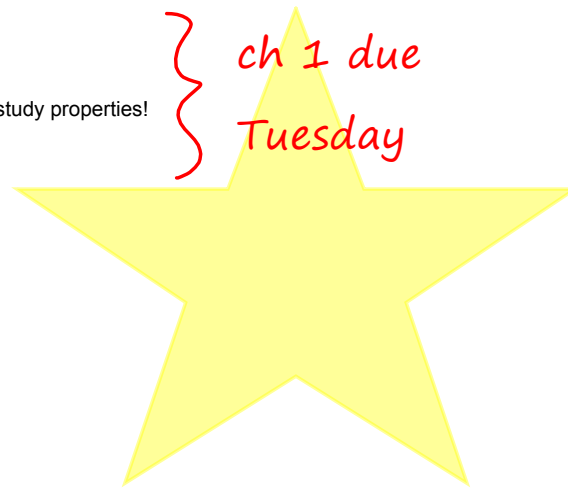


Chapter 1 Homework

- 1.1 #1-137 odd
 1.2 #97-113 odd
 1.3 #30-57 odd; 97-105 odd; and study properties!
 1.4 #1-31 odd

Chapter 2 Homework

- 2.1 #39-77 odd }
 2.2 #7-27 odd }
 2.3 #7-25 odd }
 2.4 #5,7,11,17,19,23,27
 2.5 #35-71 odd
 2.6 #33-69 odd

2.1 Equations in One Variable

- An equation that is true for only some instances of the variable is called a **conditional equation**. $2x-3=5$
- An equation that is never true for any instances of the variable is called a **contradiction**. $2x-3=2x+5 \Rightarrow -3=5$ ~~⚡~~
- An equation that is always true for any instance of the variable is called an **identity**. $2x-3=5x-3x+4-7 \Rightarrow -3=-3$
- One way to simplify an equation involving fractions is to get rid of the fractions by: multiplying both sides by the least common denominator. $\frac{1}{2}x - \frac{1}{3} = \frac{5}{6}$ $6(\frac{1}{2}x - \frac{1}{3}) = 6 \cdot (\frac{5}{6})$
- The solution set to a contradictory equation is the empty set. $3x-2=5$
- The solution set to an identity is all real numbers.

40. $7 + 8y - 12 = 3y - 8 + 5y$

$$8y - 3y - 5y = -8 - 7 + 12$$

$$0 = -3 \quad \text{contradiction}$$

$$\boxed{\emptyset}$$

66. $\frac{2}{3}x - \frac{5}{6}x - 3 = \frac{1}{2}x - 5$

$$6\left(\frac{2}{3}x - \frac{5}{6}x - 3\right) = 6\left(\frac{1}{2}x - 5\right)$$

$$4x - 5x - 18 = 3x - 30$$

$$-18 + 30 = 3x - 4x + 5x$$

$$12 = 4x$$

$$\boxed{3 = x}$$

conditional equation

92. $\frac{6}{\left(\frac{7}{a}\right)} = -18$

$$\frac{7}{a} \cdot \frac{6}{\frac{7}{a}} = -18 \cdot \frac{7}{a}$$

$$a \cdot 6 = \frac{-18 \cdot 7}{a}$$

$$\frac{6a}{6} = \frac{-18 \cdot 7}{6}$$

$$\boxed{a = -21}$$

93. $\frac{4(x-5) - (x+1)}{3} = (x-7) \cdot 3$

$$4(x-5) - (x+1) = 3x - 21$$

$$4x - 20 - x - 1 = 3x - 21$$

$$4x - x - 3x = -21 + 20 + 1$$

$$0 = 0 \quad \text{identity}$$

 $x =$
all real numbers

2.2-2.4 - Linear Equation Word Problems2.2 - Coin, Stamp, and Integer Problems

4. A collection of 22 coins has a value of \$4.45. The collection contains dimes and quarters. Find the number of quarters in the collection.

