Solutions

4. Vera earns $8.00/h working at a coffee shop. How much will she earn in

a) a 4-h shift?

b) a 35-h work week?

a) $\frac{\text{money}}{\text{time}}$

$\frac{x}{4} = \frac{8}{1}$

$x = \frac{8}{1} \times 4$

$x = \$32$

b) $\frac{x}{35} = \frac{8}{1}$

$x = \frac{8}{1} \times 35$

$x = \$280$

5. Don is paid $9.25/h. How much does he earn in

a) a 7-h day? **b)** a 37-h work week?

a) $\frac{\text{money}}{\text{time}}$

$\frac{x}{7} = \frac{9.25}{1}$

$x = \frac{9.25}{1} \times 7$

$x = \$64.75$

b) $\frac{x}{37} = \frac{9.25}{1}$

$x = \frac{9.25}{1} \times 37$

$x = \$342.25$

6. Find the unit rate in each situation.

a) Edmund rode his bicycle 60 km in 3 h.
b) Sasha earned $68 in 8 h.
c) Ron was charged $84 for a 7-h canoe rental.

a) 60km ÷ 3 hours
= 20 km/h

b) $68 ÷ 8 hours
= $8.50/h

c) $84 ÷ 7 hours
= $12/h

7. What is the unit rate in each?

a) The road crew painted 8 km of highway lane markers in 2 days.
b) The temperature rose 12°C in 5 h.
c) The tomato plant produced 36 tomatoes in 6 weeks.

a) 8 km ÷ 2 days
= 4 km/h

b) 12°C ÷ 5 hours
= 2.4°C/h

c) 36 tomatoes ÷ 6 weeks
= 6 tomatoes/week

8. Find the unit price for each item.

a) Fish costs $25.20 for 4 kg.
b) Shampoo costs $2.95 for 250 mL.
c) A can of apple juice costs $1.35 for 900 mL.

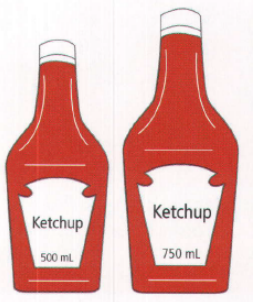
a) $25.20 ÷ 4kg
= $6.30/kg

b) $2.95 ÷ 250mL
= $0.0118/mL

c) $1.35 ÷ 900mL
= $0.0015/mL

9. Kiki is shopping for ketchup. Her favourite brand is available in two sizes.

a) Estimate which is the better buy. Explain your choice.
b) Justify your choice. Show calculations to support your reasoning.



a) The bigger bottle. Larger quantities are often the best value.

b) smaller
$1.99 ÷ 500
= $0.00398/mL

larger
$3.19 ÷ 750
= $0.004253

⟹ smaller bottle is better value.

10. A plane is cruising at a steady speed of 500 km/h.

a) How far will the plane travel in 4 h?

b) How long will it take the plane to travel 3000 km?

a) $\frac{\text{distance}}{\text{time}}$

$\frac{x}{4} = \frac{500}{1}$

$x = \frac{500}{1} \times 4$

$x = 2000 \text{ km}$

b) $\frac{\text{time}}{\text{distance}}$

$\frac{x}{3000} = \frac{1}{500}$

$x = \frac{1}{500} \times 3000$

$x = 6 \text{ hours}$

11. Ariel has scored 96 points in 8 games so far this season.

a) What is her unit rate of scoring?

b) At this rate, how many points can Ariel expect to score during a 24-game season?

a) 96 points ÷ 8 games

= 12 points/game

b) $\frac{\text{points}}{\text{games}}$

$\frac{x}{24} = \frac{96}{8}$

$x = \frac{96}{8} \times 24$

$x = 288 \text{ points}$

12. Pietro runs 200 m in 30 s, while his sister Wanda runs 300 m in 36 s.

a) Who is the faster runner? Explain how you can tell.

b) How far will each runner go in 2 min?

c) How long would it take for each runner to travel 1 km? State any assumptions that you must make.

a) calculate the unit rates

Pietro = 200m ÷ 30s

$= 6.\overline{6}$ m/s

Wanda = 300m ÷ 36s

$= 8.\overline{3}$ m/s

⟹ Wanda is faster.

b) 2 mins = 60 secs

Pietro = $6.\overline{6} \times 60$

= 400m

Wanda = $8.\overline{3} \times 60$

= 500m

c) $\frac{\text{Time}}{\text{Distance}}$ (assume unit rate can be maintained)

