Warm up

14. When you check your options at the bank, you find an account that earns 5.5% compound interest. The teller explains that compound interest is calculated using the balance in your account after each year.

a) Use a table to find out the amount for a deposit of $500 after 4 years.

b) What is the total amount of interest earned? Explain how you found this.

c) How much more does compound interest provide than simple interest, at the same rate?

Simple = 500 × 0.055 × 4
= $110

Compound
= 27.50 + 29.01 + 30.61 + 32.29
= $119.41

c) Compound − simple
= 119.41 − 110.00
$9.41 extra

Year	Principal	Rate	Interest	Amount
1	$500.00	0.055	$27.50	$527.50
2	$527.50	0.055	$29.01	$556.51
3	$556.51	0.055	$30.61	$587.12
4	$587.12	0.055	$32.29	$619.41

Apr 28-21:18

Ratios
⟹ Simplify to lowest form

Divide the values by the GCF

Eg. 15 : 35 ⟩ ÷5
   ÷5 ⟨ 3 : 7

The order IS important

May 17-2:17 PM

1

Proportion statements
$\Rightarrow$ use to find a missing value.

Eg　Bunter runs 30m in 4 seconds. How far can he run in 7 seconds?

comparing $\dfrac{\text{distance}}{\text{time}}$

$\Rightarrow \dfrac{x}{7} = \dfrac{30}{4}$

$x = \dfrac{30}{4} \times 7$

$x = 52.5m$

How long to run 40m?

$\Rightarrow \dfrac{\text{Time}}{\text{Distance}}$　$\dfrac{x}{40} = \dfrac{4}{30}$

$x = \dfrac{4}{30} \times 40$

$x = 5.\overline{3}$ seconds

May 17-2:19 PM

Unit rate
finding the comparison to "one"

Eg　Speed $= \dfrac{\text{Distance}}{\text{Time}}$

350 km in 4 hours

$\Rightarrow 350 \div 4$

$= 87.5$ km/h

May 17-2:28 PM

Taxes

5% GST = Goods and Services Tax

8% PST = Provincial Sales Tax

13% HST = Harmonised Sales Tax

Added onto the price

May 17-2:33 PM

Discounts

These are applied to the ticket price.

You then add the required tax onto the sale price.

May 17-2:36 PM

Commission

People can be paid a percentage of their sales. This is called commission.

May 17-2:39 PM

Simple Interest

$$I = P \times r \times t$$

Interest   Principal (start amount)   rate ($\div 100$)   time in years

$$A = P + I$$

end amount

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Ratios, Rates & Percentages Review

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Solutions

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Key Words

For questions 1 to 6, match each definition to one of these words:

commission	discount	principal
proportion	rate	ratio
sales taxes	simple interest	speed
unit price	unit rate	

1. a comparison of quantities measured in different units

   RATIO

2. a statement that two ratios are equal

   PROPORTION

3. the price of one unit, used in shopping

   UNIT PRICE

4. an amount subtracted from a listed price to give a sale price

   DISCOUNT

5. money collected by the government on purchases

   SALES TAXES

6. a payment, expressed as a percent, earned on sales

   COMMISSION

Apr 28-22:22

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7. Write a ratio, in simplest form, to compare the number of buttons of each colour.

   a) green to blue
   b) green to yellow

   a) 3 : 5
   b) 3 : 6
      = 1 : 2

8. Find the missing number in each proportion.

   a) 12:8 = 6:■
   b) 3:■ = 12:20
   c) 7:2 = ■:10

   a) $\begin{array}{c} 12 : 8 \\ 6 : 4 \end{array}$ ÷2, ÷2

   b) $\begin{array}{c} 3 : 5 \\ 12 : 20 \end{array}$ ÷4, ÷4

   c) $\begin{array}{c} 7 : 2 \\ 35 : 10 \end{array}$ ×5, ×5

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6

9. A baseball team has a win-loss record of 30:25.

   a) Write this as a ratio in simplest form.
   b) Predict the team's final record at the end of a 165-game season. What assumption do you need to make?

a) $\div 5 \left(\dfrac{30:25}{6:5} \right) \div 5$

b) Ratio of 6:5
$\Rightarrow 6+5 = 11$ parts
$165 \div 11 = 15$
multiply ratio by 15
$\Rightarrow 90:75$

10. Write each as a unit rate.

   a) Sonya walked 500 m in 5 min.
   b) It costs 99¢ for 3 lemons.
   c) Jordan typed 150 words in 6 min.

a) $500 \div 5 = 100$ m/min

b) $99 \div 3 = 33$ ¢/lemon

c) $150 \div 6 = 25$ words/min

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11. It costs $2.45 for 500 mL of soy sauce.

   a) Express this as a unit price per 100 mL.
   b) How much would 1.5 L of soy sauce cost?

a) $\dfrac{Price}{Volume}$
$\Rightarrow \dfrac{x}{100} = \dfrac{2.45}{500}$
$x = \dfrac{2.45}{500} \times 100$
$x = \$0.49/100mL$

b) $1.5 L = 1500 mL$
$\Rightarrow \dfrac{x}{1500} = \dfrac{2.45}{500}$
$x = \dfrac{2.45}{500} \times 1500$
$x = \$7.35$

12. Julie drove 150 km in 2 h, at a fairly constant speed.

   a) Express this as a unit rate.
   b) At this rate, how far will Julie travel in 5 h?
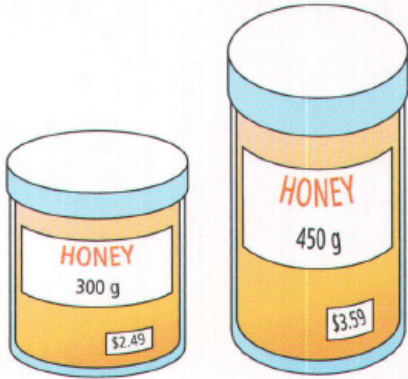   c) Describe any assumptions you must make.

a) $150 km \div 2 hrs = 75$ km/h

b) $\dfrac{Distance}{Time}$
$\Rightarrow \dfrac{x}{5} = \dfrac{150}{2}$
$x = \dfrac{150}{2} \times 5$
$x = 375$ km

c) Assume you drive at the same rate.