Type of coin	# of coins	Value per coin	Total value
Dimes	$22-x$	0.1	$(22-x)(0.1)$
Quarters	x	0.25	$x(0.25)$

$$(22-x)(0.1) + x(0.25) = 4.45$$

$$2.2 - 0.1x + 0.25x = 4.45$$

$$100 \cdot 0.15x = 2.25 \cdot 100$$

$$15x = 225$$

$$x = \frac{225}{15} = 15 \text{ quarters}$$

14. A stamp collection consists of 3¢, 12¢, and 15¢ stamps. The number of 3¢ stamps is five times the number of 12¢ stamps. The number of 15¢ stamps is four less than the number of 12¢ stamps. The total value of the stamps in the collection is \$3.18. Find the number of 15¢ stamps in the collection.

Type of stamp	# of stamps	Value per stamp	Total value
3¢	$5x$	0.03	$5x(0.03)$
12¢	x	0.12	$x(0.12)$
15¢	$x-4$	0.15	$(x-4)(0.15)$

$$5x(0.03) + x(0.12) + (x-4)(0.15) = 3.18$$

$$0.15x + 0.12x + 0.15x - 0.6 = 3.18$$

$$0.42x = 3.78$$

$$42x = 378$$

$$x = 9$$

$$x-4 = 9-4 = 5 \text{ 15¢ stamps}$$

20. One integer is four more than another integer. The sum of the integers is twenty-six. Find the integers.

$$x + (x+4) = 26$$

$$2x = 22$$

$$x = 11$$

11 & 15

22. The sum of three numbers is forty-two. The second number is twice the first number, and the third number is three less than the second number. Find the three numbers.

$$x + (2x) + (2x-3) = 42$$

$$5x = 45$$

$$x = 9$$

9, 15, 18

28. Find three consecutive even integers such that four times the sum of the first and third integers is twenty less than six times the middle integer.

$$x, x+2, x+4$$

$$4(x + (x+4)) = (6(x+2)) - 20$$

$$4(2x+4) = 6x+12-20$$

$$8x+16 = 6x-8$$

$$2x = -24$$

$$x = -12$$

$$\boxed{-12, -10, -8}$$

21. Translate into a variable expression. Do not simplify.

"the difference between a number and the total of twelve and the square of the number"

$$x - (12 + x^2)$$

"the difference between a and b" is $a-b$

22. Simplify: $4x - 2[x - 4(y - 2[5y + 3])]$

$$4x - 2[x - 4(y - 10y - 6)]$$

$$4x - 2[x + 36y + 24]$$

$$4x - 2x - 72y - 48$$

$$\boxed{2x - 72y - 48}$$

23. Solve for x: $(\frac{1}{3}(x-7) + 5 = 6x + 4) \cdot 3$

$$x-7+15 = 18x+12$$

$$8-12 = 18x-x$$

$$-4 = 17x$$

$$\boxed{\frac{-4}{17} = x}$$

← conditional equation

2.3 Value Mixture and Motion Problems

4. A coffee merchant combines coffee costing \$5.50 per pound with coffee costing \$3.00 per pound. How many pounds of each should be used to make 40 pounds of a blend costing \$4.00 per pound?

Type of coffee	Weight	Cost per pound	Total cost
\$5.50	x	5.5	$5.5x$
\$3.00	$40-x$	3	$3(40-x)$
\$4.00 blend	40	4	$4(40)$

$$5.5x + 3(40-x) = 4(40)$$

$$5.5x + 120 - 3x = 160$$

$$2.5x = 40$$

$$25x = 400$$

$$x = \frac{400}{25} = 16$$

16 lb of \$5.50
coffee &
24 lb of \$3
coffee

10. A silversmith combined pure silver that costs \$5.20 an ounce with 50 ounces of a silver alloy that costs \$2.80 an ounce. How many ounces of the pure silver were used to make an alloy of silver that costs \$4.40 an ounce?

