

# RATIO

**1** In July, a supermarket sold 45 981 bottles of fruit juice.

- (a) The cost of a bottle of fruit juice was \$1.35 .

Calculate the amount received from the sale of the 45 981 bottles.  
Give your answer correct to the nearest hundred dollars.

*Answer(a)* \$ ..... [2]

- (b) The number of bottles sold in July was 17% more than the number sold in January.

Calculate the number of bottles sold in January.

*Answer(b)* ..... [3]

- (c) There were 3 different flavours of fruit juice.

The number of bottles sold in each flavour was in the ratio apple : orange : cherry = 3 : 4 : 2.

The total number of bottles sold was 45 981.

Calculate the number of bottles of orange juice sold.

*Answer(c)* ..... [2]

- (d) One bottle contains 1.5 litres of fruit juice.

Calculate the number of 330 ml glasses that can be filled completely from one bottle.

*Answer(d)* ..... [3]

- (e)  $\frac{5}{9}$  of the 45 981 bottles are recycled.

Calculate the number of bottles that are recycled.

*Answer(e)* ..... [2]

MARKING SCHEME:

(a)	62100[.00] Final answer	2	<b>B1</b> for 62074[. 35] or 62070
(b)	39300	3	<b>M2</b> for $45981 \div 1.17$ oe <b>or M1</b> for 45981 associated with 117 [%]
(c)	20436	2	<b>M1</b> for $45981 \div (3+4+2)$ or $45981 \times 4$
(d)	4	3	<b>M2</b> for $\frac{1.5 \times 1000}{330}$ oe <b>or M1</b> for figs 4545... or 455
(e)	25545	2	<b>M1</b> for $45981 \times \frac{5}{9}$

**2** 12 000 vehicles drive through a road toll on one day.  
The ratio cars : trucks : motorcycles = 13 : 8 : 3.

**(a) (i)** Show that 6500 cars drive through the road toll on that day.

*Answer(a)(i)*

[1]

**(ii)** Calculate the number of trucks that drive through the road toll on that day.

*Answer(a)(ii)* ..... [1]

**(b)** The toll charges in 2014 are shown in the table.

Vehicle	Charge
Cars	\$2
Trucks	\$5
Motorcycles	\$1

Show that the total amount paid in tolls on that day is \$34 500.

*Answer(b)*

[2]

(c) This total amount is a decrease of 8% on the total amount paid on the same day in 2013.

Calculate the total amount paid on that day in 2013.

*Answer(c)* \$..... [3]

(d) 2750 of the 6500 car drivers pay their toll using a credit card.

Write down, in its simplest terms, the fraction of car drivers who pay using a credit card.

*Answer(d)* ..... [2]

(e) To the nearest thousand, 90 000 cars drive through the road toll in one week.

Write down the lower bound for this number of cars.

*Answer(e)* ..... [1]

MARKING SCHEME:

(a) (i)	$\frac{13}{13+8+3} \times 12000$ with no subsequent errors	1	
(ii)	4000	1	
(b)	$2 \times 6500 + 5 \times \textit{their(a)(ii)} + (12000 - 6500 - \textit{their(a)(ii)})$ or $(13 \times 2 + 8 \times 5 + 3 \times 1) \times 500$	2	<b>B1</b> for any two of $2 \times 6500$ , $5 \times \textit{their(a)(ii)}$ , $(12000 - 6500 - \textit{their(a)(ii)})$ seen or $13 \times 2 + 8 \times 5 + 3 \times 1$
(c)	37 500	3	<b>M2</b> for $\frac{34500}{100-8} \times 100$ oe or <b>M1</b> for 34500 associated with (100 – 8)%
(d)	$\frac{11}{26}$ cao	2	<b>M1</b> for any correct simplified version of $\frac{2750}{6500}$
(e)	89 500	1	

- 3** (a) Last year a golf club charged \$1650 for a family membership.  
This year the cost increased by 12%.

Calculate the cost of a family membership this year.

