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AWM10 **Ch. 1.1 Ratios and Proportions** Notes

RATIO: a comparison between two numbers with the **same** units

Can be written in several ways:

a)12 to 40 b) 12 : 40 c) $\frac{12}{40}$

Always SIMPLIFY ratios to **LOWEST TERMS!**

Ex. 12:40 - 12 and 40 can both be divided by 4 to give 3:10

- 3:10 is the same ratio as 12:40

PROPORTION: fractions that are equal (like reduced fractions)

Ex. $\frac{12}{40} = \frac{3}{10}$ is a proportion

Using Charts to Solve Problems:

Ex. #1) You are making cookies and the recipe calls for 2 eggs. Your sister says you have enough ingredients to make 6 batches of cookies. How many eggs would you need?

Batch	Number of Eggs
1	2
2	4
3	6
4	8
5	10
6	12

You would need 12 eggs for the 6 batches of cookies.

Using Algebra and Proportions to Solve Problems: $\frac{2 \text{ eggs}}{1 \text{ batch}} = \frac{x}{6 \text{ batches}}$ $x = 2 \times 6 = 12$

Ex #2) At work for a mechanic you use litres of oil and coolant at a ratio of 2:1. Your boss asks you to order 600litres of oil, how many litres of coolant should you order?

Let x = the number of litres of coolant you should order

$$2\ \frac{litres\ oil}{1\ litres\ coolant} = \frac{600\ litres\ oil}{x\ litres\ coolant}$$ Write the proportion (the equivalent fractions)

– make sure you have the same units on the top of both ratios!

- Now we can omit the units until the final answer to make it simpler

$(x)\frac{2}{1} = (x)\frac{600}{x}$ Multiply both sides by the common denominator (in this case 1 times x = 1x...or just x)

$\frac{2x}{1} = \frac{600x}{x}$ Simplify (reduce) both sides

$2x = 600$ Get the variable all by itself by dividing by its COEFFICIENT (number it is multiplied by)

$\frac{2x}{2} = \frac{600}{2}$

$x = 300$ You should order 300 litres of coolant.

Ex #3) You are working at a paint store and need to mix a certain shade of paint. You need to add 3 parts blue to 1 part green, or 3:1 (so there are 4 parts in all). You want to make 6 litres of paint in total, how many litres of blue paint should you add?

$\frac{3\ parts\ blue}{4\ parts\ total}$

Let x = the amount of blue paint you need

$\frac{3}{4} = \frac{x}{6}$ Write the proportion (the equivalent fractions)

$(24)\frac{3}{4} = (24)\frac{x}{6}$ Multiply both sides by a common denominator (in this case 6 x 4 = 24)

$\frac{72}{4} = \frac{24x}{6}$ Simplify both sides

$18 = 4x$ Get the variable all by itself by dividing by its COEFFICIENT (number it is multiplied by)

$\frac{18}{4} = \frac{4x}{4}$

$\frac{9}{2} = x$ (or 4.5 =) You should add 4.5 litres of blue paint to the mixture.

RATE: a comparison between two numbers with **different** units (is like a ratio but with 2 different units)

Ex. A) 25km:1hour B) 25km/hour C) $\frac{25km}{1hour}$

Ex #4) You are at the store to buy candy and you find you can get 200 fuzzy peaches for $6.29. How much would it cost you to buy 60 fuzzy peaches? (assuming you don't get a deal for buying more).

Let x be the price of the 60 fuzzy peaches.

$\frac{200}{6.29} = \frac{60}{x}$ Write the proportion (the equivalent fractions)

$(6.29x)\frac{200}{6.29} = (6.29x)\frac{60}{x}$ Multiply both sides by the common denominator (in this case 6.29x)

$\frac{1258x}{6.29} = \frac{377.4x}{x}$ Simplify both sides

$200x = 377.4$ Get the variable all by itself by dividing by its COEFFICIENT (number it is multiplied by)

$\frac{200x}{200} = \frac{377.4}{200}$

$x = 1.887$ It would cost you $1.89 to buy 60 fuzzy peaches.

