

Section 6.3 Applications of Sales Tax, Commission, Discount, Markup, and Percent Increase and Decrease

Section 6.3 Practice Exercises

$$1.(a) \left(\frac{\text{Sales tax}}{\text{tax rate}} \right) = \left(\frac{\text{Sales}}{\text{tax rate}} \right) \left(\frac{\text{Cost of merchandise}}{\text{merchandise}} \right)$$

$$(b) (\text{Commission}) = \left(\frac{\text{Commission rate}}{\text{rate}} \right) \left(\frac{\text{Total sales}}{\text{sales}} \right)$$

$$(c) (\text{Discount}) = \left(\frac{\text{Discount rate}}{\text{rate}} \right) \left(\frac{\text{Original price}}{\text{price}} \right)$$

$$(d) (\text{Markup}) = \left(\frac{\text{Markup rate}}{\text{rate}} \right) \left(\frac{\text{Original price}}{\text{price}} \right)$$

$$(e) \left(\frac{\text{Percent Increase}}{\text{Increase}} \right) = \left(\frac{\text{Amount of increase}}{\text{Original amount}} \right) \times 100\%$$

$$(f) \left(\frac{\text{Percent Decrease}}{\text{Decrease}} \right) = \left(\frac{\text{Amount of decrease}}{\text{Original amount}} \right) \times 100\%$$

3. 12

5. 40

7. Let x represent the number.

$$52 = (0.002)x$$

$$\frac{52}{0.002} = \frac{0.002x}{0.002}$$

$$26,000 = x$$

9. Let x represent the percent.

$$\frac{x}{100} = \frac{6}{25}$$

$$25x = (100)(6)$$

$$25x = 600$$

$$\frac{25x}{25} = \frac{600}{25}$$

$$x = 24$$

$$24\%$$

11. Let x represent the amount.

$$x = (0.016)(550)$$

$$x = 8.8$$

13.(a) $(0.05)(\$20.00) = \1.00

$$\$20.00 + \$1.00 = \$21.00$$

$$(b) \frac{\$0.50}{\$12.50} = 0.04 \text{ or } 4\%$$

$$\$12.50 + \$0.50 = \$13.00$$

(c) Let x represent the cost.

$$\begin{aligned} \$2.75 &= (0.025)x \\ \frac{\$2.75}{0.025} &= \frac{0.025x}{0.025} \\ \$110.00 &= x \\ \$110.00 + \$2.75 &= \$112.75 \end{aligned}$$

(d) $\$58.30 - \$55.00 = \$3.30$

$$\frac{\$3.30}{\$55.00} = 0.06 = 6\%$$

15. Let x represent the amount of tax.

$$\begin{aligned} x &= (0.05)(68.25) \\ x &= 3.41 \\ 68.25 + 3.41 &= 71.66 \\ \text{The total bill is } &\$71.66. \end{aligned}$$

17. Let x represent the tax rate.

$$\begin{aligned} 16.80 &= x \cdot \$240.00 \\ \frac{16.80}{240.00} &= \frac{240.00x}{240.00} \\ 0.07 &= x \\ \text{The tax rate is } &7\%. \end{aligned}$$

19. Let x represent the price of the fruit basket.

$$\begin{aligned} 2.67 &= (0.06)x \\ \frac{2.67}{0.06} &= \frac{0.06x}{0.06} \\ 44.5 &= x \\ \text{The price is } &\$44.50. \end{aligned}$$

21.(a) $(0.05)(\$20,000.00) = \1000.00

(b) $\frac{\$10,000.00}{\$125,000.00} = 0.08$ or 8%

(c) Let x represent the total sales.

$$\begin{aligned} \$540.00 &= (0.10)x \\ \frac{\$540.00}{0.10} &= \frac{0.10x}{0.10} \\ \$5400.00 &= x \end{aligned}$$

23. Let x represent the amount of commission.

$$\begin{aligned} x &= (0.07)(\$48,000) \\ x &= \$3360 \\ \text{Zach made } &\$3360 \text{ in commission.} \end{aligned}$$

25. Let x represent the commission rate.

$$\begin{aligned} 300 &= x \cdot 2000 \\ \frac{300}{2000} &= \frac{2000x}{2000} \\ 0.15 &= x \end{aligned}$$

Rodney's commission rate is 15%.

27. Amount of commission

$$\begin{aligned} &= \$67,000 - \$25,000 \\ &= \$42,000 \end{aligned}$$

Let x represent total sales.

$$\begin{aligned} 42,000 &= 0.03x \\ \frac{42,000}{0.03} &= \frac{0.03x}{0.03} \\ 1,400,000 &= x \end{aligned}$$

Her sales were \$1,400,000.

29.(a) Discount = $(0.20)(\$56.00) = \11.20

$$\text{Sale price} = \$56.00 - \$11.20 = \$44.80$$

(b) Discount = $\$900 - \$600 = \$300$

$$\begin{aligned} (\text{rate})(\$900.00) &= \$300.00 \\ \text{rate} &= \frac{\$300.00}{\$900.00} \end{aligned}$$

$$= \frac{1}{3} \text{ or } 33\frac{1}{3}\%$$

(c) Original price = $\$76.50 + \$8.50 = \$85$

$$(\text{rate})(\$85.00) = \$8.50$$

$$\begin{aligned} \text{rate} &= \frac{\$8.50}{\$85.00} \\ &= 0.10 \text{ or } 10\% \end{aligned}$$