*Answer(a)* \$ ..... [2]

- (b) The golf club runs a competition.  
The total prize money is shared in the ratio 1st prize : 2nd prize = 9 : 5.  
The 1st prize is \$500 more than the 2nd prize.

- (i) Calculate the total prize money for the competition.

*Answer(b)(i)* \$ ..... [2]

- (ii) What percentage of the total prize money is given as the 1st prize?

*Answer(b)(ii)* ..... % [1]

- (c) For the members of the golf club the ratio men : children = 11 : 2.  
The ratio women : children = 10 : 3.

- (i) Find the ratio men : women.

*Answer(c)(i)* ..... : ..... [2]

(ii) The golf club has 24 members who are children.

Find the total number of members.

*Answer(c)(ii)* ..... [3]

(d) The club shop sold a box of golf balls for \$20.40 .  
The shop made a profit of 20% on the cost price.

Calculate the cost price of the golf balls.

*Answer(d)* \$ ..... [3]

MARKING SCHEME:

(a)	1848 final answer	2	<b>M1</b> for $1650 \times \left(1 + \frac{12}{100}\right)$ oe
(b) (i)	1750	2	<b>M1</b> for $\frac{500}{9-5}$ [ $\times 5$ ] or [ $\times 9$ ] or any equation which would lead to $4x = 500$ or $4x = 2500$ or $4x = 4500$ or $4x = 7000$ when simplified
(ii)	$64\frac{2}{7}$ or 64.3 or 64.28 to 64.29	1	
(c) (i)	33 : 20 oe	2	<b>B1</b> for 33 : 6 or 20 : 6 or 5.5 oe seen or 3.33...oe seen or <b>M1</b> for two ratios with a common number of children implied by $20k$ <b>and</b> $33k$ seen, $k > 0$
(ii)	236	3	<b>M2</b> for $\frac{24}{2} \times 11 + \frac{24}{3} \times 10$ oe or $((3 \times 11) + (2 \times 10)) \times 24 \div 6$ or $\frac{6}{6+20+33} \times x = 24$ or <b>M1</b> for $\frac{24}{2} \times 11$ or $\frac{24}{2} \times 13$ soi or $\frac{24}{3} \times 10$ or $\frac{24}{3} \times 13$ soi oe or $24 \div 6$ soi
(d)	17[.00]	3	<b>M2</b> for $20.40 \div \left(1 + \frac{20}{100}\right)$ oe or <b>M1</b> for $(100 + 20)\%$ oe associated with 20.40 seen



**4**

(a) Kristian and Stephanie share some money in the ratio 3 : 2.  
Kristian receives \$72.

(i) Work out how much Stephanie receives.

\$ ..... [2]

(ii) Kristian spends 45% of his \$72 on a computer game.

Calculate the price of the computer game.

\$ ..... [1]

(iii) Kristian also buys a meal for \$8.40 .

Calculate the fraction of the \$72 Kristian has left after buying the computer game and the meal.  
Give your answer in its lowest terms.

..... [2]

(iv) Stephanie buys a book in a sale for \$19.20 .  
This sale price is after a reduction of 20%.

Calculate the original price of the book.

\$ ..... [3]

- (b) Boris invests \$550 at a rate of 2% per year simple interest.

Calculate the amount Boris has after 10 years.

\$ ..... [3]

- (c) Marlene invests \$550 at a rate of 1.9% per year compound interest.

Calculate the amount Marlene has after 10 years.

\$ ..... [2]

- (d) Hans invests \$550 at a rate of  $x\%$  per year compound interest.

At the end of 10 years he has a total amount of \$638.30, correct to the nearest cent.

Find the value of  $x$ .