Type of metal	Weight	Cost per ounce	Total cost
Pure silver	x	5.2	$5.2x$
\$2.80 alloy	50	2.8	$50(2.8)$
\$4.40 alloy	$50+x$	4.4	$4.4(50+x)$

$$5.2x + 50(2.8) = 4.4(50+x)$$

$$5.2x + 140 = 220 + 4.4x$$

$$5.2x - 4.4x = 220 - 140$$

$$0.8x = 80$$

$$8x = 800$$

$$x = 100 \text{ oz of pure silver}$$

18. Two jet skiers leave the same dock at the same time and travel in opposite directions. One skier is traveling 14 mph slower than the other skier. In half an hour the skiers are 48 miles apart. Find the rate of the slower skier.

$$\text{rate} \times \text{time} = \text{distance}$$

Skier	Rate ^{mi/h}	Time	Distance
Slower	x	$\frac{1}{2}$	$x \cdot \frac{1}{2}$
Faster	$x+14$	$\frac{1}{2}$	$(x+14) \cdot \frac{1}{2}$

$$2 \left[x \cdot \frac{1}{2} + (x+14) \cdot \frac{1}{2} \right] = [48] \cdot 2$$

$$x + x + 14 = 96$$

$$2x = 82$$

$$x = 41 \text{ mi/h}$$

26. A plane leaves an airport at 3 p.m. At 4 p.m. another plane leaves the same airport traveling in the same direction at a speed 150 mph faster than that of the first plane. Four hours after the first plane takes off, the second plane is 250 mi ahead of the first plane. How far did the second plane travel?

$$r \cdot t = d$$

$$r = \frac{d}{t}$$

$$t = \frac{d}{r}$$

Plane	Rate	Time	Distance
1	$\frac{x-250}{4}$	4	$x-250$
2	$\frac{x}{3} = \frac{x-150}{4} + 150$	3	x

$$12 \cdot \left(\frac{x}{3} \right) = \left(\frac{x-250}{4} + 150 \right) \cdot 12$$

$$4x = 3(x-250) + 12 \cdot 150$$

$$4x = 3x - 750 + 1800$$

$$x = 1050 \text{ miles}$$

2.4 Problems Involving Percent

Important formulas:

$$\begin{array}{l} \text{principal} \\ \text{(original investment \$)} \end{array} \times \begin{array}{l} x \\ \end{array} = \begin{array}{l} \text{interest rate} \\ \text{(\% written as decimal)} \end{array} = \begin{array}{l} \text{interest earned} \\ \text{(\$)} \end{array}$$

$$\begin{array}{l} \text{amt of solution} \\ \text{(volume of water mixed} \\ \text{with dissolved substance)} \end{array} \times \begin{array}{l} x \\ \end{array} = \begin{array}{l} \% \text{ concentration} \\ \text{(portion of solution} \\ \text{that is the dissolved} \\ \text{substance)} \end{array} = \begin{array}{l} \text{amt of substance} \\ \text{(volume of just} \\ \text{dissolved substance)} \end{array}$$

6. Two investments earn an annual income of \$465. One investment is a 5.5% tax-free annual simple interest account, and the other is a 4.5% annual simple interest certificate of deposit. The total amount invested is \$9600. How much is invested in each account?

type of account	principal (orig. investment)	% interest	interest earned
5.5%	x	0.055	$0.055x$
4.5%	$9600 - x$	0.045	$0.045(9600 - x)$

$$\frac{(0.055x + 0.045(9600 - x))}{1000} = (465) \cdot 1000$$

$$55x + 45(9600 - x) = 465000$$

$$55x + 45(9600) - 45x = 465000$$

$$10x = 465000 - 432000$$

$$10x = 33000$$

$$x = \$3300 \text{ in } 5.5\% \text{ acct}$$

$$\& \text{ } \$6300 \text{ in } 4.5\% \text{ acct}$$