-drink company. Yesterday Roberta received a raise of $430 per month. Roberta now earns 8% more than she did before the raise. How much does she earn now? $5,805

$B = P \div R = \$430 \div 0.08 = \$5,375$ former salary

$\$5,375 + \$430 = \$5,805$ new salary

13. A farmers' market is held downtown every Saturday. The volume has been increasing by about 3% every week. If the volume was $51,400 this week, what should the volume be next week? $52,942

$P = R \times B = 0.03 \times \$51,400 = \$1,542$

$\$51,400 + \$1,542 = \$52,942$

14. Marcia Almeida works as a sales analyst for a toy manufacturer. She predicts that toy sales will decrease by 5% from May to June. If the amount of the sales decrease is $175,000, what level of sales is she predicting for June? $3,325,000

$B = P \div R = \$175,000 \div 0.05 = \$3,500,000$ sales in May

$\$3,500,000 - \$175,000 = \$3,325,000$ sales in June

15. Last month, Fred Gerhardt started working as an apprentice machinist. One of his first projects was to reduce the diameter of a metal shaft from 0.180 inch to 0.162 inch. By what percent did he reduce the diameter of the shaft? 10%

$0.180 \text{ in.} - 0.162 \text{ in.} = 0.018 \text{ in.}$ decrease

$R = P \div B = 0.018 \text{ in.} \div 0.180 \text{ in.} = 0.10$, or 10%

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Assignment 5.3: Business Applications

B **(cont'd)**

16. Judy Gregory, a production engineer, was able to increase the efficiency of a manufacturing facility. By doing so, she decreased the cost to manufacture of a commercial quality lawn mower by $18, which was 15% of the former cost. What will be the new reduced cost to manufacture the lawn mower? $102

$B = P \div R = \$18 \div 0.15 = \$120$ former cost

$\$120 - \$18$ decrease $= \$102$ new cost

17. Richard Phipps is the purchasing manager for a janitorial service. He orders all the supplies used by his company. Because of new contracts to clean three new office buildings, Richard ordered an additional $5,000 worth of supplies this month. This was an 8% increase from last month. What was the value of the supplies that Richard ordered last month? $62,500

$B = P \div R = \$5{,}000 \div 0.08 = \$62{,}500$

18. Grace Yasui owns a gift shop that had sales of $210,000 in October. Because of the Thanksgiving and Christmas holiday seasons, Grace predicts that the shop will have a 125% increase in sales in November. What total sales is Grace predicting for November? $472,500

$P = R \times B = 1.25 \times \$210{,}000 = \$262{,}500$

$\$210{,}000 + \$262{,}500 = \$472{,}500$

19. Suppose that Yasui's Gift Shop had sales of $235,000 in October and then doubled its sales in November to $470,000. What would be the percent increase for November over October? 100%

$B = \$235{,}000$ in October; $P =$ increase $=$ additional $235,000 in November

$R = P \div B = \$235{,}000 \div \$235{,}000 = 1.0$, or 100% increase

Note: Remind students that doubling the base is always a 100% increase.

20. Because of Father's Day, Melvin's Men's Wear had sales of $470,000 in June. Sales decreased by $235,000 in July. What was the percent decrease in Melvin's sales in July? 50%

$R = P \div B = \$235{,}000 \div \$470{,}000 = 0.50$, or 50%

Note: Remind students that problems like 19 and 20, which have the same dollar amounts, have different rates because the bases are opposite.

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Assignment 5.4: Allocation of Overhead

A **Complete the square feet, percent, and distribution columns below. Round percents to the nearest whole number.**

1. Gerry Sher owns small restaurants in four different towns: (a) Alleghany, (b) Delwood, (c) Bangor, and (d) Lakeside. She manages all four restaurants from a central office that she maintains at the Alleghany restaurant. Monthly office expenses are allocated among the four restaurants based on the floor space of each. In the following table, complete the allocation table for monthly expenses of $15,000.