Apr 28-22:28

13. Which is the better buy? Justify your choice.

$$\frac{Price}{mass}$$

Smaller $\Rightarrow \dfrac{2.49}{300}$

Larger $\Rightarrow \dfrac{3.59}{450}$

$= \$0.008\overline{3}/g$

$= \$0.00797/g$

$\Rightarrow$ Larger is better value as it costs less per gram.

Apr 28-22:29

14. Find the 7% GST and the 8% PST on each item.

	Item	Price
a)	Sweater	$28.95
b)	Bracelet	$10.99
c)	Camera	$239.00

GST

$= 28.95 \times 0.07$
$= \$2.03$

$= 10.99 \times 0.07$
$= \$0.77$

$= 239.00 \times 0.07$
$= \$16.73$

PST

$= 28.95 \times 0.08$
$= \$2.32$

$= 10.99 \times 0.08$
$= \$0.88$

$= 239.00 \times 0.08$
$= \$19.12$

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15. Estimate, then calculate, each discount.
  a) 30% off a picture frame, regular price $15.95
  b) 25% off a filing cabinet, regular price $59.85
  c) 20% off a magazine subscription, regular price $28.00

Estimates
$5.30
$15
$5.50

Actual discounts

a) 15.95×0.30
$= \$4.79$

b) 59.85×0.25
$= \$14.96$

c) 28×0.20
$= \$5.60$

Apr 28-22:30

16. The regular price of a knapsack is $39.95. Now, it is marked down by 25%. It is subject to both 7% GST and 8% PST.
  a) Estimate the final price.
  b) Calculate the discount and the sale price.
  c) Calculate the total sales tax and the final price.
  d) Compare the final price to your estimate. How close were you?

a) $35

b) Discount
$= 39.95 \times 0.25$
$= \$9.99$
Sale price
$= 39.95 - 9.99$
$= \$29.96$

c) Sales tax
$= 29.96 \times 0.15$ Total tax is 15%
$= \$4.49$
Final price
$= 29.96 + 4.49$
$= \$34.45$

d) Quite close!
$35 vs $34.45

Apr 28-22:30

9

17. The regular price of a snowboard is $349. Now, it is marked at 35% off.

a) What is the sale price?
b) Find the total price, including 7% GST and 8% PST.

a) Discount
$= 349 \times 0.35$
$= \$122.15$

Sale price
$= 349 - 122.15$
$= \$226.85$

Total tax $= 15\%$

b) Total price
$= 226.85 \times 1.15$
$= \$260.88$

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18. Tomka earns 40% commission on the make-up that she sells. How much will she earn on each sale?

a) 1 eye shadow   **b)** 2 lipsticks
c) 1 mascara, 3 nail polishes, and 2 eye shadows

eye shadow	nail polish	lipstick	mascara
$7.50	$4.59	$5.95	$5.95

a) 7.50×0.40
$= \$3$

b) $2 \times 5.95 \times 0.40$
$= \$4.76$

c) $[5.95 + 3(4.59) + 2(7.50)] \times 0.40$
$= [5.95 + 13.77 + 15] \times 0.40$
$= [34.72] \times 0.40$
$= \$13.89$

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19. Aria earns a 3% commission on real estate sales.

a) What is her commission if she sells a house for $150 000?

b) Aria receives a commission cheque for a house sale. The cheque is for $6000. What was the selling price of the house?

a) $150{,}000 \times 0.03$
= $4500

b) Commission
= sales × rate

$$\frac{6000}{0.03} = \frac{y \times 0.03}{0.03}$$

$200{,}000 = y$
⟹ House sold for $200,000

Apr 28-22:32

20. Ian deposits $700 into an account that earns 6% interest per year.

a) How much interest is earned in 5 years?

b) What is the total amount after 5 years?

a) $I = P \times r \times t$
$I = 700 \times 0.06 \times 5$
$I = \$210$

b) $A = P + I$
$A = 700 + 210$
$A = \$910$

I = Interest
P = Principal [start amount]
r = rate ÷ by 100
t = time in years

Apr 28-22:32

11

21. Suhanna borrows $350 for 18 months at a rate of $8\frac{1}{2}$% interest per year. What total amount must she pay when the loan is due?

18 months
$$= \frac{18}{12} = 1.5 \text{ years}$$

$$I = P \times r \times t$$
$$I = 350 \times 0.085 \times 1.5$$
$$I = \$44.63$$
$$A = P + I$$
$$A = 350 + 44.63$$
$$A = \$394.63$$

Apr 28-22:33

22. $1000 is deposited into an account for 3 months. The account earns $5\frac{1}{4}$% interest per year. How much interest is earned?

3 months
$$= \frac{3}{12}$$
$$= 0.25 \text{ months}$$

$$I = P \times r \times t$$
$$I = 1000 \times 0.0525 \times 0.25$$
$$I = \$13.13$$

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