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AWM10 **Ch. 1.2 Unit Price** Notes

UNIT PRICE: the cost of one unit; is a rate with a fraction denominator of 1.
Aka - **UNIT RATE**

Very useful when finding out which brand or product is the cheapest.

Ex. 1) You are running a greenhouse and want to buy some new tomato seedlings. Company A sells 20 plants for $45.95 and Company B sells 24 plants for $48.50.

a)What is the unit price at each company?

Company A:
You could set it up like yesterday and then solve the proportion...
$\frac{\$45.95}{20 \text{ plants}} = \frac{x}{1 \text{ plant}}$

....But it is much easier to just divide the price by the number of units
$\frac{\$45.95}{20 \text{ plants}} = 2.2975$ or $2.30 per plant

Company B:
$\frac{\$48.50}{24 \text{ plants}} = 2.02083$ or $2.02 per plant

Company B has the best unit price on tomato plants

b) What is the unit price difference (how much will you save per plant by going with the best buy)?

$2.30 – $2.02 = $0.28 per plant or 28 cents per plant

Ex. 2) You go to the store and you want to buy a bag of chips. The type you want comes in a 200g bag for $1.00 or a 750g bag for $2.70. Which size is the better value?

200g bag:
$\frac{\$1.00}{200 \text{ g}} = 0.005$ or $0.005 per gram

750g bag:
$\frac{\$2.70}{750 \text{ grams}} = 0.0036$ or $0.0036 per gram

The 750g bag is the best value.

Unit rate can be used to find the amount it costs for more than one item.

Ex. 3) You go to the store and find that you can buy 2 frozen pizzas for $15.75. How much will it cost you to buy 5 frozen pizzas?

$\frac{\$15.75}{2 \text{ pizzas}} = \$7.875$ for 1 pizza — Find the unit rate

5 pizzas x $\frac{\$7.875}{1 \text{ pizza}} = \$39.375 = \$39.38$ — Multiply the number of objects you have by the unit rate

It would cost you $39.38 for 5 pizzas.

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AWM10 **Ch. 1.3 Setting a Price** Notes

Prices are figured out based on supply and demand, but also on how much the materials and labour cost that went into creating of the product. Sometimes the time of year can influence the supply or demand.

To make a profit, retailers mark up their products by a percentage of the price they paid for it (the wholesale price).

MARKUP: the difference between the amount a product is bought for and how much it is sold for

PERCENT: means "out of 100"; it is a ratio with a denominator (bottom number in the fraction) of 100

Retailers also set prices based on what they think will look like a lower price, like $3.99 instead of $4.00, or $2.39 per 100g rather than $23.90 per kg (which are the same price!).

As we all know, tax is also added to the price to find the total price. All Canadians pay a 5% Goods and Services Tax (GST) and most provinces have a Provincial Sales Tax (PST). People like to go to Alberta to shop since they don't have PST! We now have a 12% Harmonized Sales Tax (HST) which combines GST and PST together.

Finding a Selling Price:

Ex. 1) You are managing at a clothing store and you can buy a pair of jeans for $55.00. You need to charge a 45% markup to make a profit. What price should you sell the jeans for?

Method #1: Find the amount of mark up and add it to the wholesale price.

45% = 0.45	Convert 45% to a decimal
$55.00 x 0.45 = $24.75	Multiply the decimal by the wholesale price to find the markup you need to add.
$55.00 + $24.50 = $79.75	Add the mark up to find the selling price.

You should sell the jeans for $79.75 to have a markup of 45%
(is that the profit? – No, the mark up will be the profit and overhead costs).

Method #2: Find the new price directly.

The total price will the the wholesale price (100%) plus the markup (45%), so we can just use 145% to find our selling price.

145% = 1.45 Convert 145% to a decimal

$55.00 x 1.45 = $79.75

We get the same answer, the jeans should be sold for $79.75 for a 45% markup.

Ex. 2) More realistically the jeans would be sold at a 125% mark up.

A) How much should the $55.00 pair of jeans be sold for now?

Use **Method #2** to find the total price.