Store	Space Occupied	Square Feet	Percent of Total	Allocation of Expense
(a) Alleghany	40 ft × 30 ft	1,200	16%	$ 2,400
(b) Delwood	40 ft × 45 ft	1,800	24%	3,600
(c) Bangor	70 ft × 30 ft	2,100	28%	4,200
(d) Lakeside	60 ft × 40 ft	2,400	32%	4,800
Total		7,500	100%	$15,000

(a) $\frac{1,200}{7,500} = 0.16; 0.16 \times \$15,000 = \$2,400$

(b) $\frac{1,800}{7,500} = 0.24; 0.24 \times \$15,000 = \$3,600$

(c) $\frac{2,100}{7,500} = 0.28; 0.28 \times \$15,000 = \$4,200$

(d) $\frac{2,400}{7,500} = 0.32; 0.32 \times \$15,000 = \$4,800$

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Assignment 5.4: Allocation of Overhead

B **Complete the percent and distribution columns in the following table. Before computing the distribution, round each percent to the nearest whole number.**

2. Diane Thrift owns a personnel services company that provides temporary employees in four employment categories: (a) office/clerical; (b) hotel/motel; (c) restaurant/dining; and (d) hospital/medical. Ms. Thrift has organized her company into four departments, one for each category. The lease expense for her company office space is $8,500 per month. She allocates the monthly lease expense among the four departments based on the number of temporary employees in each business category. Calculate the percents and the resulting allocations.

Department	Number of Employees	Percent of Total	Allocation of Rent
(a) Office/clerical	136	34%	$2,890
(b) Hotel/motel	72	18%	1,530
(c) Restaurant/dining	104	26%	2,210
(d) Hospital/medical	88	22%	1,870
Total	400	100%	$8,500

(a) $\frac{136}{400} = 0.34; 0.34 \times \$8{,}500 = \$2{,}890$

(b) $\frac{72}{400} = 0.18; 0.18 \times \$8{,}500 = \$1{,}530$

(c) $\frac{104}{400} = 0.26; 0.26 \times \$8{,}500 = \$2{,}210$

(d) $\frac{88}{400} = 0.22; 0.22 \times \$8{,}500 = \$1{,}870$

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Assignment 5.4: Allocation of Overhead

C **The following situations provide practice in allocating monthly overhead expenses at a central office. From the information given in the following table, complete the allocations indicated in problems 3 through 6. Remember: Answers for each problem should sum to the total monthly overhead expense.**

Monthly Overhead Expense	Total Expense	Basis of Allocation	Location				
			East	West	North	South	TOTAL
Insurance	$39,000	Square feet	23,040	11,520	17,280	20,160	72,000
Utilities	27,000	Machine hours worked	38,400	14,400	24,000	19,200	96,000
Rent	33,000	Units produced	12,240	9,360	6,840	7,560	36,000
Maintenance	30,000	Number of employees	126	90	36	108	360

3. Allocate insurance expense based on the number of square feet at each location.

East $12,480; West $6,240; North $9,360; South $10,920

$\frac{23,040}{72,000} = 0.32$ $\frac{11,520}{72,000} = 0.16$ $\frac{17,280}{72,000} = 0.24$ $\frac{20,160}{72,000} = 0.28$

$0.32 \times \$39,000$ $0.16 \times \$39,000$ $0.24 \times \$39,000$ $0.28 \times \$39,000$

Check.

$12,480
6,240
9,360
+10,920
$39,000$

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Assignment 5.4: Allocation of Overhead

C

4. Allocate utilities expense based on the number of machine hours worked in each location.

East $10,800; West $4,050; North $6,750; South $5,400

$\frac{38,400}{96,000} = 0.40$ $\frac{14,400}{96,000} = 0.15$ $\frac{24,000}{96,000} = 0.25$ $\frac{19,200}{96,000} = 0.20$

$0.40 \times \$27,000$ $0.15 \times \$27,000$ $0.25 \times \$27,000$ $0.20 \times \$27,000$

Check.

$10,800
4,050
6,750
+5,400
$27,000

5. Allocate rent expense based on the units produced at each location.

East $11,220; West $8,580; North $6,270; South $6,930

$\frac{12,240}{36,000} = 0.34$ $\frac{9,360}{36,000} = 0.26$ $\frac{6,840}{36,000} = 0.19$ $\frac{7,560}{36,000} = 0.21$

$0.34 \times \$33,000$ $0.26 \times \$33,000$ $0.19 \times \$33,000$ $0.21 \times \$33,000$

Check.

$11,220
8,580
6,270
+6,930
$33,000

6. Allocate maintenance expense based on the number of employees at each location.

East $10,500; West $7,500; North $3,000; South $9,000

$\frac{126}{360} = 0.35$ $\frac{90}{360} = 0.25$ $\frac{36}{360} = 0.10$ $\frac{108}{360} = 0.30$

$0.35 \times \$30,000$ $0.25 \times \$30,000$ $0.10 \times \$30,000$ $0.30 \times \$30,000$

Check.

$10,500
7,500
3,000
+9,000
$30,000

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