
Grade 12
Consumer Mathematics
Standards Test

Written Test Marking Guide

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Marking Guidelines

The *Grade 12 Consumer Mathematics Standards Test: Written Test Marking Guide (June 2011)* is based on the outcomes and standards found in *Senior 4 Consumer Mathematics: A Foundation for Implementation (2004)*.

The recommended procedure for scoring student responses is as follows:

1. Read the *Written Test Marking Guide*.
2. Study the student samples provided and the rationales for the allotted scores.
3. Determine the mark for the student's response by comparing its features with the *Written Test Marking Guide* descriptions. The descriptions and samples only typify a student's response to a given question; an exact match is not anticipated.

Irregularities in Standards Tests

During the administration of standards tests, supervising teachers may encounter irregularities. Markers may also encounter irregularities during local marking sessions. Appendix A provides examples of such irregularities as well as procedures to follow to report irregularities.

If a scoring sheet is marked with "0" and/or "NR" only (e.g., student was present but did not attempt any questions) please document this on the *Irregular Test Booklet Report*.

Presentation of the Student Samples

Each constructed-response question is presented using the following sections:

Test Item
Number

Unit of
Study

Type of
Test Item

Maximum Number
of Marks Allotted

This section presents the test item as it appears in the student booklet, including how marks should be allotted.

	Question 1	V-C1	Restricted Response with Explanation	(2.5 Marks)
Test Item and Marking Guide	Kendall pays \$401 per year for her \$100 000 whole-life insurance policy.			
	A) Calculate Kendall's monthly payment (1 mark).			
	$\text{Answer: } \$401 \times \underbrace{0.09}_{0.5 \text{ mark}} = \underbrace{\$36.09}_{0.5 \text{ mark}}$			
	B) Calculate the difference Kendall pays between making one yearly payment and twelve (12) monthly payments. (1 mark)			
	$\text{Answer: } \$36.09 \times 12 = \$433.08 \quad \leftarrow 0.5 \text{ mark}$ $\$433.08 - \$401 = \$32.08 \text{ more} \quad \leftarrow 0.5 \text{ mark}$			
	C) Explain why Kendall pays more money when she makes monthly payments, rather than one yearly payment. (0.5 mark)			
	<i>Sample Answers:</i>			
	<i>She pays more for the convenience of spreading her payments over a longer time.</i>			$\leftarrow 0.5 \text{ mark}$
	<i>OR</i>			
	<i>She pays interest on the amount owing</i>			$\leftarrow 0.5 \text{ mark}$
<i>OR</i>				
<i>Her insurance company may have extra administration fees that they charge</i>			$\leftarrow 0.5 \text{ mark}$	

This section presents student sample responses with the mark(s) allotted and the rationale justifying the mark(s) allotted.

	Sample 1	Restricted Response with Explanation	(2.5 Marks)
	A)	$401 \div 12 = 34.42$	
	B)	$34.42 \times 12 = 401$	
		\updownarrow <i>There is no difference</i>	
	C)	<i>no difference</i>	
	Mark: 1 out of 2.5		
	Rationale: – Correct solution in Part B (follow-through error) (2 × 0.5 mark)		

Personal Finance

Question 1

V-C1

Restricted Response with Explanation

(2.5 Marks)

Test Item and Marking Guide

Kendall pays \$401 per year for her \$100 000 whole-life insurance policy.

- A) Calculate Kendall's monthly payment (1 mark).

$$\text{Answer: } \$401 \times \underbrace{0.09}_{0.5 \text{ mark}} = \underbrace{\$36.09}_{0.5 \text{ mark}}$$

- B) Calculate the difference Kendall pays between making one yearly payment and twelve (12) monthly payments. (1 mark)

$$\begin{aligned} \text{Answer: } \$36.09 \times 12 &= \$433.08 && \leftarrow 0.5 \text{ mark} \\ \$433.08 - \$401 &= \$32.08 \text{ more} && \leftarrow 0.5 \text{ mark} \end{aligned}$$

- C) Explain why Kendall pays more money when she makes monthly payments, rather than one yearly payment. (0.5 mark)

Sample Answers:

She pays more for the convenience of spreading her payments over a longer time. $\leftarrow 0.5 \text{ mark}$

OR

She pays interest on the amount owing $\leftarrow 0.5 \text{ mark}$

OR

Her insurance company may have extra administration fees that they charge $\leftarrow 0.5 \text{ mark}$

Sample 1

Restricted Response with Explanation

(2.5 Marks)

A) $401 \div 12 = 34.42$

B) $34.42 \times 12 = 401$

↑
There is no difference

C) *no difference***Mark: 1 out of 2.5****Rationale:** – Correct solution in Part B (follow-through error) (2×0.5 mark)**Sample 2**

Restricted Response with Explanation

(2.5 Marks)

A) $401 \times 0.09 = \$36.09$

$$\begin{array}{r}
 \text{B) } 36.09 \times 12 = 433.08 \\
 + \quad 75 \\
 \hline
 508.08
 \end{array}$$

508.08

- 401

107.08 MOREC) *ITS MORE BECAUSE OF THE POLICY FEE.***Mark: 1.5 out of 2.5****Rationale:** – Correct answer in Part A (2×0.5 mark)

– Correct difference in Part B (follow-through error) (0.5 mark)

Sample 3

Restricted Response with Explanation

(2.5 Marks)

A) $401 + 75 \times 0.09 = \$42.84$

B) $42.84 \times 12 - 476 = \38.08

C) *She pays more because she gets to spread out the payments.
It's like interest.*

Mark: 2 out of 2.5**Rationale:** – Correct table value in Part A (0.5 mark)– Correct solution in Part B (follow-through error) (2×0.5 mark)

– Correct response in Part C (0.5 mark)

Question 2

V-C1

Restricted Response

(1 Mark)

Explain why a person would choose comprehensive homeowner's insurance instead of standard homeowner's insurance.

Sample answers:

- covers more items
- covers more situations

Test Item and Marking Guide

Sample 1

Restricted Response

(1 Mark)

So that they are insured to a greater value.

Mark: 0 out of 1

Rationale: – Incorrect response

Sample 2

Restricted Response

(1 Mark)

In case of something happening

Mark: 0 out of 1

Rationale: – Incorrect response

Sample 3

Restricted Response

(1 Mark)

A person would choose comprehensive homeowner insurance over standard because you get more coverage with comprehensive compared to standard where it is just the basics getting covered, not everything you own.

Mark: 1 out of 1

Rationale: – Correct response (1 mark)

Wendy has \$50 000 saved. She would like to purchase a \$200 000 home.

