Topic Test 14 Mathematics and driving

Section I — Multiple choice

1 A used car with a sale price of $16 500 is purchased on a 25% deposit and weekly repayments of $130 for 4 years. What is the cost of purchasing the car?

A $10 885 B $16 500 C $27 040 D $31 165

2 Callum has been quoted $810 for comprehensive car insurance. He has a no claim bonus of 40%. How much is Callum required to pay?

A $324 B $486 C $1350 D $2025

3 A new SUV is bought for $40 850. What is the stamp duty payable if the charge is $5 per $200 or part $200?

A $1021.25 B $1025.00 C $2042.50 D $2050

4 A medium sized car travelled 890 km using 70 L of petrol. What was the fuel consumption?

A 7.86 L/100 km B 7.87 L/100 km C 12.71 L/100 km D 1271 L/100 km

5 Flynn buys a motor bike for $9600. It depreciates by $1300 each year and has an expected life of five years. What is the scrap value after five years?

A $1920 B $3100 C $6500 D $8300

6 Mackenzie buys a car for $24 500 and it is depreciated at a rate of 15% each year. What is the salvage value of the car after three years?

A $3675 B $13 475 C $15 046 D $20 825

7 Andrew was driving at a speed of 67 km/h and reaction time of 0.58 seconds. What is the stopping distance using the formula $d = \frac{5Vt}{18} + \frac{V^2}{170}$?

A 11 m B 25 m C 37 m D 42 m

8 Violet has a BAC of 0.065 after consuming four standard drinks in an hour. How many hours does she need to wait before driving? (Number of hours = BAC ÷ 0.015)

A 2 B 3 C 4 D 5

Topic Test 14 Mathematics and driving

Section II — Short answer

1 Darcy buys a car for $22 000. After one year, the market value of the car is $18 000. What is the percentage decrease in the price? (Answer correct to one decimal place.)

.....

2 A sports car is for sale at $65 000. Finance is available at $10 000 deposit and monthly repayments of $1980 for 5 years. What is the interest paid?

.....

3 Jesse's car uses 10.65 litres per 100 km. How many litres of petrol will her car use on a trip of 420 km from Kiama to Taree?

.....

4 A van was purchased for $24 100 and sold for $13 700 after 4 years. Assume straight line depreciation.

a How much does the van depreciate each year? b Construct a depreciation table for the first 4 years.

.....

.....

.....

5 How long will it take a vehicle to travel 580 km at a speed of 80 km/h?

.....

6 Alexandra is 68 kg and has consumed 6 standard drinks in the past four hours. Calculate Alexandra's blood alcohol content using the formula $BAC_{Female} = \frac{(10N - 7.5H)}{5.5M}$. (Answer correct to 4 decimal places)

.....

.....

7 The number of fatal accidents involving mobile phones for the past 6 months was 40, 34, 65, 38, 37 and 40.

a What are the mean, median and mode for the above data?

.....

b Which is the better measure for the centre for the data? Explain your answer.

.....

c What are the range, interquartile range and population standard deviation for the data?

.....

.....

Topic Test 14 Mathematics and driving

Worked solutions

Section 1	Solution	Answer
1	Deposit $= 0.25 \times \$16\,500$ $= \$4125$ Total repayment $= 130 \times 52 \times 4$ $= \$27\,040$ Total cost $= \$4125 + \$27\,040$ $= \$31\,165$	D
2	Premium $= 60\%$ of $\$810$ $= 0.60 \times 810$ $= \$486$	B
3	Value of vehicle $= \$41\,000$ \$5 per \$200 is the fraction $\frac{5}{200}$. Stamp duty $= \$41\,000 \times \frac{5}{200}$ $= \$1025$	B
4	$\text{Fuel Consumption} = \frac{\text{Amount of fuel} \times 100}{\text{Distance travelled}}$ $= \frac{70 \times 100}{890}$ ≈ 7.87 L/100 km	B
5	$S = V_0 - Dn$ $= 9600 - 1300 \times 5$ $= \$3100$	B
6	$S = V_0(1-r)^n$ $= 24\,500 \times (1-0.15)^3$ $= \$15\,046$	C
7	$d = \frac{5Vt}{18} + \frac{V^2}{170}$ $= \frac{5 \times 67 \times 0.58}{18} + \frac{67^2}{170}$ ≈ 37 m	C
8	$\text{Number of hours} = \frac{BAC}{0.015}$ $= \frac{0.065}{0.015}$ $= 4.33333$ ≈ 5	D

<table>
<tr><th>Section II</th><th>Solution</th></tr>
<tr><td>1</td><td>$\text{Percentage decrease} = \frac{4000}{22\,000} \times 100$
$= 18.1818... \approx 18.2\%$</td></tr>
<tr><td>2</td><td>$\text{Total repayment} = 1980 \times 12 \times 5$
$= \$118\,800$
$\text{Total cost} = \$10\,000 + \$118\,800$
$= \$128\,800$
$\text{Interest paid} = \$128\,800 - \$65\,000$
$= \$63\,800$
Interest paid is \$63 800</td></tr>
<tr><td>3</td><td>$\text{Petrol} = \frac{420}{100} \times 10.65 = 44.73 \text{ L}$
Jesse's car used 44.73 L</td></tr>
<tr><td>4a</td><td>$S = V_0 - Dn$
$13\,700 = 24\,100 - D \times 4$
$D = \frac{24\,100 - 13\,700}{4}$
$= \$2600$
Van depreciates by \$2600 each year.</td></tr>
<tr><td>b</td><td>
<table>
<tr><th>Year</th><th>Current Value</th><th>Depreciation</th><th>Depreciated Value</th></tr>
<tr><td>1</td><td>\$24 100</td><td>\$2600</td><td>\$21 500</td></tr>
<tr><td>2</td><td>\$21 500</td><td>\$2600</td><td>\$18 900</td></tr>
<tr><td>3</td><td>\$18 900</td><td>\$2600</td><td>\$16 300</td></tr>
<tr><td>4</td><td>\$16 300</td><td>\$2600</td><td>\$13 700</td></tr>
</table>
</td></tr>
<tr><td>5</td><td>$T = \frac{D}{S} = \frac{580}{80} = 7.25 \text{ h}$</td></tr>
<tr><td>6</td><td>$BAC_{Female} = \frac{(10N - 7.5H)}{5.5M} = \frac{(10 \times 6 - 7.5 \times 4)}{(5.5 \times 68)} = 0.0802$</td></tr>
<tr><td>7a</td><td>Sort data into increasing order
34, 37, 38, 40, 40, 65
Mean – 42.3
Median – 39
Mode – 40</td></tr>
<tr><td>b</td><td>Median or Mode (Mean affected by outlier)</td></tr>
<tr><td>c</td><td>$\text{Range} = 65 - 34 = 31$
$IQR = Q_3 - Q_1 = 40 - 37 = 3$
Population standard deviation – 10.34</td></tr>
</table>

