NEW CENTURY MATHS 11
MATHEMATICS STANDARD (PATHWAY 2)

FULLY WORKED SOLUTIONS

Chapter 9

SkillCheck

Question 1

a $148 \times 12 = \$1776$

b $350 \times 26 = \$9100$

c $276 \times 52 = \$14\,352$

d $2754 \div 12 = \$229.50$

e $182 \times 12 \div 52 = 2184 \div 52$
$= \$42$

Question 2

a $128 \div 2 = \$64$

b $128 \times 26 = \$3328$

c $3328 \div 12 = 277.333...$
$\approx \$277.33$

Question 3

a $0.03 \times 25\,680 = \$770.40$

b $0.025 \times 64\,320 = \$1608.00$

c $0.11 \times 12\,700 = \$1397.00$

d $0.04 \times 2564 = \$102.56$

e $0.065 \times 68\,530 = \$4454.45$

f $0.019 \times 72\,350 = \$1374.65$

Question 4

a $1\,\text{day} \quad (\times 24)$

$= 24 \text{ hours} \quad (\times 60)$

$= 1440 \text{ minutes}$

$\therefore \text{Lots of 10 minutes} = \dfrac{1440}{10}$

$= 144 \text{ cars per day}$

b $144 \times 7 = 1008 \text{ cars per week}$

c $1008 \times 52 \div 12 = 52\,416 \div 12$

$= 4368 \text{ cars per month}$

d $1008 \times 52 = 52\ 416 \text{ cars per year}$

Question 5

$150 \times \$1.69 = \$253.50$

Question 6

$10\% \text{ of } 65\,000 = \dfrac{10}{100} \times 65\,000$

$= \$6500$

$\therefore \text{Price after cash discount: } 65\,000 - 6500 = \$58\,500$

$3\% \text{ of } 58\,500 = \dfrac{3}{100} \times 58\,500$

$= \$1755$

$\therefore \text{Amount paid for car}: 58\,500 - 1755 = \$56\,745$

Exercise 9.01 Car insurance

Question 1

$$\begin{aligned}\text{Cost per year} &= 38.17 \times 12 \\ &= \$458.04 \\ \text{Cost per week} &= \$458.04 \div 52 \\ &= \$8.808... \\ &\approx \$8.81\end{aligned}$$

$\therefore$ C

Question 2

$$\begin{aligned}\text{Cost per year} &= 150 \times 12 \\ &= \$1800 \\ \therefore \text{Savings} &= 1800 - 1265 \\ &= \$535\end{aligned}$$

$\therefore$ D

Question 3

$426 + 75.78 \times 12 = \$1535.36$

Question 4

Convert each to a cost per year:

A: $\$985$ per year

B: $83.10 \times 12 = \$997.20$ per year

C: $38.25 \div 2 \times 52 = \$994.50$ per year

$\therefore$ A

Question 5

a Third party premium was \$198.

Need to pay $= 100\% - 20\% = 80\%$

$$\therefore 80\% \text{ of } \$198 = \frac{80}{100} \times 198$$
$$= \$158.40$$

b Third party premium was \$243.

Need to pay $= 100 - 3.5 = 96.5\%$

$$\therefore 96.5\% \text{ of } \$243 = \frac{96.5}{100} \times 243$$
$$= \$234.495$$
$$\approx \$234.50$$

c Third party premium was \$345.

Need to pay $= 100\% + 11.6\% = 111.6\%$

$$\therefore 111.6\% \text{ of } \$345 = \frac{111.6}{100} \times 345$$
$$= \$385.02$$

d Third party premium was \$312.

With age levy $= 100\% + 24\% = 124\%$

$$\therefore 124\% \text{ of } \$312 = \frac{124}{100} \times 312$$
$$= \$386.88$$

$\therefore$ Pay with loyalty discount $= 100 - 4.2 = 95.8\%$

$$\therefore 95.8\% \text{ of } \$386.88 = \frac{95.8}{100} \times 386.88$$
$$= \$370.631...$$
$$\approx \$370.63$$

Question 6

15% discount means that he paid $100\% - 15\% = 85\%$.

85% is amount paid $= \$734.45$

$$1\% = \frac{\$734.45}{85}$$
$$15\% = \frac{\$734.45}{85} \times 15$$
$$= \$129.608...$$
$$\approx \$129.61$$

$\therefore$ Discount is \$129.61.

Question 7

Base premium was \$379.67 without GST.