The total price will the pair of jeans (100%) plus the mark up (125%) = 225%

225% = 2.25 Convert 225% to a decimal

$55.00 x 2.25 = $123.75

The selling price for the jeans would be $123.75. (more than twice (2x) to original price)

B) How much money would be made on each pair of jeans?

Use **Method #1** to find the markup.

125% = 1.25 Convert 125% to a decimal

$55.00 x 1.25 = $68.75 Multiply the decimal by the wholesale price to find the markup.

The markup would be $68.75.

Adding Taxes:

Ex. 3) You purchase a new bed frame in Winnipeg, Manitoba (where PST = 7%) for 599.00.

A) How much will you pay in taxes?

Don't forget GST!

Method #1: Find each tax amount and then add the values to the original price

PST = 7%

7% = 0.07 Convert 7% to a decimal

$599.00 x 0.07 = $41.93 Multiply the decimal by the selling price.

You will pay $41.93 in PST

GST = 5%

5% = 0.05 Convert 5% to a decimal

$599.00 x 0.05 = $29.95 Multiply the decimal by the selling price.

You will pay $29.95 in GST

$41.93 + $29.95 = $71.88 Add the taxes together to find the total taxes.

You will pay $71.88 extra in taxes.

How much will you pay in total for the bed frame?

You can now just add the taxes you already found in part A)...

$599.00 + $71.88 = $670.88

...or if you didn't need to do part A) you can find the total price like in Method #2 before...

The total price will be: the selling price + GST + PST = 100% + 5% + 7% = 112%

112% = 1.12 Convert 112% to a decimal

$599.00 x 1.12 = Multiply the decimal by the selling price.

You will pay $670.88 in total after taxes.

Finding the percent Markup:

Ex.4) You bought an old car and fixed it up. You bought the car and fixed it up for a total of $1600. You sell the car for $2500. What was your percent markup on the car?

$$\text{Percent markup} = \frac{\text{Markup}}{\text{Original price}} \times 100\%$$

Markup = $2500 - $1600 = $900

$$\text{Percent markup} = \frac{\$900}{\$1600} \times 100\%$$

$$= 56.25\%$$

You marked the car up by 56.25%.

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AWM10 **Ch. 1.4 Sale Prices and Promotions** Notes

Sale prices and promotions are very common to see as you are shopping. It is important to be able to figure out what the best price is when you are comparing sale prices and promotional offers.

PROMOTION: an activity that makes people more aware of a product or makes them more likely to buy the product

Finding a Sale Price using Percent Discounts:

Ex. 1) You are running your own flooring company and have lots of extra slate tile left in stock. You originally sold the tiles for $6.99 per square foot.

i) If you offer the tiles at 15% off, what will be the new price per square foot?

15% = 0.15	Write the percentage as a decimal
$6.99 x 0.15 = $1.05	Multiply the decimal by the price to find the amount of the discount
$6.99 - $1.05 = $5.94	Subtract to find the new selling price

The new price for the tiles would be $5.94 per square foot.

ii) What will be the price for 50 square feet of slate before taxes?

$$50 \text{ square feet} \times \frac{\$5.94}{1 \text{ square foot}} = \$297.00$$

It would cost $297.00 dollars for 50 square feet before taxes.

iii) What will be the price of the 50 square feet of tile after taxes (in BC)?

Total price = tile price (100%) + HST (12%) = 112%

112% = 1.12	Write the percentage as a decimal
$297.00 x 1.12 = $332.64	Multiply by the percentage to find the new price

It would now cost $332.64 with taxes for 50 square feet of the tile.

Ex. 2) You are on an adventure to Nunavut, but you have forgotten your jacket. You go into a store and they have a jacket that is normally $349.95 on sale at 40% off and in you size! There is no PST in Nunavut, how much will you pay for the jacket.

Find the discounted price first:

Method #1: (like before) Find the discount amount and Subtract

40% = 0.40	Write the percentage as a decimal
$349.95 x 0.40 = $139.98	Multiply the price by the decimal to find the amount of the discount
$349.95 - $139.98 = $209.97	Subtract to find the new selling price

Method #2: Subtract from 100% to see what percent you will pay and find the amount.