- A) How much money should Wendy put as a cash down payment towards the house? Explain your answer. (1 mark)

Sample answers:

- *she should put down as much as she can afford, to lower her principal*
- *she should put down as much as possible, she will pay less interest*
- *put minimum required amount of 10% down (\$20 000)*
- *pay \$40 000 and use the leftover \$10 000 for additional expenses*
- *put 25% down (\$50 000), no extra fees from CMHC because it's not considered a high-ratio mortgage*

- B) Wendy can choose a 15-year mortgage at 5.75% or a 25-year mortgage at 6.25%. Which option should Wendy choose? Justify your response. (1 mark)

Sample answers:

- *15 years at 5.75%, pay less interest overall*
- *25 years at 6.25%, lower monthly payments*

Sample 1

Open Response

(2 Marks)

- A) *Wendy should put down the 50 000\$ because thats better than nothing put down at all*
- B) *She should pick the 25 year mortgage because then she doesn't have to put as much money down a month.*

Mark: 1 out of 2

- Rationale:** – Incorrect response in Part A
– Correct response in Part B (1 mark)

Sample 2

Open Response

(2 Marks)

- A) *she should put down all of the \$50 000 because this will cut down what is left to pay so she has to pay less interest which means less in the long run.*
- B) *She should choose the 15 year if she has the money to do so, so she pays less in interest.*

Mark: 2 out of 2

- Rationale:** – Correct response in Part A (1 mark)
– Correct response in Part B (1 mark)

Sample 3

Open Response

(2 Marks)

- A) *WENDY SHOULD PUT DOWN 45 000 BECAUSE THEN IF SHE NEEDS SOME QUICK REPAIRS DONE TO THE HOUSE SHE STILL HAS 5 000 TO DO SO.*
- B) 1) $8.27 \times 155\,000 = 1\,281.85$
- 2) $6.55 \times 155\,000 = 1\,015.25$
WENDY SHOULD CHOOSE #2 BECAUSE IT'S LESS

Mark: 2 out of 2

- Rationale:** – Correct response in Part A (1 mark)
– Correct response in Part B (1 mark)

Question 4

V-C4

Restricted Response with Explanation

(2.5 Marks)

Oscar's gross annual income is \$97 500. His monthly heating bill is \$100 and his monthly property taxes are \$300. He would like to make a monthly mortgage payment of \$2 030.

- A) Determine Oscar's Gross Debt Service Ratio (GDSR). (1.5 marks)

Answer:

$$\text{Monthly Income: } \frac{\$97\,500}{12} = \$8\,125$$

$$\text{GDSR} = \frac{\begin{array}{c} \text{Monthly} \\ \text{Mortgage} \\ \text{Payment} \end{array} + \begin{array}{c} \text{Monthly} \\ \text{Heating} \\ \text{Cost} \end{array} + \begin{array}{c} \text{Monthly} \\ \text{Property} \\ \text{Tax} \end{array}}{\text{Gross Monthly Income}} \times 100$$

$$\text{GDSR} = \frac{\$2\,030 + \$100 + \$300}{\$8\,125} \times 100 \left\{ \begin{array}{l} \text{No marks for 1 or 2 correct substitutions} \\ \text{OR} \\ \text{0.5 mark for 3 correct substitutions} \\ \text{OR} \\ \text{1 mark for all correct substitutions} \end{array} \right.$$

$$\text{GDSR} = 30\% \quad \leftarrow 0.5 \text{ mark}$$

- B) Justify whether or not Oscar can afford this monthly mortgage payment. (1 mark)

Answer: Yes, Oscar's GDSR is below the recommended 32%.

Test Item and Marking Guide

Sample 1

Restricted Response with Explanation

(2.5 Marks)

$$A) \text{GDSR} \left(\frac{2030 + 100 + 300}{97500} \right) \times 100 = 213000.30$$

B) *Oscar can afford this house because he makes good money.*

Mark: 0.5 out of 2.5

- Rationale:**
- Three correct substitutions in Part A (0.5 mark)
 - Incorrect solution in Part A
 - Incorrect response in Part B

Sample 2

Restricted Response with Explanation

(2.5 Marks)

$$A) \text{GDSR} = \frac{2030 + 100 + 300}{97500} \times 100 = 2.5\%$$

B) *yes because it is under 32%*

Mark: 2 out of 2.5

- Rationale:**
- Three correct substitutions in Part A (0.5 mark)
 - Correct answer in Part A (follow-through error) (0.5 mark)
 - Correct response in Part B (1 mark)

Sample 3

Restricted Response with Explanation

(2.5 Marks)

$$A) \frac{2030.00 + 100 + 300}{8125} \times 100 = 29.9$$

$$B) 8125 \times .32 = 2600$$

$$2600 - 300 - 100 = \underline{\$2200} \text{ Yes, he can afford it.}$$

Mark: 2.5 out of 2.5

- Rationale:**
- Correct solution in Part A (1.5 marks)
 - Correct response in Part B (alternate solution) (1 mark)

Government Finances

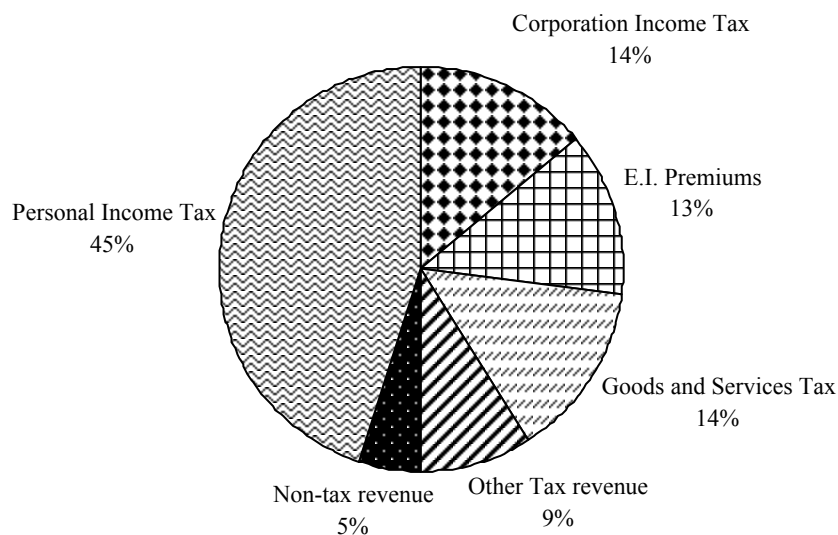
Question 5

V-E2

Restricted Response

(1 Mark)

2007 Federal Government Revenue



Test Item and Marking Guide

Calculate the revenue generated by the GST in 2007 if the federal government's total revenue was \$164.5 billion.