Need to pay = Base levy with GST + MCIS levy

As GST is 10% = 100%+10% = 110%

Base levy with gst = 110% of \$379.67

$$= \frac{110}{100} \times \$379.67$$

$$= \$417.637$$

MCIS levy = 24% of Base levy without GST

$$= \frac{24.42}{100} \times 379.67$$

$$= \$92.715...$$

$$\therefore \text{Total to pay} = \$417.637 + \$92.715...$$

$$= \$510.352...$$

$$\approx \$510.35$$

Question 8

a $238 + 19.35 \times 12 = \$470.20$

b $8.5\% \text{ of } \$7320 = \frac{8.5}{100} \times 7320$

$$= \$622.20$$

c \$1360 (he did not have comprehensive insurance to cover himself in the accident).

Question 9

a Need to pay $= 100\% + 14.6\% = 114.6\%$

$\therefore 114.6\% \text{ of } \$500 = 1.146 \times 500$

$= \$573$

b Need to pay $= 100\% + 9.8\% = 109.8\%$

$\therefore 109.8\% \text{ of } \$550 = 1.098 \times 550$

$= \$603.90$

c Need to pay $= 100\% - 4.6\% = 95.4\%$

$\therefore 95.4\% \text{ of } \$550 = 0.954 \times 550$

$= \$524.70$

d Need to pay $= 100\% - 6.3\% = 93.7\%$

$\therefore 93.7\% \text{ of } \$500 = 0.937 \times 500$

$= \$468.50$

e Need to pay $= 100\% + 14.6\% = 114.6\%$

$\therefore 114.6\% \text{ of } \$500 = 1.146 \times 500$

$= \$573$

f Need to pay $= 100\% + 13.5\% = 113.5\%$

$\therefore 113.5\% \text{ of } \$550 = 1.135 \times 550$

$= \$624.25$

Question 10

a **i** $0.26\% \text{ of } 125\,000 = \dfrac{0.26}{100} \times 125\,000 = 325$

ii $78\% \text{ of } 325 = 0.78 \times 325$
$= 253.5$
≈ 254

b **i** 70% chance of recovery, so $100\% - 70\% = 30\%$ of stolen cars never recovered
$\therefore 30\% = 2195$ cars
$1\% = \dfrac{2195}{30}$
$100\% = \dfrac{2195}{30} \times 100$
$= 7316.66...$
≈ 7317 cars stolen

ii $0.19\% = 7316.66...$
So, $1\% = \dfrac{7316.66...}{0.19}$
$\therefore 100\% = \dfrac{7316.66...}{0.19} \times 100$
$= 3\,850\,877.19...$
$\approx 3\,850\,877$ vehicles in Qld

Question 11

a $286 + 12.45 \times 52 = \$933.40$

b Total cost repairs $= 6320 + 4280$
$= \$10\,600$
Ellie paid 8.5%.
$\therefore$ Insurance paid $100\% - 8.5\% = 91.5\%$
$\therefore 91.5\% \text{ of } 10\,600 = \dfrac{91.5}{100} \times 10\,600$
$= \$9699$

c $100\% + 13.5\% = 113.5\%$
New premium $= 113.5\% \text{ of } 12.45$
$= \dfrac{113.5}{100} \times 12.45$
$= 14.130...$
$\approx \$14.13$ per week
$\therefore \$14.13 \times 52 = \$734.799...$
$\approx \$734.80$ per year

Question 12

a $317 + 272 + 264 = 853$

b $54.7\%\text{ of }214 + 52.9\%\text{ of }189$

$$= \frac{54.7}{100} \times 214 + \frac{52.9}{100} \times 189$$

$$= 217.039$$

$$\approx 217$$

c $\text{Not recovered} = 100 - 83 = 17\%$

$$\therefore 17\%\text{ of }182 = \frac{17}{100} \times 182$$

$$= 30.94$$

$$\approx 31$$

d Easier to break into.

Question 13

The number of men injured when driving (for driver, motorcyclist, pedal cyclist) is far greater than the number of women driving. This means the insurance premiums are more costly for males.

Exercise 9.02 Stamp duty

Question 1

$\$22\,120 \approx \$22\,200$ rounded up to nearest hundred

$\therefore 3\%\text{ of }22\,200 = \$666$

$\therefore$ D

Question 2

$\$55\,000 = \$45\,000 + \$10\,000$

$\begin{aligned}\text{Stamp duty} &= 3\%\text{ of }45\,000 + 5\%\text{ of }10\,000\\ &= \$1850\end{aligned}$