The new price = original price (100%) – discount (40%) = 60%

60% = 0.60	Write the percentage as a decimal
$349.95 x 0.60 = $209.97	Multiply the price by the decimal to find the new selling price

Now find the price with tax:

Total price = jacket price (100%) + GST (5%) = 105%

105% = 1.05	Write the percentage as a decimal
$209.97 x 1.05 = $220.47	Multiply by the percentage to find the new price

It would now cost $220.47 with taxes for the jacket.

Finding the percentage an item is discounted by:

Ex. 3) You look in the newspaper and find an add for a car stereo you want to buy. It is normally $499.95, but it is on sale for $349.99. What percent of a discount are you receiving?

Work backwards!

$499.95 - $349.99 = $149.96	Find how much money you save
$\frac{\$149.96}{\$499.95}$ = 0.30	Divide the savings by the original price.
0.30 = 30%	Change the decimal to a percentage

The stereo is 30% off the original price.

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AWM10 **Ch. 1.5 Currency Exchange Rates** Notes

CURRENCY: the money a country uses.

When people travel, they need to be able to pay for items in the currency of the country they are going to visit. When businesses buy or sell items with businesses in other countries they need to understand each other's currency and how much it is worth compared to their own currency so they can get a fair price. The exchange rates change daily based on what is going on in different countries. In order to change one type of money into another, you need to use a currency exchange: a business that buys one type of money and sells you another type of money...for a fee of course!

EXCHANGE RATE: the price of one currency in terms of another currency

Ex. One Canadian dollar is worth $0.9578 American dollars

BUYING RATE: the rate a currency exchange buys money from its customers

Ex. If you want the currency exchange to BUY back pesos you have left over from a trip to Mexico

SELLING RATE: the rate a currency exchange sells money to its customers

Ex. If you want the currency exchange to SELL you Euros for a trip to Europe

Note #1: the buying and selling rates talk about what the CURRENCY EXCHANGE is doing, not what you are doing!
Note #2: All 3 rates are **UNIT RATES** like in Ch. 1.2

*Unless you are told the rate in your question, assume the rates in the chart are 1 unit of foreign currency = the rate shown in CAD.

Comparing Currency Values:

Ex. 1) Which Currency on the list is worth the most?

Table shows amount of foreign currency per 1 Canadian dollar, so need to find the largest number.

Answer: Great Britain Pound = $1.9681 selling rate
= $1.9681 Canadian dollars = 1 Great Britain Pound

Ex. 2) Which countries have currency worth less than the Canadian dollar?

An exchange rate of 1.000000 would mean the currencies are worth the same, so anything with a value less than 1.000000 would be worth less than $1 Canadian per 1 unit of foreign currency

Answer: Any country with an exchange rate less than 1

Ex. 3) Which currency is the closest in value to the Canadian dollar

Answer the one closest to 1.000000, since that would mean they are exactly the same.
= Australian dollar at $0.9926 Canadian dollar = 1 Australian dollar

Canadian Bank Foreign Exchange Rates for Buying and Selling (cash rates for June 28, 2009)			
Country	**Currency Name/ Currency Code**	**Buying Rate**	**Selling Rate**
Australia	Dollar (AUD)	0.8788	0.9926
Brazil	Real (BRL)	0.5046	0.6578
Canada	Dollar (CAD)	—	—
Cayman Is.	Dollar (KYD)	1.2568	1.5000
Euro	Euro (EUR)	1.5552	1.6877
France	Franc (FRF)	0.2222	Refer to Euro
Great Britain	Pound (GBP)	1.8413	1.9681
Hong Kong	Dollar (HKD)	0.1389	0.1597
India	Rupee (INR)	0.01964	0.03034
Indonesia	Rupiah (IDR)	0.000089	0.000130
Israel	Shekel, New (ILS)	0.2554	0.3241
Japan	Yen (JPY)	0.011647	0.012579
Mexico	Peso (MXN)	0.0760	0.0927
Philippines	Peso (PHP)	0.02084	0.02839
Saudi Arabia	Riyal (SAR)	0.2734	0.3338
South Africa	Rand (ZAR)	0.1233	0.1598
South Korea	Won (KRW)	0.000774	0.001050
Switzerland	Franc (CHF)	1.0213	1.1085
United States	Dollar (USD)	1.1210	1.1810

Using Selling Rate (when you are buying foreign currency):

Ex. 4) You are planning to attend Project Help Mexico with the school this year so you can build houses for families in Mexico. The teacher in charge of the trip tells you to bring along approximately 1000 pesos. How much will that cost you in Canadian dollars?