$$\text{Answer: } \$164.5 \text{ billion} \times \underbrace{0.14}_{0.5 \text{ mark}} = \underbrace{\$23.03 \text{ billion}}_{0.5 \text{ mark}}$$

Sample 1

Restricted Response

(1 Mark)

$$164\ 500\ 000 \times .05 = \$8\ 225\ 000$$

Mark: 0 out of 1**Rationale:** – Incorrect solution**Sample 2**

Restricted Response

(1 Mark)

$$164\ 500\ 000\ 000 \times .14 = \$2.303 \times 10^{10} \text{ in GST}$$

Mark: 1 out of 1**Rationale:** – Correct solution (2 × 0.5 mark)**Sample 3**

Restricted Response

(1 Mark)

$$164.5 \text{ billion} \times \frac{14}{100} = \$23.03 \text{ billion}$$

Mark: 1 out of 1**Rationale:** – Correct solution (2 × 0.5 mark)

Question 6

V-E3

Restricted Response

(1 Mark)

A company imports \$4 000 of house paint from Italy (MFN). Calculate the customs duties paid on this import purchase.

Answer:

$$\begin{array}{r} \$4\,000 \times \underbrace{0.065}_{0.5 \text{ mark}} = \underbrace{\$260}_{0.5 \text{ mark}} \text{ customs duties} \end{array}$$

Test Item and Marking Guide

Sample 1

Restricted Response

(1 Mark)

$$\$4\ 000 \times 6.5 = \$26\ 000 \text{ customs}$$

Mark: 0.5 out of 1**Rationale:** – Correct rate (0.5 mark)**Sample 2**

Restricted Response

(1 Mark)

$$4\ 000 \times 3\% = \$120$$

Mark: 0.5 out of 1**Rationale:** – Correct answer (follow-through error) (0.5 mark)**Sample 3**

Restricted Response

(1 Mark)

$$\$260$$

Mark: 0.5 out of 1**Rationale:** – Correct answer (0.5 mark)

A Canadian hockey team needs \$54 million US to pay their players' salaries.

- A) Calculate the amount of money in Canadian funds they must convert to US funds to pay their players. (1 mark)

$$\text{Answer: } \$54\,000\,000 \text{ US} \times \underbrace{1.0760}_{0.5 \text{ mark}} = \underbrace{\$58\,104\,000}_{0.5 \text{ mark}}$$

- B) The exchange rate has increased to 1.1212. Calculate the increased cost to the hockey team. (1 mark)

$$\text{Answer: } \$54\,000\,000 \text{ US} \times 1.1212 = \$60\,544\,800 \quad \leftarrow 0.5 \text{ mark}$$

$$\$60\,544\,800 - \$58\,104\,000 = \$2\,440\,800 \quad \leftarrow 0.5 \text{ mark}$$

OR

$$1.1212 - 1.0760 = 0.0452 \quad \leftarrow 0.5 \text{ mark}$$

$$\$54\,000\,000 \text{ US} \times 0.0452 = \$2\,440\,800 \quad \leftarrow 0.5 \text{ mark}$$

Sample 1

Restricted Response

(2 Marks)

A) $54\,000\,000 \div 1.0440 = \$51\,724\,138$

B) $\frac{54\,000\,000}{1.1212} = \$48\,162\,682$

Mark: 0 out of 2**Rationale:** – Incorrect solution in Part A
– Incorrect solution in Part B**Sample 2**

Restricted Response

(2 Marks)

A) $54\text{ million} \times 1.0440 = 56.376\text{ million}$

B) $54\text{ million} \times 1.1212 = 60.5448\text{ million}$

Mark: 1 out of 2**Rationale:** – Incorrect rate in Part A
– Correct solution in Part A (follow-through error) (0.5 mark)
– Correct new cost in Part B (0.5 mark)**Sample 3**

Restricted Response

(2 Marks)

A) $\$54\text{ million} \times 1.0760 = \$58.104\text{ million CAD}$

B) $54\text{ million} \times 1.1212 = 60.54\text{ million}$
 $60.54\text{ million} - 58.104\text{ million} = \2.44 million

Mark: 2 out of 2**Rationale:** – Correct solution in Part A (2×0.5 mark)
– Correct solution in Part B (2×0.5 mark)

Question 8

V-E5

Restricted Response

(1 Mark)

Calculate the amount of provincial tobacco taxes on two 34-gram tins of loose tobacco.

Answer: $2 \times 34 = 68 \text{ grams}$

$$68 \text{ grams} \times \underbrace{\$0.15/\text{gram}}_{0.5 \text{ mark}} = \underbrace{\$10.20}_{0.5 \text{ mark}}$$

Test Item and Marking Guide

Sample 1

Restricted Response

(1 Mark)

$$\begin{aligned} 34 \times .15 &= 5.10 \\ \$5.10 \times 0.05 &= \underline{.25} \\ & \$5.35 \end{aligned}$$

Mark: 0.5 out of 1**Rationale:** – Correct tax rate (0.5 mark)**Sample 2**

Restricted Response

(1 Mark)

$$34 \times .15 = 5.1 \times 2 = 10.20$$

Mark: 1 out of 1**Rationale:** – Correct solution (2 × 0.5 mark)**Sample 3**

Restricted Response

(1 Mark)

$$\begin{aligned} 15 \times 34 &= \$5.10 \\ 15 \times 34 &= \underline{\$5.10} \\ & \$10.20 \end{aligned}$$

Mark: 1 out of 1**Rationale:** – Correct solution (2 × 0.5 mark)

The total portioned assessment of property in Shoreville is \$20 680 000. The city needs to collect \$500 000 in property taxes.

- A) Calculate the mill rate for Shoreville. (1 mark)

Answer:

$$PTR = \frac{\text{Total Revenue Required}}{\text{Total Portioned Assessment}} \times 1\,000$$

$$PTR = \frac{500\,000}{20\,680\,000} \times 1\,000 \quad \leftarrow 0.5 \text{ mark for substitution}$$

$$= 24.18 \text{ (mills)} \quad \leftarrow 0.5 \text{ mark}$$

Note to marker: "mills" not required; it is given in the question.