$\therefore$ C

Question 3

a **i** $\begin{aligned}3\%\text{ of }30\,000 &= 0.03\times 30\,000\\ &= \$900\end{aligned}$

ii $\begin{aligned}\$45\,000 &= \$30\,000 + \$10\,000 + \$5000\\ &3\%\text{ of }30\,000 + 11\%\text{ of }10\,000 + 4\%\text{ of }5000\\ &= 0.03\times 30\,000 + 0.11\times 10\,000 + 0.04\times 5000\\ &= \$900 + \$1100 + \$200\\ &= \$2200\end{aligned}$

iii $\begin{aligned}\$60\,000 &= \$30\,000 + \$10\,000 + \$20\,000\\ &3\%\text{ of }30\,000 + 11\%\text{ of }10\,000 + 4\%\text{ of }20\,000\\ &= 0.03\times 30\,000 + 0.11\times 10\,000 + 0.04\times 20\,000\\ &= \$900 + \$1100 + \$800\\ &= \$2800\end{aligned}$

b piecewise graph, goes through (0, 0), (30 000, 900), (40 000, 2000), (80 000, 3600)

c **i** \$3400

ii \$65 000

Question 4

a 2.75% of $\$20\,000 = 0.0275 \times 20\,000 = \$550$

b First \$20 000: \$550

Next \$25 000: 5.75% of $\$25\,000 = 0.0575 \times 25\,000$

$= \$1437.50$

$\therefore$ Stamp duty $= 550 + 1437.50$

$= \$1987.50$

c First \$20 000: \$550

Next \$25 000: \$1437.50

Rest: 6.5% of $(78\,500 - 45\,000) = 0.065 \times 33\,500$

$= \$2177.50$

$\therefore$ Stamp duty $= 550 + 1437.50 + 2177.50$

$= \$4165$

Question 5

a

i \$500

ii \$1500

iii \$2200

b

i \$90 000

ii \$70 000

iii \$45 000

Question 6

a $\dfrac{6350}{200} = 31.75$

≈ 32

$\therefore 32 \times \$10 = \$320$

b $\dfrac{68\,980}{200} = 344.9$

≈ 345

$\therefore 345 \times \$10 = \$3450$

c $\dfrac{146\,000}{200} = 730$

$\therefore 730 \times \$10 = \$7300$

Question 7

a $\$8000 = \$3000 + \$5000$

Stamp duty $= 60 + 0.04 \times 5000$

$= 60 + 200$

$= \$260$

b $\$12\ 500 = \$3000 + \$9500$

Stamp duty $= 60 + 0.04 \times 9500$

$= 60 + 380$

$= \$440$

c $\$69\ 750 = \$3000 + \$66\ 750$

Stamp duty $= 60 + 0.04 \times 66\,750$

$= 60 + 2670$

$= \$2730$

Question 8

a $5\%\text{ of } 57\,100 = 0.05 \times 57\,100$

$= \$2855$

b $2.5\%\text{ of } 22\,500 = 0.025 \times 22\,500$

$= \$562.50$

c $5\%\text{ of } 132\,400 = 0.05 \times 132\,400$

$= \$6620$

Question 9

a $1\%\text{ of } 980 = 0.01 \times 980$

$= \$9.80$

b $\$30 + 3\%\text{ of } (2850 - 2000) = 30 + 0.03 \times 850$

$= 30 + 25.5$

$= \$55.50$

c $\$60 + 4\%\text{ of } (3200 - 3000) = 60 + 0.04 \times 200$

$= 60 + 8$

$= \$68$

Question 10

a $\$18$

b $3\%\text{ of } 34\,800 = 0.03 \times 34\,800$

$= \$1044$

c $4\%\text{ of } 105\,500 = 0.04 \times 105\,500$

$= \$4220$

d $3\%\text{ of } 890 = 0.03 \times 890$

$= \$26.70$

e $\$1050 + 11\%\text{ of } (38\,750 - 35\,000)$

$= 1050 + 0.11 \times 3750$

$= 1050 + 412.50$

$= \$1462.50$

Exercise 9.03 On-road costs

Question 1

$$\begin{aligned}\text{Total cost} &= 2\% \text{ of } 15\,000 + 15\,000 + 200 + 150 + 240 \\ &= 0.02 \times 15\,000 + 15\,590 \\ &= 300 + 15\,590 \\ &= \$15\,890\end{aligned}$$

$\therefore$ D

Question 2

$$\begin{aligned}\text{GST price} &= 45\,000 + 10\% \text{ of } 45\,000 \\ &= 45\,000 + 0.1 \times 45\,000 \\ &= 45\,000 + 4500 \\ &= \$49\,500\end{aligned}$$

$$\begin{aligned}\therefore \text{ Stamp duty} &= \$49\,500 + 5\% \text{ of } 49\,500 + 860 + 420 \\ &= 49\,500 + 2475 + 860 + 420 \\ &= \$53\,255\end{aligned}$$

$\therefore$ B

Question 3

$$\begin{aligned}\text{GST price} &= 59\,600 + 10\% \text{ of } 59\,600 \\ &= 59\,600 + 0.1 \times 59\,600 \\ &= \$65\,560\end{aligned}$$

$$\begin{aligned}\text{Stamp duty} &= \$1350 + 5\% \times (65\,560 - 45\,000) \\ &= \$2380\end{aligned}$$

$$\begin{aligned}\therefore \text{Total cost} &= \$65\,560 + 2380 + 615 + 419 + 1625 \\ &= \$70\,599\end{aligned}$$

