NUMBERS

1 Conrad, Delia and Eli share \$8000 in the ratio Conrad : Delia : Eli = 5 : 7 : 8 .

(a) Show that Eli receives \$3200.

[2]

(b) Conrad buys a toy for \$65.
He sells it for \$55.

Calculate the percentage loss.

..... % [3]

(c) Delia invests \$2500 at a rate of 2.5% per year simple interest.

Calculate the interest Delia has at the end of 8 years.

\$ ..... [2]

(d) Eli invests \$2400 at a rate of 2.4% per year compound interest.

Calculate the interest Eli has at the end of 8 years.

\$ ..... [3]

(e) Conrad buys a coat in a sale.
The sale price is \$79.80 after a reduction of 5%.

Calculate the original price of the coat.

\$ ..... [3]

MARKSCHEME:

(a)	$\frac{8000}{5+7+8} \times 8$ [= 3200]	**M2**	**M1** for 8000 ÷ (5 + 7 + 8) If 0 scored **SC1** for $\frac{3200}{8} \times 20 = 8000$ oe
(b)	15.4 or 15.38…	**3**	**M2** for $\frac{65-55}{65}$[×100] or $\frac{55}{65} \times 100$ or $1-\frac{55}{65}$ or **M1** for 65 − 55 or $\frac{55}{65}$
(c)	500	**2**	**M1** for $\frac{2500 \times 2.5 \times 8}{100}$ oe
(d)	501.42	**3**	**M2** for 2400 × 1.024^8 oe (2901 or 2901.4[0] or 2901.42…) or **M1** for 2400 × 1.024^n oe where $n > 1$
(e)	84	**3**	**M2** for 79.80 ÷ $\left(1-\frac{5}{100}\right)$ oe or **M1** for recognising 79.80 is 95%

2 Every year the value of Xavier's car decreases by 10%.

The value is now \$12 960.

(a) Calculate the value of the car 2 years ago.

\$ ..... [2]

(b) Calculate the number of complete years it will take for the value to decrease from \$12 960 to less than \$6480.

..... [3]

MARKSCHEME:

(a)	16 000	**2**	**M1** for $12\,960 \div \left(1-\frac{10}{100}\right)^2$ oe or **B1** for 14400
(b)	7 nfww	**3**	**B2** for 6.58 or 6.578 to 6.579 or **M2** for $\frac{\log\left(\frac{6480}{12960}\right)}{\log 0.9}$ oe or appropriate sketch or at least two trials with $n > 3$ or **M1** for $12960 \times \left(1-\frac{10}{100}\right)^n = 6480$ oe if 0 scored, **SC1** for answer 9 nfww, coming from 16000

3 Sam walks for 30 minutes at 4 km/h and then runs 5 km in 25 minutes.

Calculate his average speed.
Give your answer in km/h.

..... km/h [3]

(b) (i) Tami walks for 10 minutes at x km/h and then runs y kilometres in z minutes.

Find her average speed in terms of x, y and z.
Give your answer in km/h, in its simplest form.

..... km/h [3]

(ii) When Tami walks for 10 minutes at 3 km/h and then runs for 20 minutes, her average speed is 11 km/h.

Find the distance Tami runs.

..... km [2]

(c) Urs walks for t minutes at 3 km/h and then runs for $(t+\quad)$ 10 minutes at 7 km/h.

(i) Show that his average speed is $\frac{5t+35}{t+5}$ km/h.

[3]

(ii) When the average speed is $5\frac{1}{2}$ km/h, find the value of t.

$t =$ ..... [2]

MARKSCHEME:

(b)(i)	$\frac{10x+60y}{10+z}$ or $\frac{10(x+6y)}{10+z}$	**3**	**M2** for $\left(\frac{x\times\frac{10}{60}+y}{\frac{10}{60}+\frac{z}{60}}\right)$ oe or **M1** for total distance = $x\times\frac{10}{60}+y$ or total time = $\frac{10}{[60]}+\frac{z}{[60]}$
(b)(ii)	5	**2**	**M1** for correct substitution of $x = 3$, $z = 20$ and average speed = 11 in *their* formula which must contain x, y and z. or **B1** for 5.5 oe or 330 seen
(c)(i)	$\frac{3t}{60}+\frac{7(t+10)}{60}$ oe	**M1**	
	$\frac{t}{[60]}+\frac{t+10}{[60]}$	**M1**	The two **M1**s may be seen together in a correct fraction
	Correct simplification to $\frac{5t+35}{t+5}$ seen	**A1**	dep on M1M1 At least one line of working and no errors
(c) (ii)	15	**2**	**M1** for $(5t + 35) = \left(5\frac{1}{2}\right)(t + 5)$ oe or better

4 **(a)** Work out.

$$\frac{\sqrt[3]{402}}{3.15^2}$$

..... [1]

(b) Write 130.47 correct to

(i) one decimal place,

..... [1]

(ii) one significant figure.

..... [1]

(c) Work out 23% of \$76.80 .

\$ ..... [2]

(d) \$4200 is shared in the ratio 3 : 4 : 6 : 8 .

Find the difference between the largest share and the smallest share.

\$ ..... [3]

(e) Write down an irrational number less than 10.