- B) If Shoreville raised the mill rate to 27.42 mills, determine the amount of revenue they could collect. (1 mark)

Answer:

$$PTR = \frac{\text{Total Revenue Required}}{\text{Total Portioned Assessment}} \times 1\,000$$

$$27.42 = \frac{\text{Total Revenue Required}}{\$20\,680\,000} \times 1\,000 \quad \leftarrow 0.5 \text{ mark for substitution}$$

$$\text{Total Revenue Required} = \$567\,045.60 \quad \leftarrow 0.5 \text{ mark}$$

OR

$$\$20\,680\,000 \times \underbrace{\frac{27.42}{1\,000}}_{0.5 \text{ mark}} = \underbrace{\$567\,045.60}_{0.5 \text{ mark}}$$

Sample 1

Restricted Response

(2 Marks)

A) $\$500\,000 \div \$20\,680\,000 \times 1\,000$
 $= 24.18 \text{ mills}$

B) They could collect \$663

$$\frac{50\,000}{20\,680\,000} \times 1000 \times 27.42 = 663$$

Mark: 1 out of 2**Rationale:** – Correct solution in Part A (2×0.5 mark)**Sample 2**

Restricted Response

(2 Marks)

A) $\frac{500\,000}{20\,680\,000} \times 100 = 2.42\%$

B) $\frac{27.42 \times 20\,680\,000}{1\,000} = \$567\,045.60$

Mark: 1.5 out of 2**Rationale:** – Correct substitution in Part A (0.5 mark)
– Correct solution in Part B (2×0.5 mark)**Sample 3**

Restricted Response

(2 Marks)

A) $PTR = \frac{500\,000}{20\,680\,000} \times 1\,000 = 24.178$

B) $PTR = \frac{REVENUE}{20\,680\,000} \times 1\,000 = 27.42$

$$REVENUE = \$567\,045.60$$

Mark: 2 out of 2**Rationale:** – Correct solution in Part A (2×0.5 mark)
– Correct solution in Part B (2×0.5 mark)

Statistics

Question 10

V-F2

Restricted Response with Explanation

(2 Marks)

Tommy and 5 other students scored 78 out of 85 on an English exam. Forty (40) students wrote the exam, and 23 students scored lower than Tommy.

- A) Calculate Tommy's percentile rank. (1.5 marks)

Answer:

$$P = \left(\frac{B + 0.5E}{n} \right) \times 100$$

$$P = \left(\frac{23 + 0.5(6)}{40} \right) \times 100$$

$\left\{ \begin{array}{l} \text{No mark for 1 correct substitution} \\ \text{OR} \\ \text{0.5 mark for 2 correct substitutions} \\ \text{OR} \\ \text{1 mark for 3 correct substitutions} \end{array} \right.$

$P = 65$ or P_{65} or 65th percentile ← 0.5 mark

- B) Explain what Tommy's percentile rank represents. (0.5 mark)

Sample answers: 65% of students scored lower than Tommy

OR

65% of students scored equal to or lower than Tommy

OR

35% of students scored higher than Tommy

Test Item and Marking Guide

Sample 1

Restricted Response with Explanation

(2 Marks)

$$A) PR = \frac{B + (0.5E)}{n} \times 100 \quad PR = \frac{23 + (0.5 \times 6)}{40} \times 100 = 65\%$$

B) *Tommy's percentile number represents how well he did out of all of the other students; it does not tell you his mark on his test.*

Mark: 1 out of 2

Rationale: – Three correct substitutions in Part A (1 mark)
– Incorrect answer (percent) in Part A
– Incorrect response in Part B

Sample 2

Restricted Response with Explanation

(2 Marks)

$$A) \begin{aligned} B &= 23 \\ E &= 6 \\ N &= 40 \end{aligned}$$

B) *it represents the percent of people who did better than him*

Mark: 1 out of 2

Rationale: – Three correct substitutions (equivalent) in Part A (1 mark)
– Incorrect response in Part B

Sample 3

Restricted Response with Explanation

(2 Marks)

$$A) P = \left(\frac{B + 0.5E}{n} \right) \times 100$$
$$P = \left(\frac{23 + 0.5(5)}{40} \right) \times 100$$
$$P = 63.75$$

B) *THE PERCENT OF THE CLASS THAT TOMMY IS ABOVE.*

Mark: 1.5 out of 2

Rationale: – Two correct substitutions in Part A (0.5 mark)
– Correct solution in Part A (follow-through error) (0.5 mark)
– Correct response in Part B (0.5 mark)

Question 11

V-F4

Restricted Response

(2 Marks)

Ten people participated in a bull riding competition. Their times (x) are listed in the chart below.

Complete the chart and determine the standard deviation for the times.

Answer:

<i>times (x)</i>	$(x - \bar{x})^2$
1	16
2.5	6.25
4	1
4	1
4.5	0.25
5	0
6.5	2.25
7	4
7.5	6.25
8	9
$\Sigma(x - \bar{x})^2$	46

← 0.5 mark

← 0.5 mark

$$S = \sqrt{\frac{\Sigma(x - \bar{x})^2}{n-1}}$$

$$S = \sqrt{\frac{46}{9}}$$

← 0.5 mark for substitution

$$S = 2.26$$

← 0.5 mark

Note to marker: accept $\sqrt{\frac{46}{10}} = 2.14$

Test Item and Marking Guide

Sample 1

Restricted Response

(2 Marks)

times (x)	$(x - \bar{x})^2$
1	16
2.5	6.25
4	1
4	1
4.5	0.25
5	0
6.5	2.25
7	4/9
7.5	6.25
8	9
$\Sigma(x - \bar{x})^2$	91

Mark: 0.5 out of 2**Rationale:** – Correct sum (follow-through error) (0.5 mark)**Sample 2**

Restricted Response

(2 Marks)

$$\frac{50}{10} = 5$$

$$\sqrt{\frac{6 - 5^2}{10 - 1}}$$

$$\sqrt{\frac{6 - 25}{9}}$$

$$\sqrt{\frac{19}{9}}$$

$$\sqrt{2.11} = 1.45$$

times (x)	$(x - \bar{x})^2$
1	16
2.5	6.25
4	1
4	1
4.5	0.25
5	0
6.5	2.25
7	4
7.5	6.25
8	9
$\Sigma(x - \bar{x})^2$	6

Mark: 1 out of 2

Rationale: – One correct table value (0.5 mark)
 – Incorrect substitution
 – Correct solution (follow-through error) (0.5 mark)

Sample 3

Restricted Response

(2 Marks)

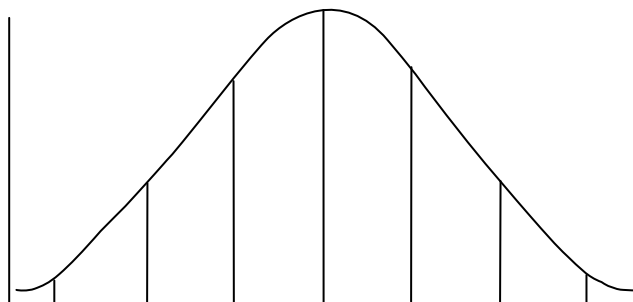
times (x)	$(x - \bar{x})^2$
1	16
2.5	6.25
4	1
4	1
4.5	0.25
5	0
6.5	2.25
7	4
7.5	6.25
8	9
$\Sigma(x - \bar{x})^2$	46

$$\sqrt{\frac{46}{9}}$$

$$s = 2.26$$

Mark: 2 out of 2**Rationale:** – Correct solution (4 × 0.5 mark)

The mean gas mileage of all vehicles within the town of Ashern is 12.5 miles/gallon. The gas mileage follows a normal distribution with a standard deviation of 1.5 miles/gallon.



