# ASSIGNMENT 3

DYLAN ZWICK'S MATH 1010 CLASS

## 1. Section 2.2

**2.2.1:** Find a number such that the sum of the number and 24 is 68.

$$\begin{aligned} x + 24 &= 68 \\ x &= 44 \end{aligned}$$

**2.2.3:** You have accepted a job offer at an annual salary of \$37,210. This salary includes a year-end bonus of \$2,800. You are paid every 2 weeks. What will your gross pay be for each paycheck?

$$\begin{aligned} 26x + 2800 &= 37,120 \\ 26x &= 34,320 \\ x &= 1320 \end{aligned}$$

In Exercise 5-12, complete the table showing the equivalent forms of various percents.

| Percent | Parts out of 100 | Decimal | Fractions |
|---|---|---|---|
| 30% | 30 | 0.30 | $\frac{3}{10}$ |
| 75% | 75 | 0.75 | $\frac{3}{4}$ |
| 8% | 8 | 0.08 | $\frac{2}{25}$ |
| $66\frac{2}{3}\%$ | $66\frac{2}{3}$ | $0.\overline{6}$ | $\frac{2}{3}$ |
| 42% | 42 | 0.42 | $\frac{21}{50}$ |

In Exercise 13-34, solve using a percent equation.**See Examples 2 and 3**.

**2.2.13:** What is 35% of 250?
$(250)(0.35) = 87.5$

**2.2.15:** What is 65% of 800?
520

**2.2.18:** What is $33\frac{1}{3}$% of 816?
272

**2.2.22:** What is 300% of 16?
48

**2.2.23:** 84 is 24% of what number?
350

**2.2.25:** 42 is 120% of whtat number?
35

**2.2.29:** 496 is what percent of 800?
62%

**2.2.31:** 2.4 is what percent of 480?
0.5%

**2.2.34:** 900 is what percent of 500?
180 %

In Exercise 35-42, write the verbal expression as a ratio. Use the same units in both the numerator and denominator, and simplify. **See Example 5**

**2.2.35:** 120 meters to 180 meters
$\frac{120}{180} = \frac{2}{3}$

**2.2.38:** 125 centimeters to 2 meters
$\frac{5}{8}$

**2.2.39:** 40 milliliters to 1 liter
$\frac{1}{25}$

**2.2.40:** 1 pint to 1 gallon
$\frac{1}{8}$

In Exercises 43-52, solve the proportion. **See Example 7**

**2.2.43:** $\frac{x}{6} = \frac{2}{3}$
$x = 6(\frac{2}{3}) = 4$

**2.2.46:** $\frac{5}{16} = \frac{x}{4}$
$\frac{5}{4}$

**2.2.48:** $\frac{7}{8} = \frac{2}{x}$
$\frac{7}{4}$

**2.2.52:** $\frac{y+1}{10} = \frac{y-1}{6}$
4

**2.2.55: Passing Grade** There are 40 students in your class. On one test, 95% of the students received passing grades. How many students failed the test?
$40(1 - 0.95) = 40(0.05) = 2$

**2.2.65: Real Estate Commission** A real estate agency receives a commission of \$12,250 for the sale of a \$ 175,000 house. What percent commission is this?
$\frac{12250}{175000} = 0.07 = 7\%$

**2.2.67: Quality Control** A quality control engineer reported that 1.5% of a sample of parts were defective. The engineer found three defective parts. How large was the sample?

$\frac{3}{0.15} = 200$

In Exercise 87, use unit prices to determine the better buy. **See Example 6**.

**2.2.87:** (a) A $14\frac{1}{2}$-ounce bag of chips for \$2.32
(b) A $5\frac{1}{2}$-ounce bag of chips for \$0.99
$14\frac{1}{2}$-ounce

## 2. Section 2.3

In Following exercises, find the missing quantities. (Assume that the markup rate is a percent based on the cost.)

| Cost | Selling Price | Markup | Markup Rate |
|---|---|---|---|
| \$45.97 | \$64.33 | \$18.36 | 40% |
| \$62.40 | \$96.72 | \$34.32 | 55% |
| \$402.40 | \$623.72 | \$221.32 | 55% |
| \$12,550.00 | \$16,440.50 | \$3890.50 | 31% |

In the following exercises, Find the missing quantities.(Assume that the discount rate is a percent based on the list price.)

| List Price | Sale Price | Discount | Discount Rate |
|---|---|---|---|
| \$49.95 | \$25.74 | \$24.21 | 48.5% |
| \$119.00 | \$79.73 | \$39.27 | 33% |
| \$345.00 | \$210.45 | \$134.55 | 39% |
| \$1155.50 | \$831.76 | \$323.54 | 28% |

**2.3.17: Markup** The selling price of a jacket in a department store is \$157.14. The cost of the jacket to the store is \$130.95. What is the markup?
$157.14 - 130.95 = 26.19$