..... [1]

(f) Work out $7.31 \times 10^{-2} + 1.56 \times 10^{-1}$.
Give your answer in standard form.

..... [2]

MARKSCHEME:

1(a)	0.744 or 0.7437 to 0.7438	**1**	
(b)(i)	130.5 final answer	**1**	
(b)(ii)	100 [.00] final answer	**1**	
(c)	17.66	**2**	**M1** for 0.23×76.8 oe
(d)	1000	**3**	**M2** for $\frac{8-3}{3+4+6+8} \times 4200$ oe or **M1** for $\frac{4200}{3+4+6+8}$ [×3 or 8] oe
(e)	Any irrational number less than 10	**1**	e.g. π, $\sqrt{12}$, e ; and not with decimal or fractional equivalent
1(f)	$2.29[1] \times 10^{-1}$ final answer	**2**	**B1** for figs 229[1]

5 Flavia makes china cats.
They each cost $22.60 to make.

(a) Flavia sells some of them to Ari.
She makes a profit of 35% on each cat.

Calculate the price Ari pays for each cat.

$ ..... [2]

(b) Ari sells each cat for $43.

Calculate Ari's percentage profit.

.....% [3]

(c) Jean buys 92 of Flavia's cats.
This is 15% more than the number Ari bought.

Calculate the number of cats that Ari bought.

..... [3]

(d) Jean bought the cats for $32 each.
He sells some of the cats for $45 each.
For the rest of the cats he reduces the price by 5% each day.

Find the number of reductions he has made when the price first falls below $32.

..... [3]

MARKSCHEME:

(a)	30.51	**2**	**M1** for $22.6 \times \left(1+\frac{35}{100}\right)$ oe
(b)	40.9 or 40.93 to 40.94	**3**	**M2** for $\frac{43-\textit{their}\ 30.51}{\textit{their}\ 30.51}$ [× 100] oe or **M1** for 43 – *their* 30.51 or $\frac{43}{\textit{their}\ 30.51}$
(c)	80	**3**	**M2** for $92 \div \left(1+\frac{15}{100}\right)$ oe or **M1** for 92 = 115% oe
(d)	7 nfww	**3**	**M2** for $\frac{\log(\frac{32}{45})}{\log 0.95}$ soi by 6.64 to 6.65 or trials as far as $n = 5$ or **M1** for 45×0.95^n oe soi

6 In a sale, a shop reduces all its prices by 15%.

(a) Calculate the sale price of a television originally costing \$630.

\$ ..... [2]

(b) The price of a fridge in the sale is \$952.

Calculate the original price.

\$ ..... [3]

(c) After one week the shop reduces the price of the television in **part (a)** by a further 5% each week until it is sold.

Calculate the number of weeks from the start of the sale until the television reaches half the original price.

..... [4]

MARKSCHEME:

(a)	535.5[0] final answer	**2**	**M1** for $630 \times \left(1-\frac{15}{100}\right)$ oe
(b)	\$1120	**3**	**M2** for $952 \div \left(1-\frac{15}{100}\right)$ oe or **M1** for 85% associated with 952
(c)	12 nfww	**4**	**M3** for $n\log\left(1-\frac{5}{100}\right) = \log\left(\frac{\frac{1}{2}(630)}{their\,535.50}\right)$ oe soi by 10.3 or 10.4 or 10.34 to 10.36… or correct trials as far as 10 and 11 or suitable sketch(es) e.g. $y = 535.5 \times 0.95^x$ and $y = 315$ or **M2** for $\left(1-\frac{5}{100}\right)^n = \left(\frac{\frac{1}{2}(630)}{their\,535.50}\right)$ oe or at least 3 correct trials or final answer 11 nfww or **M1** for *their* $535.5 \times \left(1-\frac{5}{100}\right)^n = \frac{1}{2}(630)$ soi oe

7 Louis and Maria share \$50 in the ratio 11 : 14.

(a) Show that Louis receives \$22.

[1]

(b) Louis and Maria each spend \$6 from their share of the \$50.

Find the new ratio Louis' money : Maria's money.

..... : ..... [2]

(c) Louis spends $\frac{17}{32}$ of his **remaining** money to buy a bus ticket.

Calculate the cost of the bus ticket.

\$ ..... [1]

(d) In a sale, a bookshop reduces the price of each book by 10%.
Maria buys two of these books.

(i) The first book Maria buys has an original price of \$6.

Calculate how much Maria pays for this book.

\$ ..... [2]

(ii) Maria pays \$3.69 for her second book.

Calculate the original price of this book.

\$ ..... [3]

MARKSCHEME:

(a)	$\frac{11}{11+14} \times 50$ or $\frac{11}{25} \times 50$ oe	**M1**	
(b)	16 : 22 oe isw	**2**	**M1** for 22 – 6 and 50 –22 – 6 oe If 0 scored, **SC1** for 22 : 16 oe
(c)	8.5[0]	**1**	
(d)(i)	5.4[0]	**2**	**M1** for 0.9 × 6 oe
(d)(ii)	4.1[0] nfww	**3**	**M2** for $\frac{3.69}{0.9}$ oe or **M1** for associating 3.69 with 90%