Curriculum Outcome

General Outcome: Develop number sense and critical thinking skills.

N1 Solve problems that involve unit pricing and currency exchange, using proportional reasoning.

N2 Demonstrate an understanding of income, including: wages, salary, contracts, commission, piecework, and calculating gross pay and net pay.

N3 Demonstrate an understanding of compound interest.

N4 Demonstrate an understanding of financial institution services used to access and manage finances.

N5 Demonstrate an understanding of credit options, including: credit cards, and loans.

Student Friendly:

MATH *ON THE JOB*

"In 1997, I moved back to the old family homestead, turning the place into an organic, small plot gardening, herb farm and an informal learning centre. We grow food, flowers, garlic, herbs, and wheatgrass," says Pam Trenholm. Pam is a farmer who operates Brighton Botanicals, located near Hartland, New Brunswick. She attended Hartland High School and later took business courses at Carleton County Vocational School in Woodstock, New Brunswick.

Pam's job includes ordering seeds, selling produce, and planting and caring for crops. Pam needs to fertilize a crop with an organic liquid fertilizer that is mixed with water. Five hundred mL of fertilizer is mixed with 60 L of water. If Pam is using 750 mL of fertilizer, how much water does she need to add? How can Pam use proportional reasoning to solve this problem?

Pam (right) and her intern check plants to see if they have received enough nutrients.

METHOD 1: Set up a ratio by aligning the same units. Students may have seen this method in science class, where it is called dimensional analysis. Show the students that the same units (mL) should cancel each other out, leaving the desired units (L).

$$\frac{500\text{ mL}}{750\text{ mL}} = \frac{60\text{ L}}{x}$$

To solve for x, multiply both sides of the equation by the common denominator, $300x$.

$$750x\left(\frac{500}{750}\right) = \left(\frac{60}{x}\right)750x$$

$$\frac{375\,000x}{750} = \frac{45\,000x}{x}$$

Simplify each side of the equation by dividing by the denominator.

$$500x = 45\,000$$

Divide each side by the coefficient of the variable, 500.

$$\frac{500x}{500} = \frac{45\,000}{500}$$

$$x = 90\text{ L}$$

Pam's job includes ordering seeds, selling produce, and planting and caring for crops. Pam needs to fertilize a crop with an organic liquid fertilizer that is mixed with water. Five hundred mL of fertilizer is mixed with 60 L of water. If Pam is using 750 mL of fertilizer, how much water does she need to add? How can Pam use proportional reasoning to solve this problem?

$$\frac{f}{w} = \frac{500\text{ mL}}{60\text{ L}} = \frac{750\text{ mL}}{x}$$

$$\frac{x\ (500\text{mL})}{500\text{mL}} = \frac{45\,000\text{mL}}{500\text{mL}}$$

$$x = 90\text{ L}$$

$f : w$

$500 : 60$ ↘ 1.50

1.50 ↘ $750 : x$

↳ $x = 90$

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Pam (right) and her intern check plants to see if they have received enough nutrients.

METHOD 2: Find the unit amount of L/mL first by dividing the numerator by the denominator, 500.

$$\frac{60\text{ L}}{500\text{ mL}} = \frac{0.12\text{ L}}{1\text{ mL}}$$

For every mL of fertilizer, 0.12 L of water is added. Multiply to find the amount of water needed for 750 g of liquid fertilizer.

$$0.12 \times 750 = 90$$

The farmer must add 90 L of water to 750 g of fertilizer.

EXAMPLE #1:

Engines requiring a mixture of oil and fuel to provide lubrication are called 2-stroke engines. Lisa lives in McCallum, Newfoundland, and uses her boat for transportation. Her boat motor's tank holds 25 L of fuel. The ratio of gasoline to oil required is 50 parts of gasoline to 1 part of oil. Lisa mixes the fuel and oil in a 30-L jerry can before filling up her boat's tank. How much oil should be added to the gasoline?

$$\frac{50\text{L Gas}}{1\text{L Oil}} = \frac{25\text{L Gas}}{(?)\text{L Oil}}$$

0.5L of Oil

Jean-Luc, a builder, works in Kentville, Nova Scotia. He has found that he can arrange the work cubicles of his employees best if the ratio between the length and the width of a room is 3:2. If a room is 6 m long, how wide should the room be?