**2.3.21: Discount** A shoe store sells a pair of athletic shoes for \$75. The shoes go on sale for \$45. What is the discount?
\$30

**2.3.25: Long-Distance Rate** The weekday rate for a telephone call is \$0.75 for the first minute plus \$0.55 for each additional minute. Determine the length of a call that costs \$5.15. What would have been the cost of the call if it had been made during the weekend, when there is a 60% discount?
$\frac{5.45}{0.55} = 9$ (minutes), $5.45(1 - 0.4) = 3.27$

**2.3.29: Labor** An automobile repair bill of \$216.37 lists \$136.37 for parts and the rest for labor. The labor rate is \$32 per hour. How many hours did it take to repair the automobile?
2.5 hours

**2.3.31: Labor** The bill for the repair of an automobile is \$380. Included in this bill is a charge of \$275 for parts, and the remainder of the bill is for labor. The charge for labor is \$35 per hour. How many hours were spent in repairing the automobile?
\$37

**2.3.33:** Determine the numbers of units of solutions 1 and 2 needed to obtain a final solution of the specified amount and concentration. **See EXample 4**.

| Concentration of Solution 1 | Concentration of Solution 2 | Concentration of Final Solution | Amount of Final Solution |
|---|---|---|---|
| 20% | 60% | 40% | 100 gal |

$$x = \text{Gallons of solution 1}$$
$$0.2x + 0.6(100 - x) = 0.4 \times 100$$
$$x = 50(Gallons)$$

**2.3.37: Seed Mixture** A nursery wants to mix two types of lawn seed. Type 1 sells for \$12 per pound, and type 2 sells for \$20 per pound. To obtain 100 pounds of a mixture at \$14 per pound, how many pounds of each type of seed are needed?
75 pounds of type 1; 25 pounds of type 2

**2.3.40: Ticket Sales** Ticket sales for a spaghetti dinner total \$1,350. There are four times as many adult tickets sold as children's tickets. The prices of the tickets for adults and children are \$6 and \$3, respectively. Find the number of children's tickets sold.

$$\begin{aligned} x &= \text{number of children's tickets} \\ 4x \times 6 + x \times 3 &= 1350 \\ x &= 50 \end{aligned}$$

**2.3.55: Distance** Two planes leave Chicago's O'Hare International Airport at approximately the same time and fly in opposite directions. How far apart are the planes after $1\frac{1}{3}$ hours if their average speeds are 480 miles per hour and 600 miles per hour?
1440 miles

**2.3.61: Work-Rate Problem** You can complete a typing project in 5 hours, and your friend can complete it in 8 hours.

(a) What fractional part of the project can be accomplished by each person in 1 hour?
$\frac{1}{5}, \frac{1}{8}$
(b) How long will it take both of you to complete the project working together?
$\frac{40}{13} = 3\frac{1}{13}$hours

In Exercises 65, 72, solve for the specified variable.

**2.3.65:** Solve for R.
*Ohm's Law*: $E = IR$
$R = \frac{E}{I}$

**2.3.72:** Solve for a.
*Free-Falling Body*: $h = -15t + \frac{1}{2}at^2 + 50$
$a = (2h + 30t - 100)/t^2$

**2.3.77: Geometry** A rectangular picture frame has a perimeter of 3 feet. The width of the frame is 0.62 times its height. Find the height of the frame.

$$\begin{aligned} x &= \text{height of the frame} \\ (0.62x + x) \times 2 &= 3 \\ x &= 0.926 \end{aligned}$$

**2.3.80: Geometry** The length of a rectangle is three times its width. The perimeter of the rectangle is 64 inches. Find the dimensions of the rectangle.
8inches $\times$ 24inches

**2.3.81: Meteorology** The average daily high temperature in August in Denver, Colorado is 86 degrees Fahrenheit . In August, what is Denver's average daily high temperature in degrees Celsius?
30 degrees Celsius

**2.3.83: Simple Interest** Find the interest on a \$5000 bond that pays an annual percentage rate of $6\frac{1}{2}$ for 6 years.
\$1950

## 3. Section 2.4

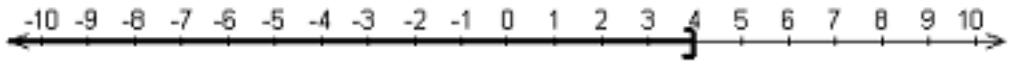
In Exercise 1,3, determine whether each value of $x$ satisfies the inequality.

| | Inequality | Values |
|---|---|---|
| **2.4.1:** | $7x - 10 > 0$ | (a) $x = 3$ Yes (b) $x = -2$ No |
| | | (c) $x = \frac{5}{2}$ Yes (d) $x = \frac{1}{2}$ No |

