

TOPIC 3 APPLYING PROPORTIONAL RELATIONSHIPS

END OF TOPIC TEST (FORM B)

Name _____ Date _____

- 1 A coat is on sale for 65% of the original price of \$58. Calculate the sale price.

$$\frac{65}{100}(58) = \frac{13}{20}(58)$$
$$= 37.7$$

The sale price is \$37.70.

➤ Solve each percent problem.

- 2 The \$149.99 cell phone Charmange purchased was on sale for 15% off. What amount did Charmange save?

$$\frac{15}{100} = \frac{x}{149.99}$$
$$100x = 2249.85$$
$$x = 22.4985$$

Charmange received \$22.50 off the original price.

- 3 An HDTV is normally \$949 but is discounted to \$499. What percent of the original price does Keenan pay?

$$\frac{x}{100} = \frac{499}{949}$$
$$949x = 49900$$
$$x \approx 52.58$$

Keenan pays approximately 53% of the original price.

- 4 LaDonna paid \$110 for a computer tablet that was 75% of the original price. What was the original price?

$$\frac{75}{100} = \frac{110}{x}$$
$$75x = 11000$$
$$\frac{75x}{75} = \frac{11000}{75}$$
$$x \approx 146.67$$

The original price was \$146.67.

- 5 Shoes that usually cost \$124.95 are on sale for \$87.46. What percent off are they?

$$\frac{x}{100} = \frac{87.46}{124.95}$$
$$124.95x = 8746 \quad \text{or}$$
$$x \approx 70$$

$$100\% - 70\% = 30\%$$

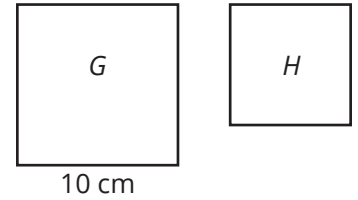
$$124.95 - 87.46 = 37.49$$

$$\frac{x}{100} = \frac{37.49}{124.95}$$
$$124.95x = 3749$$

$$x \approx 30\%$$

The shoes are approximately 30% off.

- 6 Consider the squares shown. Square G has a side length of 10 centimeters. Square H has a side length 20% smaller than Square G .



- a Determine the area of each square.

$$x = 10(0.2) = 2$$

The side length of Square H is $10 - 2 = 8$ centimeters.

$$A_H = 8 \times 8 = 64 \text{ square centimeters}$$

$$A_G = 10 \times 10 = 100 \text{ square centimeters}$$

- b Determine the percent decrease in area from Square G to Square H .

$$\frac{100 - 64}{100} = 0.36$$

The area of Square H has a decrease of 36% from the area of Square G .

- 7 Estimate a 15% tip for each bill shown.

- a \$49.60

Approximately \$7.50

- b \$134.82

Approximately \$20.25

- 8 The Movie Factory is an online DVD seller. When DVDs are purchased, the shipping fees are added to the price. The table shows how shipping fees are calculated.

Purchase Total	Shipping Fees
Less than \$25	5% of total
\$25-\$34.99	7% of total
\$35-\$49.99	8% of total
Greater than \$50	10% of total

Elisa bought 3 DVDs priced at \$19.75, \$12.49, and \$14.20.

- a Determine the shipping fees for Elisa's order.

$$19.75 + 12.49 + 14.20 = 46.44$$

$$x = 46.44(0.08) = 3.72$$

The shipping fees on Elisa's order are \$3.72.

- b What is Elisa's total cost including shipping?

$$46.44 + 3.72 = 50.16$$

Elisa's total cost is \$50.16.

9 Jared's monthly income is \$4500. Jared spends 11% of his monthly income on groceries.

a Calculate the amount Jared spends each month on groceries.

$$\$4500(0.11) = \$495$$

Jared spends \$495 on groceries each month.

b Jared spends \$185 each month on his car payment. What percent of his monthly income does Jared spend on his car payment?

$$\frac{\$185}{\$4500} \approx 0.041$$

Jared spends approximately 4.1% of his monthly income on his car payment.

10 Complete the table to show the interest earned for different savings principals, interest rates, and time periods.

Principal Amount Saved (in dollars)	Interest Rate	Time (in years)	Interest Earned (in dollars)
150	3%	4	18.00
275	5%	6	82.50
520	2%	3	31.20
350	4%	5	70.00

11 Electrical World marks up its prices to maximize profits. Complete the table to show the percent increase of each item. Round to the nearest whole percent, if necessary.