- A) State the percent of vehicles that have a better gas mileage than 15.5 miles/gallon. (0.5 mark)

Answer: $2.35\% + 0.15\% = 2.5\%$ ← 0.5 mark

- B) There are 1 150 vehicles within the town of Ashern. Calculate the number of vehicles that will get less than 11 miles/gallon. (1 mark)

Answer: $13.5\% + 2.35\% + 0.15\% = 16\%$ ← 0.5 mark
 $1\ 150 \times 0.16 = 184$ ← 0.5 mark

- C) A company claims a new additive will increase everyone's gas mileage by 10%. Explain what this will do to the standard deviation. (0.5 mark)

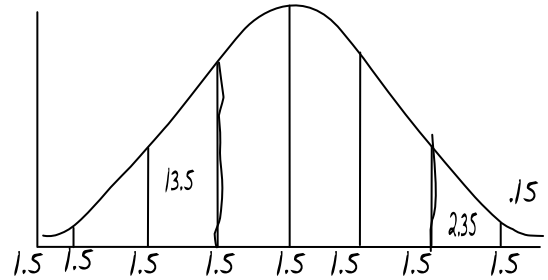
Answer: *It will remain the same.* ← 0.5 mark

Sample 1

Restricted Response

(2 Marks)

- A) $2.35 + 0.15 = 2.5\%$ have more than 15.5 miles/gallon
- B) $13.5 + 2.35 + 0.15 = 16\%$ have less than 11 miles/gallon
- C) goes up 10% too

**Mark: 1 out of 2**

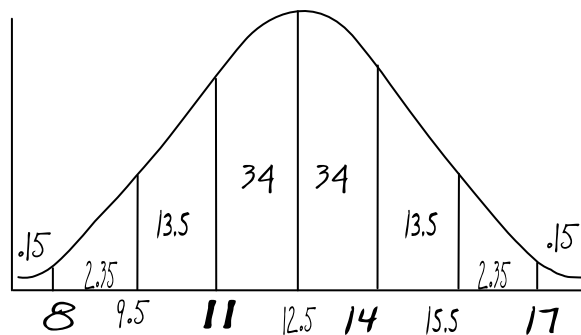
- Rationale:**
- Correct answer in Part A (0.5 mark)
 - Correct percent in Part B (0.5 mark)
 - Incorrect answer in Part C

Sample 2

Restricted Response

(2 Marks)

- A) 97.5%
- B) $1150 \times 16\% = 184$
- C) they all go up the same,
so no change

**Mark: 1 out of 2**

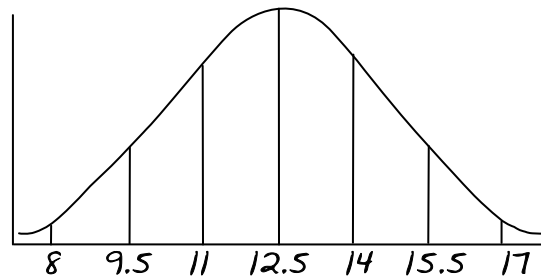
- Rationale:**
- Correct solution in Part B (2×0.5 mark)
 - Correct response in Part C (0.5 mark)

Sample 3

Restricted Response

(2 Marks)

- A) 2.5%
- B) 0.16×1150
 $= 184$ vehicles
- C) $1.5 \times 1.10 = 1.65$

**Mark: 1.5 out of 2**

- Rationale:**
- Correct answer in Part A (0.5 mark)
 - Correct solution in Part B (2×0.5 mark)

Question 13

V-F6

Open Response

(1 Mark)

Describe the relationship that exists between part-time hours worked after school and math test scores if the correlation coefficient is -0.85 .

Sample answers:

*The more part-time hours you work,
the lower your math test scores.*

← 1 mark

OR

*The less part-time hours you work,
the higher your math test scores.*

← 1 mark

OR



← 1 mark

OR

This is a strong negative correlation.
 0.5 mark 0.5 mark

Sample 1

Open Response

(1 Mark)

There is not a relationship between part time hours and test scores they have nothing to do with each other.

Mark: 0 out of 1**Rationale:** – Incorrect response**Sample 2**

Open Response

(1 Mark)

The more hours a student works the lower the test scores become.

Mark: 1 out of 1**Rationale:** – Correct response (1 mark)**Sample 3**

Open Response

(1 Mark)

There is no proof, but -0.85 is close to -1 , so it's a strong negative relationship.

Mark: 1 out of 1**Rationale:** – Correct response (1 mark)

Design and Measurement

Question 14

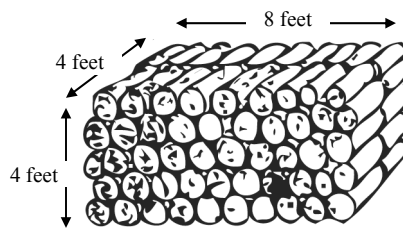
V-D5

Restricted Response

(2.5 Marks)

Jerimiah lives in a house that uses a wood burning stove for heating. He needs your help to determine the cost of buying wood for the winter season.

A cord of wood is wood piled in the shape of a rectangular solid to measure 4 feet high, 4 feet wide, and 8 feet long.



He uses approximately 6% of a cord of wood per day to heat his house. He anticipates the number of days in the winter season to be 150 days and a cord of wood costs \$140.

Calculate Jeremiah's seasonal heating cost.