L W

$\frac{3}{6} = \frac{2}{x}$

$x = 4\text{ m}$

Recipe #1

3 cups of concentrate
7 cups of water

Not so hard: So, if you used 10 cups of concentrate, how much water would you need?

10 Total $\frac{3^c}{7^w} = \frac{10}{x}$ $x = \frac{70 \cdot 10}{3} = 23.3$ cup water

A bit harder:

You only want to make 8 cups of Recipe #1. How many cups of concentrate and how many cups of water will you need? Explain your solution.

① Total

② Concentrate

$\frac{3^c}{10^T} = \frac{x}{8^T}$

$x = 2.4$ cups of Conc.

8 cup (total) − 2.4 = 5.6 cups Water

or

$\frac{7^w}{10^T} = \frac{x}{8}$ $x = 5.6$

Recipe #1

3 cups of concentrate
7 cups of water

You only want to make 8 cups of Recipe #1. How many cups of concentrate and how many cups of water will you need? Explain your solution.

- **This is a question dealing with totals!!!!!!**
- **We will determine the total of the batch & a total ratio.**

Batch Total

# of concentrate = 3
# of water = 7

Total # = 10

Recipe #1

3 cups of concentrate
7 cups of water

You only want to make 8 cups of Recipe #1. How many cups of concentrate and how many cups of water will you need? Explain your solution.

Batch Total

# of concentrate = 3
# of water = 7

Total # = 10

Total Ratio

Let x = concentrate

$$\frac{\text{\# of concentrate}}{\text{Total}}$$

$$\frac{3}{10} = \frac{x}{8}$$

$$10x = 24$$

$$x = 2.4$$

2.4 Cups of Concentrate

Water = Total # - Concentrate

Water = 8 - 2.4

Water = 5.6

5.6 Cups of Water!!!!

Recipe #2
2 cups of concentrate
5 cups of water

You want to make 12 cups of Recipe #2. How many cups of concentrate and water will you need?

7 cups total

$\frac{2\text{ c}}{7\text{ T}} = \frac{x\text{ c}}{12\text{ T}}$

$x = \frac{2 \times 12}{7}$

$x = 3.4$ cups of concen.

12 c − 3.4 = 8.6 cups of water

Recipe #2

2 cups of concentrate
5 cups of water

You want to make 12 cups of Recipe #2. How many cups of concentrate and water will you need?

Batch Total

$\frac{\text{\# of concentrate}}{\text{\# of water}} = \frac{2}{5}$

Total # = 7

Total Ratio

Let x = concentrate

$\frac{\text{\# of concentrate}}{\text{Total}}$

$\frac{2}{7} = \frac{x}{12}$

$7x = 24$

$x = 3.4$ cups

Water = Total # - Concentrate

Water = 12 - 3.4

Water = 8.6

8.6 Cups of Water!!!!

Recipe #2
2 cups of concentrate
5 cups of water

You want to make 12 cups of Recipe #2. How many cups of concentrate and water will you need?

$c : w = T$

$2 : 5 = 7$

$x : y = 12$

$$\frac{c}{T} = \frac{2}{7} = \frac{x}{12}$$

$$\frac{7x}{7} = \frac{24}{7}$$

$x = 3.4$

Water

12 cup - 3.4

= 8.6 cups

HOMEWORK: P. 21 #1 - 9
and Page 273 - circled ques.