Question 4

$$\text{Stamp duty} = 1.5\% \text{ of } \$31\,280$$
$$= \$469.20$$

$$\therefore \text{Total cost} = \$31\,280 + 469.20 + 32 + 427 + 317$$
$$= \$32\,525.20$$

Question 5

15% discount means $100\% - 15\% = 85\%$ paid.

a Discount price: $85\% \times \$31\,468 = \$26\,747.80$

Price with GST: $110\% \times \$26\,747.80 = \$29\,422.58$

For stamp duty round up to nearest \$100:

Stamp duty: $3\% \text{ of } \$29500 = \$885$

Rego: \$325

CTP: \$614

3rd party property insurance: \$250

$$\therefore \text{Total cost} = \$29\,422.58 + \$885 + \$325 + \$614 + \$250$$
$$= \$31\,496.58$$

b Discount price: 85% × \$6500 = \$5525

Price with GST: 110% × \$5525 = \$6077.50

No stamp duty on GST prices of \$6500 or less.

Price: $0.85 \times 6500 = 5525$

Rego: \$318

CTP: \$598

No other insurance.

$$\therefore \text{Total cost} = \$6077.50 + \$318 + \$598$$
$$= \$6993.50$$

c Discount price: 85% × \$65 489 = \$55 665.65

Price with GST: 110% × \$55 665.65 = \$61 232.215

For stamp duty round up to nearest \$100: \$61 300

Stamp duty: \$1350 + 5% × (\$61 300 – \$45 000) = \$2165

Rego: \$336

CTP: \$437

Comprehensive insurance: \$999

Total = \$61 232.215 + \$2165 + \$336 + \$437 + \$999

= \$65 169.215

≈ \$65 169.22

d Discount price: 85% × $27 650 = $23 502.50
Price with GST: 110% × $23 502.50 = $25 852.75
For stamp duty round up to nearest $100: $25 900
Stamp duty: 3% × $25 900 = $777
Rego: $384
CTP: $503
No other insurance.
Total = $25 852.75 + $777 + $384 + $503
= $27 516.75

e Discount price: 85% × $18 639 = $15 843.15
Price with GST: 110% × $15 843.15 = $17 427.465
For stamp duty round up to nearest $100: $17 500
Stamp duty: 3% × $17 500 = $525
Rego: $396
CTP: $602
Comprehensive insurance: $1003
Total = $17 427.465 + $525 + $396 + $602 + $1003
= $19 953.465
≈ $19 953.47

f Discount price: 85% × $58 790 = $49 971.50
Price with GST: 110% × $49 971.50 = $54 968.65
For stamp duty round up to nearest $100: $55 000
Stamp duty: $1350 + 5% × ($55 000 – $45 000) = $1850
Rego: $401
CTP: $599
3rd party property insurance: $278
Total = $54 968.65 + $1850 + $401 + $599 + $278
= $58 096.65

Question 6

Price: $43\,860$

Stamp duty: $43\,860 = 25\,000 + 18\,860$

$$\therefore \text{ 1.5\% of } 25\,000 + 3\% \text{ of } 18\,860 = 0.015 \times 25\,000 + 0.03 \times 18\,860$$
$$= 375 + 565.80$$
$$= 940.80$$

Rego: 726

CTP: 854

Comprehensive: 1352

$$\therefore \text{Total cost} = 43\,860 + 940.80 + 726 + 854 + 1352$$
$$= 47\,732.80$$

Question 7

a GST price: $56\,780 + 10\% \times 56\,780 = 62\,458$

Stamp duty: $3\% \times 45\,000 + 5\% \times (62\,459 - 45\,000) = 2222.95$

Rego and Green slip: $743 + 50 + 837 = \$1630$

Comprehensive $= 1034 + 10\% \times 1034$
$= 1034 + 103.40$
$= 1137.40$

$\therefore$ Total cost $= 62\,458 + 2222.95 + 1630 + 1137.40$
$= \$67\,448.35$

b GST price: $1.1 \times 36\,204 = 39\,824.40$

Stamp duty: 3% of $39\,824.40 = \$1194.732$

Rego and Green slip : 1630 (see part **a**)

Third party property insurance = 328

$\therefore$ Total cost $= 39\,824.70 + 1194.732 + 1630 + 328$
$= \$42\,977.132$
$\approx \$42\,977.13$

c GST price: $1.1 \times 38\,759 = 42\,634.90$

Stamp duty: 3% of $42\,634.90 = 0.03 \times 42\,634.90$
$= 1279.047$

Rego and Green slip: 1630 (see part **a**)