Answer:

$$4' \times 4' \times 8' = 128 \text{ feet}^3 \quad \leftarrow 0.5 \text{ mark}$$

$$6\% \times 128 \text{ feet}^3 = 7.68 \text{ feet}^3 \text{ per day} \quad \leftarrow 0.5 \text{ mark}$$

$$7.68 \text{ feet}^3 \times 150 \text{ days} = 1\,152 \text{ feet}^3 \quad \leftarrow 0.5 \text{ mark}$$

$$1\,152 \text{ feet}^3 \div 128 \text{ feet}^3 = 9 \text{ cords of wood needed per season} \quad \leftarrow 0.5 \text{ mark}$$

$$9 \times \$140 = \$1\,260 \text{ per season} \quad \leftarrow 0.5 \text{ mark}$$

OR

$$0.06 \text{ cord per day} \quad \leftarrow 1 \text{ mark}$$

$$0.06 \times 150 = 9 \text{ cords per 150 days} \quad \leftarrow 1 \text{ mark}$$

$$9 \times \$140 = \$1\,260 \text{ per season} \quad \leftarrow 0.5 \text{ mark}$$

Test Item and Marking Guide

Sample 1

Restricted Response

(2.5 Marks)

150 days per cord \$140

$$8 \times 4 \times 4 = V = 128 \qquad 6 \times 140 = \$840$$

$$\underline{\times 0.06}$$

7.68 = 6 cords of wood for the winter season. He will need \$840 to buy wood to last the winter.

Mark: 1.5 out of 2.5

- Rationale:**
- Correct volume per day (2×0.5 mark)
 - Incorrect number of cords
 - Correct cost (follow-through error) (2×0.5 mark)

Sample 2

Restricted Response

(2.5 Marks)

*6%**150 DAYS**\$140/CORD*

$$0.06 \times 150 = 9$$

$$9 \times 140 = \$1260 \text{ HIS HEATING FOR THE YEAR WILL COST } \$1260$$

Mark: 2.5 out of 2.5

- Rationale:**
- Correct solution (5×0.5 mark)

Sample 3

Restricted Response

(2.5 Marks)

$$128 \text{ feet}^3 \qquad 140 \div 128 = 1.09 \text{ per ft}^3$$

$$128 \times .06 = 7.68 \text{ ft}^3 \text{ per day}$$

$$7.68 \times 1.09 = \$8.37 \text{ per day}$$

$$\$1255.50 \text{ for 150 days}$$

Mark: 2.5 out of 2.5

- Rationale:**
- Correct solution (5×0.5 mark)

Variation and Formulas

Question 15

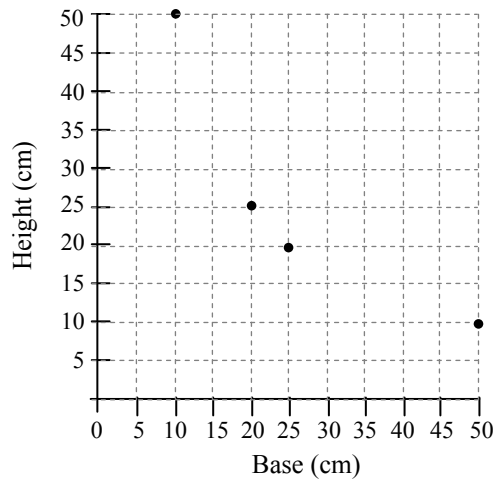
VI-F2

Restricted Response

(1 Mark)

Ms. Peabody's students are constructing triangles that have areas of 250 cm^2 .

Below is a graph showing four possible dimensions for a triangle that has an area of 250 cm^2 . (1 mark)



Use the graph to complete the table below:

Type of Variation	
Constant of Variation Value	

Answer:

Type of Variation	<i>Inverse</i>
Constant of Variation Value	500 <i>(height × base)</i>

← 0.5 mark

← 0.5 mark

Test Item and Marking Guide



Question 16

VI-F1

Restricted Response

(2 Marks)

Interest earned on a one-year Guaranteed Investment Certificate (GIC) is directly proportional to the amount invested. When \$550 is invested, interest of \$34.10 is earned. Determine the interest earned if \$2 000 is invested.

Answer: $y = kx$

$$34.10 = k(550) \quad \leftarrow 0.5 \text{ mark}$$

$$k = \frac{34.10}{550}$$

$$k = 0.062 \quad \leftarrow 0.5 \text{ mark}$$

$$y = kx$$

$$y = 0.062x \quad \leftarrow 0.5 \text{ mark}$$

$$y = 0.062(2\,000)$$

$$y = \$124 \quad \leftarrow 0.5 \text{ mark}$$

OR

$$\frac{550}{34.10} = \frac{2\,000}{x} \quad \leftarrow 0.5 \text{ mark}$$

$$550x = (2\,000)(34.10) \quad \leftarrow 0.5 \text{ mark}$$

$$x = \frac{68\,200}{550} \quad \leftarrow 0.5 \text{ mark}$$

$$x = \$124 \quad \leftarrow 0.5 \text{ mark}$$

Sample 1

Restricted Response

(2 Marks)

$$\begin{array}{r} 34.10 \\ \times 4 \\ \hline \$136.40 \end{array}$$

Mark: 0 out of 2**Rationale:** – Incorrect solution**Sample 2**

Restricted Response

(2 Marks)

$$\begin{aligned} \$550 \div 34.10 &= 16.129 \\ 16.13 \times 2\,000 &= 32\,260 \end{aligned}$$

Mark: 1 out of 2**Rationale:** – Correct alternate constant (2×0.5 mark)**Sample 3**

Restricted Response

(2 Marks)

$$\begin{aligned} y &= kx \\ \frac{34.10}{550} &= k \frac{550}{550} \\ k &= .062 \\ y &= .062 (2000) \\ y &= \$124 \end{aligned}$$

Mark: 2 out of 2**Rationale:** – Correct solution (4×0.5 mark)

Question 17

VI-F3

Restricted Response

(1 Mark)

A flying bird dives towards a shiny object on the ground. The formula that represents this dive is:

$$h = 4t^2 - 12t + 9.1$$

where t = time in seconds

h = height in metres

Determine how high the bird is above the ground after 1.5 seconds.

Answer:

$$h = 4t^2 - 12t + 9.1$$

$$h = 4(1.5)^2 - 12(1.5) + 9.1 \quad \leftarrow 0.5 \text{ mark for substitution}$$

$$h = 0.1 \text{ (metre)} \quad \leftarrow 0.5 \text{ mark}$$

Note to marker: "metre" not required.