$x =$  ..... [3]

**MARKING SCHEME:**

<b>(a) (i)</b>	48	2	<b>M1</b> for $\frac{72}{3}$
<b>(ii)</b>	32.4[0]	1	
<b>(iii)</b>	$\frac{13}{30}$	2	<b>M1</b> for $\frac{72 - \text{their}(ii) - 8.4}{72}$ oe
<b>(iv)</b>	24	3	<b>M2</b> for $\frac{19.2}{0.8}$ oe or <b>M1</b> for recognising 19.2 is 80%
<b>(b)</b>	660	3	<b>M2</b> for $\frac{550 \times 2 \times 10}{100} + 550$ oe or <b>M1</b> for $\frac{550 \times 2 \times 10}{100}$ oe
<b>(c)</b>	663.9[0]	2	<b>M1</b> for $550 \times 1.019^{10}$ oe
<b>(d)</b>	1.5[0]	3	<b>M2</b> for $\sqrt[10]{\frac{638.3[0]}{550}}$ oe or <b>M1</b> for $550 \times m^{10} = 638.3[0]$

**5**

Mr Chan flies from London to Los Angeles, a distance of 8800 km.  
The flight takes 11 hours and 10 minutes.

- (a) (i) His plane leaves London at 09 35 local time.  
The local time in Los Angeles is 8 hours behind the time in London.

Calculate the local time when the plane arrives in Los Angeles.

..... [2]

- (ii) Work out the average speed of the plane in km/h.

..... km/h [2]

- (b) There are three types of tickets, economy, business and first class.  
The price of these tickets is in the ratio economy : business : first class = 2 : 5 : 9.

- (i) The price of a business ticket is \$2350.

Calculate the price of a first class ticket.

\$..... [2]

- (ii) Work out the price of an economy ticket as a percentage of the price of a first class ticket.

.....% [1]

- (c) The price of a business ticket for the same journey with another airline is \$2240.

- (i) The price of a first class ticket is 70% more than a business ticket.

Calculate the price of this first class ticket.

\$..... [2]

- (ii) The price of a business ticket is 180% **more** than an economy ticket.

Calculate the price of this economy ticket.

\$..... [3]

- (d) Mr Chan hires a car in Los Angeles.  
The charges are shown below.

<p><b><u>Car Hire</u></b></p> <p>\$28.00 per day plus \$6.50 per day insurance.</p> <p>\$1.25 for every kilometre travelled after the first 800 km. The first 800 km are included in the price.</p>
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Mr Chan hired the car for 12 days and paid \$826.50 .

- (i) Find the number of kilometres Mr Chan travelled in this car.

..... km [4]

- (ii) The car used fuel at an average rate of 1 litre for every 10 km travelled.  
Fuel costs \$1.30 per litre.

Calculate the cost of the fuel used by the car during the 12 days.

\$..... [2]

**MARKING SCHEME:**

<b>(a) (i)</b>	12 45 [pm]	<b>2</b>	<b>B1</b> for 20 45 seen or 8 45 pm seen or [0]1 35 seen
<b>(ii)</b>	788 or 787.8 to 788.1	<b>2</b>	<b>M1</b> for $8800 \div 11\text{h } 10\text{ mins oe}$
<b>(b) (i)</b>	4230[.00]	<b>2</b>	<b>M1</b> for $2350 \div 5\text{ oe}$
<b>(ii)</b>	22.2 or 22.2...	<b>1</b>	
<b>(c) (i)</b>	3808 final answer	<b>2</b>	<b>M1</b> for $2240 \times \frac{100+70}{100}\text{ oe}$
<b>(ii)</b>	800	<b>3</b>	<b>M2</b> for $2240 \div \frac{100+180}{100}\text{ oe}$ or <b>M1</b> for 2240 associated with 280%
<b>(d) (i)</b>	1130	<b>4</b>	<b>M3</b> for $(826.5[0] - 12 \times (28 + 6.5[0])) \div 1.25$ seen or <b>M2</b> for $826.5[0] - 12 \times (28 + 6.5[0])$ seen or <b>M1</b> for $12 \times (28 + 6.5[0])$ seen
<b>(ii)</b>	\$146.9[0] final answer	<b>2FT</b>	<b>FT</b> <i>their</i> (d)(i) $\times 0.13$ correctly evaluated If answer not exact to at least 3 sf or better <b>M1</b> for <i>their</i> (d)(i) $\div 10 \times 1.3$