Third party property insurance: 407

$\therefore$ Total cost $= 42\,634.90 + 1279.047 + 1630 + 407$
$= 45\,950.947$
$\approx \$45\,950.95$

d GST price: $1.1 \times 128\,000 = 140\,800$

Stamp duty: $3\% \times 45\,000 + 5\% \times (140\,800 - 45\,000) = \$6140$

Rego and Green slip: 1630 (see part **a**)

Third party property insurance: 6945

$\therefore$ Total cost $= 140\,800 + 6140 + 1630 + 6945$

$= \$155\,515$

e GST price: $1.1 \times 15\,320 = 16\,852$

Stamp duty: $3\% \times \$16\,852 = \$505.56$

Rego and Green slip: \$1630 (see part **a**)

3rd party prop ins $= 269 + 5\% \times 269$

$= 282.45$

$\therefore$ Total cost $= 16\,852 + 505.56 + 1630 + 282.45$

$= \$19\,270.01$

f GST price: $1.1 \times 21\,648 = 23\,812.80$

Stamp duty: 3% of $23\,812.80 = 0.03 \times 23\,812.80$

$= 714.384$

Rego and Green slip: \$1630 (see part **a**)

Comprehensive $= 747 + 10\%$ of 747

$= 747 + 0.1 \times 747$

$= 821.70$

$\therefore$ Total cost $= 23\,812.80 + 714.384 + 1630 + 821.70$

$= 26\,978.884$

$\approx \$26\,978.89$

Exercise 9.04 Running costs

Question 1

$\$202.67 \times 52 = \$10\ 538.84$

Question 2

a $\$37.69 \div \$1.28 = 29.445...$
≈ 29 L

b $\$37.69 \times 52 = \$1959.88$

Question 3

a Total km $= 500 \times 52 = 26\ 000$ km
No. Litres $= 26\ 000 \div 11 = 2363.63...$
Fuel bill $= \$1.38 \times 2363.63...$
$= \$3261.818...$
$\approx \$3261.82$

b Car Rego and 3rd party: \$785
Comp Ins: \$725
Servicing and maint: \$1100
M'ship fees: \$180
Tolls: $\$50 \times 52 = \$2600$
Parking: \$500
$\therefore$ Total cost $= \$3261.82 + 785 + ... + 500$
$= \$9151.82$

c $\$9151.82 \div 26 = \$351.993...$
$\approx \$352$/fortnight

Question 4

a NSW: $(953 + 1474 + ... + 2834) \div 52 = \$107.923...$
$\approx \$107.92$

Vic: $(1010 + 1232 + ... + 2979) \div 52 = \$108.423...$
$\approx \$108.42$

Qld: $(1096 + 1096 + ... + 3494) \div 52 = \$114.173...$
$\approx \$114.17$

b $\$114.17 - \$107.92 = \$6.25$.

Yearly difference = \$6.25 × 52
= \$325

Fuel is more expensive in Qld.

Question 5

$\$235.87 \times 52 = \$12\ 265.24$

Question 6

$$\begin{aligned}\text{Running costs} &= 49.29 \times 20\ 000 \\ &= 985800 \text{ c per year} \\ &= \$9858 \text{ per year}\end{aligned}$$

$$\begin{aligned}\text{Average weekly running cost} &= \$9858 \div 52 \\ &= \$189.576... \\ &\approx \$189.58\end{aligned}$$

Question 7

a Fuel: \$3744

Rego, CTP, comp ins: \$1432

Services: $\$267 + \$321 = \$588$

Tyres: $\$212 \times 4 = \$848$

NRMA gold m'ship: \$180

Tolls, parking: \$890

Parking fines: \$320

$$\begin{aligned}\text{So, Yearly costs} &= \$3744 + \$1432 + ... + \$320 \\ &= \$8002\end{aligned}$$

$$\begin{aligned}\therefore \text{Weekly costs} &= \$8002 \div 52 \\ &= \$153.884... \\ &\approx \$153.88\end{aligned}$$

b $\text{Annual running costs} = \$6000 + \$8002$

$= \$14\ 002$

$$\begin{aligned}\therefore \text{Weekly running costs} &= \$14\ 002 \div 52 \\ &= \$269.269... \\ &= \$269.27\end{aligned}$$

Question 8

$$\begin{aligned}\text{Value after 1 year} &= \text{list price} - \text{depreciation} \\ &= \$32\ 990 - \$74.86 \times 52 \\ &= \$29\ 097.28\end{aligned}$$