Test Item and Marking Guide

Sample 1

Restricted Response

(1 Mark)

$$H = 4t^2 - 12t + 9.1$$

$$3.1 = H$$

Mark: 0 out of 1**Rationale:** – Incorrect solution**Sample 2**

Restricted Response

(1 Mark)

$$h = 4 \times 1.5^2 - 12 \times 1.5 + 9.1$$

$$h = 36 - 18 + 9.1$$

$$h = 27.1 \text{ metres}$$

Mark: 0.5 out of 1**Rationale:** – Correct substitution (0.5 mark)**Sample 3**

Restricted Response

(1 Mark)

$$h = 4t^2 - 12t + 9.1$$

$$h = 4 \times 1.5^2 - 12 \times 1.5 + 9.1 = 0.1$$

Mark: 1 out of 1**Rationale:** – Correct solution (2 × 0.5 mark)

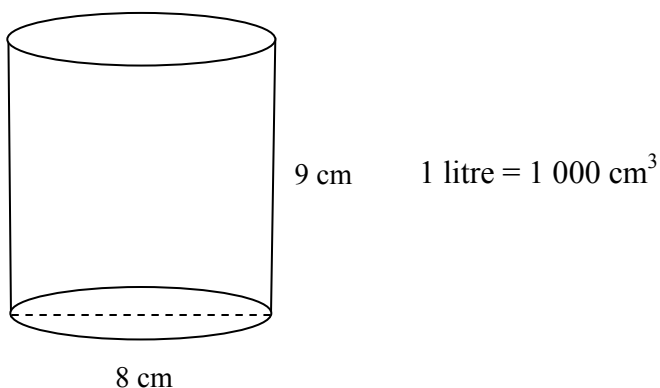
Question 18

VI-F4

Restricted Response

(2 Marks)

Cheryl wants to drink 1 litre of water at work each day. The glasses at work have a diameter of 8 cm and a height of 9 cm. Determine if 3 glasses of water will be enough for Cheryl to meet her goal.


Test Item and Marking Guide

Answer:

$$\text{radius} = 4 \text{ (cm)} \quad \leftarrow 0.5 \text{ mark}$$

$$V = \pi r^2 h$$

$$V = \pi(4)^2 (9) \quad \leftarrow 0.5 \text{ mark for substitution}$$

$$V = 452.39 \text{ (cm}^3\text{)} \quad \leftarrow 0.5 \text{ mark}$$

$$1\,000 \div 452.39$$

$$= 2.2 \text{ cups of water}$$

$$\therefore 3 \text{ cups is enough} \quad \leftarrow 0.5 \text{ mark}$$

OR

$$\text{radius} = 4 \text{ (cm)} \quad \leftarrow 0.5 \text{ mark}$$

$$V = \pi r^2 h$$

$$V = \pi(4)^2 (9) \quad \leftarrow 0.5 \text{ mark for substitution}$$

$$V = 452.39 \text{ (cm}^3\text{)} \quad \leftarrow 0.5 \text{ mark}$$

$$452.39 \times 3 = 1\,357.17 \text{ cm}^3$$

$$\therefore 3 \text{ cups is enough} \quad \leftarrow 0.5 \text{ mark}$$

Note to marker: Units not required in intermediate calculations.

Sample 1

Restricted Response

(2 Marks)

$$SA = 2\pi rh + 2\pi r^2$$

$$SA = 2 \times 3.14 \times 9\text{cm} + 2 \times 3.14^2 = 62.8\text{cm}$$

$$62.8\text{cm} \times 3 = 188.4\text{cm}$$

$$8\text{cm} + 9\text{cm} + 1000 = 1017$$

$$1017 \times 3 = 3051$$

Mark: 0 out of 2

Rationale: – Incorrect solution

Sample 2

Restricted Response

(2 Marks)

$$\frac{8}{2} = 4$$

$$\text{Volume} = \pi r^2 h$$

$$r = \text{radius} \quad h = \text{height}$$

$$3.14(4)^2(9) = 452.15\text{ ml} \times 3 = 1356.48 = 1.4\text{ litres}$$

Mark: 1.5 out of 2

Rationale: – Correct volume (3 × 0.5 mark)

Sample 3

Restricted Response

(2 Marks)

$$V = \pi r^2 h$$

$$V = \pi(4)^2 9$$

$$V = \pi(16)(9)$$

$$V = 452.4\text{ cm}^3$$

$$452.4 \times 3 = 1357.2\text{ litres}$$

Yes, three glasses are enough for her to reach her goal.

Mark: 2 out of 2

Rationale: – Correct solution (4 × 0.5 mark)

Question 19

VI-F3

Restricted Response

(1.5 Marks)

Crankshaft runs around a tree that has a diameter of 2 feet. He is 3 feet away from the tree and runs around the tree 10 times. Determine the distance Crankshaft runs using the formula:

$$c = \pi d$$

where c = circumference in feet

d = diameter in feet

(The cartoon that appeared in the print version is not available due to copyright restrictions.)

Answer:

$$d = 8 \quad \leftarrow 0.5 \text{ mark}$$

$$c = \pi d$$

$$c = \pi(8)$$

$$= 25.133 \text{ (feet)} \quad \leftarrow 0.5 \text{ mark}$$

$$25.133 \times 10$$

$$= 251.33 \text{ (feet)} \quad \leftarrow 0.5 \text{ mark}$$

Note to marker: "feet" not required

Test Item and Marking Guide

Sample 1

Restricted Response

(1.5 Marks)

$$C = \pi d$$

$$C = \pi 2$$

$$C = 6.3$$

Mark: 0.5 out of 1.5

Rationale: – Incorrect diameter
– Correct circumference (follow-through error) (0.5 mark)

Sample 2

Restricted Response

(1.5 Marks)

$$c = \pi d$$

$$c = \pi 2 = 6.28$$

$$c = 6.28 \text{ feet}$$

$$6.28 \times 10 = 62.8 \text{ feet}$$

$$\underline{62.8 + 3 = 65.8 \text{ feet}}$$

Mark: 0.5 out of 1.5

Rationale: – Incorrect diameter
– Correct circumference (follow-through error) (0.5 mark)

Sample 3

Restricted Response

(1.5 Marks)

$$C = \pi 5 \times 10 = 157 \text{ ft.}$$

Mark: 1 out of 1.5

Rationale: – Incorrect diameter
– Correct solution (follow-through error) (2×0.5 mark)

Investments

Question 20

VI-D3

Open Response

(2 Marks)

Angela is 60 years old and considering investing some of her money. Explain what type of investment she should make with respect to risk and liquidity.

Answer:

- *Student response should reference low risk* ← 1 mark
- *Student response should reference high liquidity* ← 1 mark

Test Item and Marking Guide

Sample 1

Open Response

(2 Marks)

She should invest in a GIC or Canada Savings Bonds. Not much risk as stocks, not as liquid as a savings account, but you make more interest than a savings account.

Mark: 2 out of 2**Rationale:** – Correct responses (2 × 1 mark)**Sample 2**

Open Response

(2 Marks)

- she should not put it in stocks because it is far too risky
 - she should put it in a savings account because it is safe but she can take money out if she decides she needs it
- OR
- she could put it in a bond so she can't touch it

Mark: 2 out of 2**Rationale:** – Correct responses (2 × 1 mark)**Sample 3**

Open Response

(2 Marks)

I would put the money in a savings account because it slowly builds interest and you can take it out when ever needed.