You are buying, but the currency exchange is selling, so look up the selling rate for pesos.

1 peso = $0.0927 Canadian

Method #1: Set up a proportion

Let x represent the amount of Canadian dollars it will cost you.

$$\frac{1 peso}{.0927 can} = \frac{1000 peso}{x}$$

Solve the proportion for x like we did in Ch. 1.1

(cross multiply & divide)

(1000)0.0927 = x

x = $92.70

It would cost you $92.70 Canadian to buy the 1000 pesos from the bank.

Note: Always round to the nearest cent (same as 2 decimal places)

Method #2: Use the units to cancel out and you will be left with the value of the currency you need.

Write the value you have and multiply it by the selling rate with the unit you "want" on the top and the unit you "want to get rid of" on the bottom.

$$1000 \text{ pesos} \times \frac{\$0.0927 \text{ Canadian}}{1 \text{ peso}} = \$92.70 \text{ Canadian}$$

Note: Help keep track of the units by actually crossing them out as you do the calculation.

Ex. 5) Your friend Bob and his parents are going to Disneyland. They invite you to come along and tell you all you need to do is bring money to get into Disneyland and pay for food while you are there. They tell you to bring the equivalent of $300 Canadian in American dollars. How much American money is $300 Canadian?

Method #1: Set up a proportion (hint: the bank is selling you American $)

Let x represent the amount of American dollars you need.
The bank will be selling you American dollars, so look up the selling rate.

1 American dollar = $1.1810 Canadian

$\frac{\$1.1810 \text{ CAD}}{\$1 \text{ USD}} = \frac{\$300 \text{ CAD}}{x \text{ USD}}$ Solve the proportion for x like we did in Ch. 1.1 (cross multiply & divide)

$1.1810x = 300$ Get x all by itself by dividing by the coefficient 1.1810

$\frac{1.1810x}{1.1810} = \frac{300}{1.1810}$

$x = \$254.02$ You would be bringing $254.02 USD

Method #2: Use the units to cancel out and find the answer.

Write the value you have and multiply it by the selling rate with the unit you "want" on the top and the unit you "want to get rid of" on the bottom.

$$\$300 \text{ CAD} \times \frac{\$1 \text{ USD}}{\$1.1810 \text{ CAD}} = \$254.02$$

CAD / CAD cancels CAD out
300 X 1 = 300, then /1.181 because that is on the bottom.

Buying foreign currency with a given rate.

Ex.6) Given the following information, calculate how much of the foreign currency you would get for $500.00 CAD. Round to the nearest whole unit. ($1 CAD = 6.43033 Chinese Yen)

$\frac{\$500 \text{ CAD}}{X} = \frac{\$1 \text{ CAD}}{6.43033 \text{ YEN}}$ $x = 500 \text{ X } 6.43033$
$x = 3215 \text{ YEN}$

Using Buying Rate (when you are selling foreign currency):

Ex. 7) You go to Europe with the school spring break trip and you brought 800 Euros. You spent 625 Euros. When you return, you want to change your left over Euros back into Canadian dollars. How much will you get back?

Find out how much you have left:
800 – 625 = 175 Euros left over

You are selling, but the currency exchange is buying, so look up the buying rate for Euros (any European country will work to look up).
1 Euro = $1.5552 Canadian

Method #2: Use the units to cancel out

$$175 \text{ EUR} \times \frac{\$1.5552 \text{ CAD}}{1 \text{ EUR}} = \$272.16 \text{ CAD}$$