Exercise 9.05 Fuel consumption and prices

Question 1

$100 \div 3.2 = 31.25$
$\therefore$ C

Question 2

$14 \div 1.6 = 8.75 \text{ L/100 km}$
$\therefore$ D

Question 3

a $11.5 \div 100 = 0.115 \text{L/km}$

b $980 \times 0.115 = 112.7 \text{L} \approx 113 \text{L}$

c $55 \div 0.115 = 478.26... \approx 478 \text{ km}$

d $48 \text{ L} = 695$

$$1 \text{ L} = \frac{695}{48}$$

$$\text{So, } 102 \text{ L} = \frac{695}{48} \times 102$$
$$= 1476.875 \text{ km}$$
$$\approx 1477 \text{ km}$$

Question 4

a $\frac{5.5}{100} \times 10 = 0.55 \text{ L}$

b $\frac{5.5}{100} \times 2347 \approx 129.09 \text{ L}$

Question 5

$8 \div 10 = 0.08 \text{ L/km}$

a 0.08 L

b $0.08 \times 150 = 12 \text{ L}$

Question 6

a Toyota Corolla

b $\frac{45}{4.1} \times 100 = 1097.56... \approx 1097 \text{ km}$

c $5.4 \times 25 = 135$ L (Average)
$7.2 \times 25 = 180$ L (City)
$4.4 \times 25 = 110$ L (Highway)

d **i** No. 100 km $= 1348 \div 100$
$= 13.48$
No. litres needed $= 13.48 \times 11.1$ (Comb)
$= 149.628$
$\therefore$ Cost $= 149.628 \text{ L} \times 174.6$ c/L
$= 26\ 125.04...$ c
$= \$261.250...$
$\approx \$261.25$

ii No. 100 km $= 1348 \div 100$
$= 13.48$
No. litres needed $= 13.48 \times 9$ (Comb)
$= 121.32$
$\therefore$ Cost $= 121.32 \text{ L} \times 142.3$ c/L
$= 17\ 263.8...$ c
$= \$172.638...$
$\approx \$172.64$

Question 7

a $(131.3 + 127.8 + 131.0 + 128.9 + 134.1 + 135.6) \div 6 = 131.45$ cents
$\approx \$1.31$

b $151.9 - 127.9 = 24$ c/L

c **i** $144.5 \times 160 = 23\ 120$ c
$= \$231.20$

ii $\frac{160}{13.2} = 12.1212...$ lots of 100 km

$\therefore 12.1212... \times 100 = 1212.12...$ km
≈ 1212 km

Question 8

a $(131.3 + 127.8 + 131.0) \div 3 = 130.033...$
≈ 130.0 c/L

b $131.3 - 127.8 = 3.5$ c/L

c $135.6 \times 50 = 6780$ c
$= \$67.80$

d $440 \div 100 = 4.4$ lots of 100 km
$40 \div 4.4 = 9.0909...$
≈ 9.09 L/100 km

Question 9

a $(143.4 + 140.4 + 139.2 + 150.7 + 150.6 + 148.3 + 146.2) \div 7 = 1018.8 \div 7$
$= 145.542...$
≈ 145.54 c/L

b $(143.4 + 149.7 + 151.1 + 150.0 + 146.7 + 154.1) \div 6 = 895 \div 6$
$= 149.166...$
≈ 149.17 c/L

c $155.9 - 146.5 = 9.4$ c/L

d $146.7 - 145.9 = 0.8$ c/L

e Brisbane: $(143.4 + ... + 146.2) \div 7 \approx 145.5...$
Sydney: $(149.7 + ... + 151.8) \div 7 \approx 152.5...$
Melb: $(151.1 + ... + 153.0) \div 7 \approx 153.2...$
Adelaide: $(150.0 + ... + 152.7) \div 7 = 153.4$
Perth: $(146.7 + ... + 146.6) \div 7 \approx 146.4...$
Hobart: $(154.1 + ... + 153.9) \div 7 \approx 154.0...$
$\therefore$ The lowest was Brisbane.

f Mon: $(143.4 + ... + 154.1) \div 6 \approx 149.1...$

Tues: $(140.4 + ... + 154.1) \div 6 \approx 147.5...$

Wed: $(139.2 + ...154.0) \div 6 \approx 147.0...$

Thurs: $(150.7 + ...154.0) \div 6 \approx 154.9...$

Fri: $(150.6 + ... + 154.0) \div 6 \approx 154.1...$

Sat: $(148.3 + ... + 154.0) \div 6 \approx 152.4...$

Sun: $(146.2 + ... + 153.9) \div 6 = 150.7$

$\therefore$ The greatest was Thursday.

g Brisbane: $150.7 - 139.2 = 11.5$

Sydney: $159.5 - 147.6 = 11.9$

Melbourne: $158.5 - 148.0 = 10.5$

Adelaide: $160.9 - 147.8 = 13.1$

Perth: $146.7 - 145.9 = 0.8$

Hobart: $154.1 - 153.9 = 0.2$

$\therefore$ The highest was Adelaide.

h Mon: $154.1 - 143.4 = 10.7$

Tues: $154.1 - 140.4 = 13.7$

Wed: $154.0 - 139.2 = 14.8$

Thurs: $160.9 - 145.9 = 15$

Fri: $158.5 - 146.3 = 12.2$

Sat: $155.9 - 146.5 = 9.4$

Sun: $153.9 - 146.2 = 7.7$

$\therefore$ The smallest was Sunday.