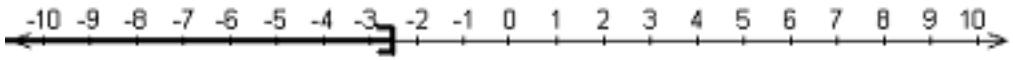
| | Inequality | Values |
|---|---|---|
| **2.4.3:** | $0 < \frac{x+4}{5} < 2$ | (a) $x = 10$ No (b) $x = -4$ No<br>(c) $x = 0$ Yes (d) $x = 6$ No |

In Exercises 11-24, sketch the graph of the inequality. **See Example 1.**

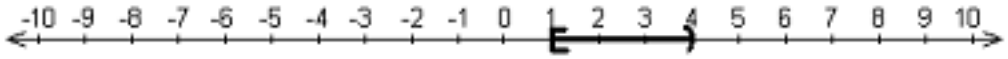
**2.4.11:** $x \leq 4$



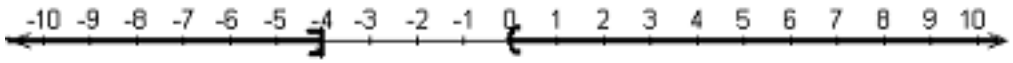

**2.4.14:** $x \leq -2.5$




**2.4.17:** $4 > x \geq 1$




**2.4.22:** $x \leq -4$ or $x > 0$




**2.4.25:** Write an inequality equivalent to $5 - \frac{1}{3}x > 8$ by multiplying each side by $-3$.
$-15 + x < 24$

In Exercises 27,30,31, determine whether the inequalities are equivalent.

**2.4.27:** $3x - 2 < 12, 3x < 10$
No

**2.4.30:** $-4(5 - x) < 32, 5 - x < -8$
No

**2.4.31:** $7x - 6 \leq 3x + 12, 4x \leq 18$
Yes

In the Excercises 35-82, solve the inequality and sketch the solution on the real number line. **See Examples 2-8**

**2.4.37:** $x + 7 \leq 9$
$x \leq 2$

**2.4.41:** $-9x \geq 36$
$x \leq -4$

**2.4.50:** $12 - 5x > 5$
$x < \frac{7}{5}$

**2.4.55:** $\frac{x}{4} > 2 - \frac{x}{2}$
$x > \frac{8}{3}$

**2.4.58:** $\frac{x+3}{6} + \frac{x}{8} \geq 1$
$x \geq \frac{12}{7}$

**2.4.61:** $0 < 2x - 5 < 9$
$\frac{5}{2} < x < 7$

**2.4.70:** $-\frac{2}{3} < \frac{x-4}{-6} \leq \frac{1}{3}$
$2 \leq x < 8$

**2.4.71:** $2x - 4 \leq 4$ and $2x + 8 > 6$
$-1 < x \leq 4$

**2.4.75:** $7.2 - 1.1x > 1$ or $1.2x - 4 > 2.7$
$-\infty < x < \infty$

**2.4.76:** $0.4x - 3 \leq 8.1$ or $4.2 - 1.6x \leq 3$
$-\infty < x < \infty$

**2.4.79:** $-3(y + 10) \geq 4(y + 10)$
$y \leq -10$

**2.4.83:** write the solution set as a compound inequality. Then write the solution using set notation and the union or intersection symbol. **See Example 9**

In Exercises 89, 91, write the compound inequality using set notation and the union or intersection symbol. **See Example 10**

**2.4.89:** $-7 \leq x < 0$
$\{x|x \geq -7\} \bigcap \{x|x < 0\}$

**2.4.94:** $-3 > x$ or $x > 8$
$\{x|x < -3\} \bigcup \{x|x > 8\}$

In Exercises 97, 100, rewrite the statement using inequality notation. **See Example 11**

**2.4.97:** $z$ is at least 8
$z \geq 8$

**2.4.100:** $x$ is at least 450 , but no more that 500.
$450 \leq x \leq 550$

**2.4.107: Meteorology** Miami's average temperature is greater than the average temperature in Washington, DC, and the average temperature is Washington, DC is greater thatn the average temperature in New York City. How does the average temperature in Miami compare with the average temperature in New York City?
Greater

**2.4.117: Hourly Wage** Your company requires you to select one of two payment plans. One plan pays a strqight $12.50 per hour. The second plan pays $8.00 per hour plus $0.75 per unit produced per hour. Write an inequality for the number of units that must be produced per hour so that the second option yields the greater hourly wage. Solve the inequality.
$12.50 < 8 + 0.75n \ ; n > 6$

In Ecercises 119, use the quation $y = 21.8t - 160$, for $9 \leq t \leq 15$, which models the annual consumption of energy produced by wind (in trillions of British thermal units) in the United States from 1999 to 2005. In this model, $t$ represents the year, with $t = 9$ corresponding to 1999.

**2.4.119:** During which years was the consumption of energy produced by wind less than 100 trillion Btu?
1999, 2000, 2001