1.1 Build Your Skills Detailed Solutions.pdf

BUILD YOUR SKILLS

1. A computer repair technician fixes 8 printers for every 2 computers she repairs. What is the simplest form of this ratio? What are two ways you can write this ratio?
2. Sheena is a secretary at a high school in Newfoundland. She types 55 words per minute. How long will it take her to type a 2000-word report?
3. An apprentice mechanic rotates the 4 tires on a pick-up truck in 15 minutes. How long would it take him to rotate the tires on 5 trucks? How long does rotating 2 tires take?
4. Jane is selling tickets to see the band Vishten. She sells 4 tickets on Thursday, 6 on Friday, and an equal number each on Saturday and Sunday, for a total of 36 tickets sold over four days. How many tickets were sold each day on Saturday and Sunday? What proportion of the total sales took place on Saturday?
5. The ratio between Siu's height and the height of her brother Tai is 5:6. If Tai is 145 cm tall, how tall is Siu, to the nearest centimetre?
6. If the Sound Source music store makes a profit of $2550.00 on the sale of 200 DVDs, how much profit would the store make on the sale of 50? On the sale of 900?

The Acadian band Vishten is from Prince Edward Island. Their music has a Celtic sound and French lyrics.

7. Oliver's Restaurant purchases a 5-kg jar of olives for $15.00 through a wholesaler. How many kilograms would it get for $75.00? How much would it cost the restaurant to buy 20 kilograms?

8. Keri is a member of New Brunswick's Madawaska Maliseet First Nation. She works as a carpenter and is mixing a shade of stain for a set of cabinets she has built. The ratio for the shade she wants is 3 parts of Spanish oak to 4 parts of red mahogany. If she needs 12 litres in all, how many litres of each stain does she need?

9. Keiko says that the Japanese Bullet Train (Shinkansen) takes about 6 minutes to travel 30 km. Akira says that at this rate, he could travel around the world at the equator in less than 8 days. Keiko disagrees; she thinks it will take longer. Who is correct? Justify your response. The circumference of the earth at the equator is approximately 40 074 km.

1. a. $\frac{n}{9} = \frac{15}{27}$ b. $\frac{9}{10.5} = \frac{n}{7}$
c. $\frac{9}{8} = \frac{153}{n}$ d. $\frac{72}{n} = \frac{16}{6}$
e. $7:15 = n:75$ f. $n:8 = 15:6$

2. George plants 5 tree seedlings for every 3 that Linda plants. How many trees does George plant in 1 min if Linda plants 6 trees in 1 min?

3. The ratio of goals scored to shots taken by a hockey star is 2:9. If he has a 50-goal season, how many shots did he take?

4. In an election, the number of votes received by Aaron, Yves, and Mario was in the ratio 4:3:2. If Yves received 36 votes, how many votes each did Aaron and Mario receive?

5. In a photograph of a mother and a daughter standing side by side, the mother measures 60 mm and the daughter measures 22 mm. If the mother's actual height is 180 cm, what is the daughter's actual height?

6. The ratio of a man's height to his arm span is 24:23. How tall is a man if his arm span is 184 cm?

41.6 kg. Find the mass of pipe that is 9.7 m long.

8. Find the missing terms.
a. $12:18:9 = n:6:3$ b. $n:2:p = 3:1:4$
c. $7:5:n = 21:p:18$ d. $4:n:7 = 5:10:p$
e. $6:8:n = p:12:3$ f. $n:p:2 = 4:6:8$

9. At a movie theatre the ratio of tickets sold for one show for adults, youths, and children was 3:5:6.
a. If 65 youth tickets were sold, how many tickets were sold for adults? children?
b. Adult tickets cost \$5, youth tickets \$3, and children's tickets \$2.50. How much money was received from this one show?

10. In 1986 in Saskatchewan the ratio of people whose mother tongue was English to the total population was 4:5. If there were 800 000 people whose mother tongue was English, what was the population of Saskatchewan in 1986?

11. The shadow of a flagpole is 15 m long. A person who is 170 cm tall casts a shadow 3 m long. How tall is the flagpole?

Fishery biologists caught and tagged 500 healthy

1) 4:1 $\frac{4}{1}$ 4 to 1

2) 36 min

3) i) 75 min ii) 7.5 min

4) i) 13 ii) 13:36

5) 121 .

6) $637.50 for 50 dvd

900 dvds for $11 475.00

7) $\frac{25 kg}{\$75}$ and $\frac{20 kg}{\$60}$

8) red: 6.86L oak 5.14L

Attachments

1.1 Build Your Skills Detailed Solutions.pdf