Question 10

$$\begin{aligned}\text{Brodie} &= \frac{47+43+46}{497+364+579} \\ &= \frac{146 \text{ L}}{1440 \text{ km}} \\ &= 0.10138 \text{ L/km} \\ &\approx 10.14 \text{ L/100 km}\end{aligned}$$

$$\begin{aligned}\text{Lachlan} &= \frac{68+43+56}{543+297+410} \\ &= \frac{167 \text{ L}}{1250 \text{ km}} \\ &= 0.1336 \text{ L/km} \\ &\approx 13.36 \text{ L/100 km}\end{aligned}$$

$$\begin{aligned}\text{Mitchell} &= \frac{56+39+45}{624+208+524} \\ &= \frac{140 \text{ L}}{1356 \text{ km}} \\ &= 0.1032 \text{ L/km} \\ &\approx 10.32 \text{ L/100 km}\end{aligned}$$

$\therefore$ Brodie has the best fuel consumption.

Question 11

1st row: $62 \div 8.63 = 7.184... \approx 7.2$

2nd row: $43 \div 11.2 \times 100 = 383.92... \approx 383.9$

3rd row: $13.04 \times 8.4 = 109.536 \approx 109.5$

4th row: $86 \div 9.7 \times 100 = 886.59... \approx 886.6$

5th row: $23.56 \times 12.9 = 303.924 \approx 303.9$

6th row: $167 \div 17.30 = 9.653... \approx 9.7$

Exercise 9.06 Choosing the best car

Question 1

Rego and Greenslip: $780

Comprehensive ins: $589

Fuel: $1800

Maintenance, service, tyres: $1100

Car loan: $610 \times 12 = \$7320$

So, Yearly costs $= \$780 + \$589 + ... + \$7320$

$= \$11\ 589$

$\therefore$ Weekly budget $= \$11\ 589 \div 52$

$= \$222.865...$

$\approx \$222.87$

Question 2

Car 1: $\$44\ 430 + \$235.87 \times 52 \times 5 = \$105\ 756.20$

Car 2: $\$42\ 700 + \$241.58 \times 52 \times 5 = \$105\ 510.80$

$\therefore$ Car 2 is the best option as it is slightly cheaper.

Question 3

Petrol: $134.9 \times 65 = 8768.5$ c $= \$87.685$

LPG: $71.5 \times 65 = 4647.5$ c $= \$46.475$

$\therefore$ Difference $= \$87.685 - \$46.475$

$= \$41.21$

$\therefore$ The difference in the fuel bill is petrol costs $41.21 more.

Question 4

a Amount borrowed $= 75\%$ of \$32 700

$= 0.75 \times \$32\ 700$

$= \$24\ 525$

b Interest: $P = \$24\ 525,\ r = 9.4\% = 0.094,\ n = 3$

$I = Prn$

$= 24\ 525 \times 0.094 \times 3$

$= \$6916.05$

Total to repay $= \$24\ 525 + \$6916.05$

$= \$31\ 441.05$

No. weeks in 3 years $= 3 \times 52$

$= 156$

Weekly budget costs $= \$31\ 441.05 \div 156$

$= \$201.545...$

$\approx \$201.55$

Question 5

Option A: Total cost $= \$731.17 \times 12 \times 4$

$= \$35\ 096.16$

Option B: Total cost $= \$441.98 \times 26 \times 3$

$= \$34\ 474.44$

$\therefore$ Option B is the better option as it is cheaper.

Question 6

The warranty is for 5 years or 100 000 km, whichever comes first. So if a car with this warranty covers a distance of 100 000 km in 2 years, the warranty has then lasted only 2 years.

Question 7

Teacher to check.

Sample HSC problem

a $\text{Stamp duty} = \$3 \times \dfrac{\$18\,700}{100}$

$= \$3 \times \$187$

$= \$561$

b **i** $18\,700 + \dfrac{18\,700}{100} \times 3 + 32 = 19\,293$

ii $\text{Total costs} = \$540 \times 12 \times 4$

$= \$25\,920$

iii $\text{Weekly cost} = \$540 \times 12 \div 52$

$= \$6480 \div 52$

$= \$124.615...$

$\approx \$124.62$

Test yourself 9

Question 1

a $95\% \text{ of } \$302 = 0.95 \times 302$
$= \$286.90$

b $108\% \text{ of } \$297 = 1.08 \times 297$
$= \$320.76$

Question 2

a $\$15.80 \times 26 = \$410.80$
$\therefore \text{ Saving} = 410.80 - 402.50$
$= \$8.30$

b Nothing. He was only insured for the damage to other people's property.
He needs comprehensive insurance to insure his own property.