(d) $(0.50)(\text{original price}) = \38.00

$$\begin{aligned} \text{original price} &= \frac{\$38.00}{0.50} \\ &= \$76.00 \end{aligned}$$

$$\text{Sale price} = \$76.00 - \$38.00 = \$38.00$$

31.(a) Markup = $(0.05)(\$92.00) = \4.60

$$\text{Retail price} = \$92 + \$4.60 = \$96.60$$

(b) Markup = $\$118.80 - \$110.00 = \$8.80$

$$(\text{rate})(\$110.00) = \$8.80$$

$$\begin{aligned} \text{rate} &= \frac{\$8.80}{\$110.00} \\ &= 0.08 \text{ or } 8\% \end{aligned}$$

(c) Orig price = \$422.50 - \$97.50 = \$325

(rate)(\$325.00) = \$97.50

$$\text{rate} = \frac{\$97.50}{\$325.00}$$

= 0.30 or 30%

(d) (0.20)(original price) = \$9.00

$$\text{original price} = \frac{\$9.00}{0.20}$$

= \$45.00

Retail price = \$45 + \$9 = \$54

33. Let x represent the amount of discount.

$$x = (0.15)(\$5.60) = \$0.84$$

Sale price = \$5.60 - \$0.84 = \$4.76

The discounted lunch bill is \$4.76.

34.(a) Let x represent the amount of discount.

$$x = (0.10)(\$550) = \$55$$

The discount is \$55.

(b) Sale price = \$550 - \$55 = \$495

The discounted yearly membership will cost \$495.

35. Discount = \$60 - \$45 = \$15

Let x represent the discount rate.

$$(x)(\$60) = \$15$$

$$x = \frac{\$15}{\$60} = 0.25$$

The discount rate is 25%.

37.(a) Let x represent the amount of markup.

$$x = (0.18)(\$150.00) = \$27.00$$

The markup is \$27.00.

(b) Retail price = \$150.00 + \$27.00
= \$177.00

The retail price is \$177.00.

(c) Tax = (0.07)(\$177.00) = \$12.39

The total price is

$$\$177.00 + \$12.39 = \$189.39.$$

39. Markup amount = \$375 - \$300 = \$75

Let x represent the markup rate.

$$\$75 = (x)(\$300)$$

$$\frac{\$75}{\$300} = x$$

$$0.25 = x$$

The markup rate is 25%.

41. Let x represent the discount amount.

$$x = (0.30)(\$269) = \$80.70$$

sale price = \$269 - \$80.70 = \$188.30

The discount is \$80.70 and the sale price is \$188.30.

43. Original price = \$123.20 - \$43.20 = \$80.00

Let x represent the markup rate.

$$\$43.20 = (x)(\$80.00)$$

$$\frac{\$43.20}{\$80.00} = x$$

$$0.54 = x$$

The markup rate is 54%.

45. Let x represent the discount amount.

$$x = (0.10)(\$109.99) = \$11.00$$

Sale price = \$109.99 - \$11 = \$98.99

The discount is \$11.00, and the sale price is \$98.99.

47. \$60 - \$30

$$\frac{\$30}{\$60} \times 100\% = 1 \times 100\% = 100\%$$

c

49. Increase = 42,000 - 21,000 = 21,000

$$\begin{aligned} \text{Percent increase} &= \frac{21,000}{21,000} \times 100\% \\ &= 1 \times 100\% \\ &= 100\% \end{aligned}$$

51. Increase = 5500 - 5000 = 500

$$\begin{aligned} \text{Percent increase} &= \frac{500}{5000} \times 100\% \\ &= 0.10 \times 100\% \\ &= 10\% \end{aligned}$$

53. Increase = 45,000 - 42,000 = 3000

$$\begin{aligned} \text{Percent increase} &= \frac{3000}{42,000} \times 100\% \\ &\approx 0.07 \times 100\% \\ &\approx 7\% \end{aligned}$$

55. Decrease = 360,000 - 253,800 = 106,200

$$\begin{aligned}\text{Percent decrease} &= \frac{106,200}{360,000} \times 100\% \\ &\approx 0.295 \times 100\% \\ &= 29.5\%\end{aligned}$$

$$57. \text{ Decrease} = \$12.60 - \$11.97 = \$0.63$$

$$\begin{aligned}\text{Percent decrease} &= \frac{\$0.63}{\$12.60} \times 100\% \\ &= 0.05 \times 100\% \\ &= 5\%\end{aligned}$$

$$59. \text{ Decrease} = 5 - 1.6 = 3.4$$

$$\begin{aligned}\text{Percent decrease} &= \frac{3.4}{5} \times 100\% \\ &= 0.68 \times 100\% \\ &= 68\%\end{aligned}$$

$$61. \text{ Decrease} = 12 - 10.2 = 1.8$$

$$\begin{aligned}\text{Percent decrease} &= \frac{1.8}{12} \times 100\% \\ &= 0.15 \times 100\% \\ &= 15\%\end{aligned}$$

$$63.(\mathbf{a}) \text{ Retail price per ticket} = \frac{\$648}{4} = \$162$$

$$\text{Markup per ticket} = \$162 - \$113 = \$49$$

$$\begin{aligned}(\mathbf{b}) \text{ Markup rate} &= \frac{49}{113} \times 100\% \\ &= 0.4335 \times 100\% \\ &\approx 43.4\%\end{aligned}$$

$$65. \text{ Change} = 23.05 - 6.06 = \$16.99$$

$$\begin{aligned}\text{Percent increase} &= \frac{16.99}{6.06} \times 100\% \\ &\approx 2.804 \times 100\% \\ &\approx 280.4\%\end{aligned}$$

$$67. \text{ Change} = 132.45 - 118.37 = \$14.08$$

$$\begin{aligned}\text{Percent increase} &= \frac{14.08}{118.37} \times 100\% \\ &\approx 0.119 \times 100\% \\ &\approx 11.9\%\end{aligned}$$