Item	Cost	Sells For	Difference	% Increase
Computer	\$650	\$793	\$143	22%
Digital Camera	\$139	\$187	\$48	35%
Tablet	\$215	\$258	\$43	20%
Mouse and Keyboard	\$48	\$87	\$39	81%

12 A computer depreciates about 18% each year. How much would a new computer depreciate the first year if it cost \$520?

$$(0.18)(520) = 93.6$$

A computer that costs \$520 would depreciate \$93.60 in the first year.

- 13 Products at a clothing store cost less when purchased online rather than in the store. The chart shows the in-store price and the online price.

In-Store Price	Online Price
\$60.00	\$48.00
\$84.00	\$67.20
\$113.00	\$90.40

- a Does the online price vary directly with the in-store price? Explain your reasoning.

The prices vary directly. The ratio of the online price to the in-store price is always 0.8, or 80%. Therefore, the ratios are equivalent, and there is a proportional relationship between the two prices.

- b Define the variables and write an equation to represent the relationship between the in-store price and the online price.

Let l represent the online price and let s represent the in-store price.

$$l = 0.8s$$

- c What is the constant of proportionality? Interpret the constant of proportionality for this problem situation.

The constant of proportionality is $k = 0.8$.

The 0.8 means that the online price is 80% of the in-store price.

- d What is the online price for a product that costs \$96 in the store?

$$l = 0.8s$$

$$l = 0.8(96)$$

$$l = \$76.80$$

A product that costs \$96 in the store costs \$76.80 online.

- e What is the percent markup for in-store products from online products?

$$\frac{60 - 48}{48} = 0.25$$

The in-store products are marked up 25% from the online products.

14 A realtor makes 6% commission on each sale.

- a Define the variables and write an equation to represent the relationship between the price of a home and the commission received.

Let p represent the cost of a home and let c represent the commission the realtor earns from a sale.

$$c = 0.06p$$

- b How much commission does the realtor earn for selling a \$140,000 home?

$$c = 0.06p$$

$$c = 0.06(140,000)$$

$$c = 8400$$

The commission is \$8400.

- c If the realtor earned a \$9025 commission, what was the price of the home?

$$c = 0.06p$$

$$9025 = 0.06p$$

$$p = 150,417$$

The price of the home was \$150,417.

- 15 Angela got a new job that pays \$18.50 per hour. She works 40 hours per week. She pays 4.5% state income tax on her earnings. How much does Angela have remaining after state income tax is deducted from 4 weeks of pay?

$$18.50(40)(4) = 2960$$

Angela makes \$2960 in 4 weeks.

$$2960(0.045) = 133.20$$

Angela pays \$133.20 for state income tax for the 4 weeks.

$$2960 - 133.20 = 2826.80$$

Angela has \$2826.80 remaining after state income tax is deducted from 4 weeks of pay.

- 16 This table shows the amount a store in Nevada charges customers on selected purchases.

Price of Item	Price Including Sales Tax
\$45.00	\$47.25
\$60.00	\$63.00
\$110.00	\$115.50
\$225.00	\$236.25

- a Use the table to determine the price including sales tax for an item with a price tag of \$170.00.

Since $\$170 = \$60 + \$110$, the price including sales tax is $\$63.00 + \$115.50 = \$178.50$.

- b Use the table to determine the Nevada sales tax rate.

$$\frac{47.25}{45.00} = 1.05$$

The sales tax rate is 5%.

- c Wes bought an electric guitar at a music store in Nevada that was selling the guitar at full list price. He paid \$193.20 including sales tax. Determine the list price of the guitar.

$$193.20 = 1.05x$$

$$x = 184$$

The list price of the guitar is \$184.00.

- d Didi bought the same guitar at another store in Nevada that was selling it for 13% off the list price. Determine how much she paid for the guitar, including sales tax.

The sale price is 87% of the list price, or $(\$184)(0.87) = \160.08 .

The price with sales tax is $(\$160.08)(1.05) = \168.08 .

17 Gloria was shopping for new shoes at a store near her home. On the shelf where she found the shoes she wanted, she saw two signs. The first one read, "Clearance: 18% off." The second one read, "\$12 off – Instant Savings." The original price of the shoes was \$75.00. Gloria lives in Oregon, where there is no sales tax.

a How much will Gloria pay for the shoes if the 18% discount is applied before the \$12 discount?

$$\begin{aligned}\text{Sale price} &= (\$75.00)(0.82) - \$12.00 \\ &= \$61.50 - \$12.00 \\ &= \$49.50\end{aligned}$$

b How much will Gloria pay for the shoes if the \$12 discount is applied before the 18% discount?

$$\begin{aligned}\text{Sale price} &= (\$75.00 - \$12.00)(0.82) \\ &= (\$63.00)(0.82) \\ &= \$51.66\end{aligned}$$