Question 3

a $1.5\% \text{ of } \$5000 + 2.5\% \text{ of } (23\,600 - 5000)$
$= 0.015 \times 5000 + 0.025 \times 18\,600$
$= 75 + 465$
$= \$540$

b $1.5\% \text{ of } \$5000 + 2.5\% \text{ of } 30\,000 + 5\% \text{ of } (57\,000 - 35\,000)$
$= 0.015 \times 5000 + 0.025 \times 30\,000 + 0.05 \times 22\,000$
$= 75 + 750 + 1100$
$= \$1925$

c $1.5\% \text{ of } \$4800 = 0.015 \times 4800$
$= \$72$

d $1.5\% \text{ of } \$5000 + 2.5\% \text{ of } 30\,000 + 5\% \text{ of } (84\,600 - 35\,000)$
$= \$3305$

Question 4

a $\frac{24\,500}{200} = 122.5$

≈ 123

$\therefore \$5 \times 123 = \$615$

b $\frac{36\,750}{200} = 183.75$

≈ 184

$\therefore \$5 \times 184 = \$920$

c $\frac{71\,260}{200} = 356.3$

≈ 357

$\therefore \$10 \times 357 = \$3570$

d $\frac{59\,800}{200} = 299$

$\therefore \$10 \times 299 = \$2990$

Question 5

a \$21 370 rounds up to \$21 400

$\text{Stamp duty} = 3\% \times \$21\ 400$

$= \$642$

b \$44 020 rounds up to \$44 100

$\text{Stamp duty} = 3\% \times \$44\,100$

$= \$1323$

c $\text{Stamp duty} = \$1350 + 5\% \times (\$58700 - \$45000)$

$= \$2035$

d \$89 220 rounds up to \$89 300

$\text{Stamp duty} = \$1350 + 5\% \times (\$89300 - \$45000)$

$= \$3565$

Question 6

Stamp duty = 1.5% × \$5000 + 2.5% × \$15 000 + 4.5% \$4999

= \$674.955

$\text{Total cost} = \$24\,999 + \$674.955 + \$328 + \$503 + \$1204$

$= \$27\,708.955$

$\approx \$27\,708.96$

Question 7

a Fuel: $\$42 \times 52 = \$2184$

Comprehensive ins: $\$70.81 \times 12 = \$849.72$

Car rego and CTP: $\$812.68$

Service: $\$590$

Repairs and tyres: $\$450$

Motorway costs: $\$62 \times 52 = \$3224$

$\therefore$ Total cost $= \$2184 + \$849.72 + ... + \$3224$

$= \$8110.40$

b $\$8110.40 \div 52 = \$155.97$

Question 8

a $(14.5 + 12.7 + 10.8 + 8.4 + 7.3) \div 5 = 53.7 \div 5$

$= 10.74$ L/100 km

b $\frac{14.5}{100} \times 35 = 5.075 \approx 5.1$

$\frac{12.7}{100} \times 26 = 3.302 \approx 3.3$

$\frac{10.8}{100} \times 460 = 49.68 \approx 49.7$

$\frac{8.4}{100} \times 2635 = 221.34 \approx 221.3$

$\frac{7.3}{100} \times 9870 = 720.51 \approx 720.5$

c Don't speed; accelerate slowly; walk or cycle short distances.

Question 9

a $17.2 - 5.6 = 11.6 \text{ L/100 km}$

b $(11.7 + 11.3 + 5.7 + 8.0 + 9.8 + 5.8 + 5.6 + 17.2 + 6.7 + 9.9) \div 10$

$= 91.7 \div 10$

$= 9.17 \text{ L/100 km}$

c **i** $\frac{6.7}{100} = 0.067 \text{ L/km}$

ii $\frac{5.7}{100} = 0.057 \text{ L/km}$

iii $\frac{11.3}{100} = 0.113 \text{ L/km}$

d $\frac{11.7}{100} = 0.117 \text{ L/km}$

$\therefore \frac{70 \text{ L}}{0.117} = 598.29...$

$\approx 598 \text{ km}$

e $\frac{9.8}{100} = 0.098 \text{ L/km}$

$\therefore 2500 \times 0.098 = 245 \text{ L}$

Question 10

Difference in cost per $\text{L} = 158.9 - 128.6$

$= 30.3 \text{ c/L}$

Difference in cost for tank $= 30.3 \times 70$

$= 2121 \text{ c}$

$= \$21.21$