1 km = 1000m

Pietro

$\frac{x}{1000} = \frac{30}{200}$

$x = \frac{30}{200} \times 1000$

$x = 150\text{s}$

Wanda

$\frac{x}{1000} = \frac{36}{300}$

$x = \frac{36}{300} \times 1000$

$x = 120\text{s}$

13. Each week, Karla earns $420 for 35 h of work at a factory. Her friend Enzo makes $440 for 40 h of work at a store.

a) Who has the greater hourly rate of pay?
b) How much does Enzo earn in an 8-h shift?

a) Find unit rate
Karla = 420 ÷ 35
= $12/h
Enzo = 440 ÷ 40
= $11/h
⇒ Karla has the greater rate of pay

b) $\frac{\text{money}}{\text{time}}$

$\frac{x}{8} = \frac{440}{40}$

$x = \frac{440}{40} \times 8$

$x = \$88$

14. It takes Famke 10 min to type one quarter of her 1000-word essay.

a) What is Famke's average typing speed, in words per minute?
b) At this rate, how long will it take for Famke to finish typing her essay?

$\frac{1}{4}$ of 1000
= 250 words

a) Unit rate (speed)
= 250 ÷ 10
= 25 words/min

b) $\frac{\text{Time}}{\text{Words}}$

$\frac{x}{1000} = \frac{10}{250}$

$x = \frac{10}{250} \times 1000$

$x = 40$ mins

15. A 500-g package of pastrami costs $6.25.

a) Determine the unit price per 100 g.
b) What would 750 g of pastrami cost?
c) How much would 2 kg cost?

a) $\frac{\text{Price}}{\text{mass}}$

$\frac{x}{100} = \frac{6.25}{500}$

$x = \frac{6.25}{500} \times 100$

$x = \$1.25/100\text{g}$

b) $\frac{x}{750} = \frac{6.25}{500}$

$x = \frac{6.25}{500} \times 750$

$x = \$9.375$

$x = \$9.38$

c) $\frac{x}{2000} = \frac{6.25}{500}$

$x = \frac{6.25}{500} \times 2000$

$x = \$25$

16. The forecast for an outdoor concert is sunny and hot. Because there is no shade for the audience, each person should drink at least one 500-mL bottle of water every 2 h.

a) How many millilitres will each person need for a 10-h concert? How many litres is this?

b) How many litres should you have available, if you expect 1000 people to attend?

c) At the 2003 Rolling Stones concert in Toronto, almost 500 000 people attended. It was a hot, sunny day with no shade. If everyone stayed for the entire concert, how many litres of water were needed?

a) $\frac{\text{Vol}}{\text{Time}}$

$\frac{x}{10} = \frac{500}{2}$

$x = \frac{500}{2} \times 10$

$x = 2500\text{mL}$

b) 2500 mL per person

$2500 \div 1000$

$= 2.5\text{L/person}$

$\Rightarrow 2.5 \times 1000$ people

$= 2500\text{ L}$ of water

c) $\frac{\text{Vol}}{\#\text{people}} \Rightarrow \frac{x}{500{,}000} = \frac{2500}{1000}$

$x = \frac{2500}{1000} \times 500{,}000$

$x = 1{,}250{,}000\text{ L}$

[for a 10 hour concert]

17. The makers of Purr 'n' Chew cat food want to price their cat food so that it costs just less than their main competitor, Happy Kitty.

A 5-kg bag of Happy Kitty costs $12.99.

a) What is the maximum price that Purr 'n' Chew should charge for their 4-kg bag of cat food?

b) Explain how you found this price.

a) $\frac{\text{cost}}{\text{mass}}$

PnC : HK

$\frac{x}{4} = \frac{12.99}{5}$

$x = \frac{12.99}{5} \times 4$

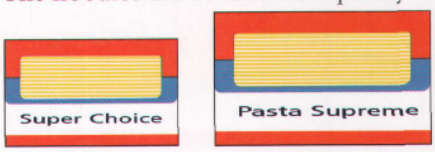
$x = \$10.392$

$\Rightarrow$ Charge \$10.39 or less

b) I found the price that would give the same unit cost (\$10.392). I rounded down to the nearest cent (\$10.39)

Try This!

18. Two brands of noodles are shown. The noodles are of the same quality.



Super Choice	Pasta Supreme
700 g	1.25 kg
99¢	$1.29

a) Without calculating, which do you think is the better buy? Explain your decision.

b) Find the unit price per 100 g for each brand.

c) Which is the better buy? Explain your choice. Compare it with your prediction.

d) Explain why estimating unit costs is useful when grocery shopping.

a) Pasta Supreme as bigger packs are USUALLY better value.

b) Super Choice
= $0.99 ÷ 700 × 100
= $0.141/100g
Pasta Supreme
= $1.29 ÷ 1250 × 100
= $0.103/100g

c) Pasta Supreme is the better choice because it costs less per 100g
I was correct with my prediction :)

d) It can help to identify bargains and your total spending!