Mark: 2 out of 2**Rationale:** – Correct responses (2 × 1 mark)

Question 21

VI-D4

Restricted Response

(1 Mark)

Tyler has to decide whether or not to invest in a Registered Savings Plan (RSP). Identify two reasons that support purchasing the RSP.

Answer:

- *Immediate tax savings* ← 0.5 mark
- *All growth is tax free until you take it out* ← 0.5 mark

Test Item and Marking Guide

Sample 1

Restricted Response

(1 Mark)

He will have money when he retires to fall back on.

Mark: 0 out of 1**Rationale:** – Incorrect response**Sample 2**

Restricted Response

(1 Mark)

THE REASONS ARE LOW RISK AND GOOD INTEREST.

Mark: 0 out of 1**Rationale:** – Incorrect response**Sample 3**

Restricted Response

(1 Mark)

- Tax refunds - when putting money in RSP's the government gives you income tax refunds*
- can be withdrawn with little penalty*

Mark: 0.5 out of 1**Rationale:** – Correct response (“tax”) (0.5 mark)

Zoë decides to buy stocks through a broker. The broker charges a base price of \$40 per trade plus 8¢ per share.

- A) If Zoë buys 1 200 shares of PetroCan at \$74 a share, calculate how much she will pay for the shares in total. (1.5 marks)

Answer:

$$\$40 + 1\,200(\$0.08) = \$136 \text{ Commission} \quad \leftarrow 0.5 \text{ mark}$$

$$1\,200 \times \$74 = \underline{\$88\,800} \text{ Stock Price} \quad \leftarrow 0.5 \text{ mark}$$

$$\$88\,936 \text{ Total Cost} \quad \leftarrow 0.5 \text{ mark}$$

- B) Zoë sells the stock a month later and receives \$85 864. Determine her percentage gain or loss on the stock transaction. (1.5 marks)

Answer:

$$\$85\,864 - \$88\,936 = \$3\,072 \text{ loss (or } -\$3\,072 \text{ or } (\$3\,072)) \quad \leftarrow 0.5 \text{ mark}$$

$$\frac{-\$3\,072}{\$88\,936} = -0.0345 \text{ or } 3.45\% \text{ loss} \quad \leftarrow 0.5 \text{ mark correct value}$$

$\leftarrow 0.5 \text{ mark correct indication of "loss"}$

OR

$$\frac{\$85\,864}{\$88\,936} = 0.965 \quad \leftarrow 0.5 \text{ mark}$$

$$1 - 0.965 = \underbrace{0.0345}_{0.5 \text{ mark}} \quad \underbrace{\text{loss}}_{0.5 \text{ mark}}$$

Sample 1

Restricted Response

(3 Marks)

A) $1200 \times 74 = 88800$
 $88800 \times .08 = 7104 + 40 = 7144$
 $\$95944$

B) $\frac{95944}{85864} = \text{she gained } 12\% \text{ of her profit back.}$

Mark: 1 out of 3

Rationale: – Incorrect commission in Part A
 – Correct solution in part A (follow-through error) (2×0.5 mark)

Sample 2

Restricted Response

(3 Marks)

A) $1200 \times (74 + .08) + 40 = \88936

B) 85864

$- 88936 = -3072$ $-\frac{3072}{88936} = -0.035\%$

Mark: 2.5 out of 3

Rationale: – Correct solution in Part A (3×0.5 mark)
 – Correct difference in Part B (0.5 mark)
 – Correct indication of “loss” in Part B (0.5 mark)

Sample 3

Restricted Response

(3 Marks)

A) $1200 \times .08 = \$96 + 40 = \136
 $1200 \times 74 = 88800$

+136
 $\$88936$

B) $88936 \div 85864 = 96.5\%$
 she lost 3.5%

Mark: 3 out of 3

Rationale: – Correct solution in Part A (3×0.5 mark)
 – Correct solution in Part B (3×0.5 mark)

Tracy has \$165 000 in assets and \$130 000 in liabilities.

A) Calculate Tracy’s net worth. (0.5 mark)

$$\begin{aligned}
 \text{Answer: Net worth} &= \text{Assets} - \text{Liabilities} \\
 &= \$165\,000 - \$130\,000 \\
 &= \$35\,000 \qquad \leftarrow 0.5 \text{ mark}
 \end{aligned}$$

B) Tracy borrows \$16 000 from the bank to purchase a car. Complete the chart below: (1.5 marks)

New assets	
New liabilities	
New net worth	

Answer:

<i>New assets</i>	<i>\$181 000</i>	<i>← 0.5 mark</i>
<i>New liabilities</i>	<i>\$146 000</i>	<i>← 0.5 mark</i>
<i>New net worth</i>	<i>\$35 000</i>	<i>← 0.5 mark</i>

OR

<i>New assets</i>	<i>+\$16 000</i>	<i>← 0.5 mark</i>
<i>New liabilities</i>	<i>+\$16 000</i>	<i>← 0.5 mark</i>
<i>New net worth</i>	<i>no change</i>	<i>← 0.5 mark</i>

Sample 1

Restricted Response

(2 Marks)

A) 35 000

B)

New assets	\$181 000
New liabilities	\$130 000
New net worth	\$19 000

Mark: 1 out of 2

Rationale: – Correct answer in Part A (0.5 mark)
– One correct answer (assets) in Part B (0.5 mark)

Sample 2

Restricted Response

(2 Marks)

A) $165\,000 - 130\,000 = \$35\,000$ net worth

B)

New assets	\$181 000
New liabilities	\$130 000
New net worth	\$51 000

Mark: 1.5 out of 2

Rationale: – Correct answer in Part A (0.5 mark)
– Correct answer (assets) in Part B (0.5 mark)
– Correct answer (net worth) in Part B (follow-through error) (0.5 mark)

Sample 3

Restricted Response

(2 Marks)

A) 35 000

B)

New assets	+16 000
New liabilities	-16 000
New net worth	+0

Mark: 1.5 out of 2

Rationale: – Correct answer in Part A (0.5 mark)
– Correct answer (assets) in Part B (0.5 mark)
– Correct answer (net worth) in Part B (0.5 mark)

Appendix A

IRREGULARITIES IN STANDARDS TESTS

A GUIDE FOR LOCAL MARKING

During the marking of standards tests, irregularities are occasionally encountered in test booklets. The following list provides examples of irregularities for which an *Irregular Test Booklet Report* should be completed and sent to the Department:

- completely different penmanship in the same test booklet
- incoherent work with correct answers
- notes from a teacher indicating how he or she has assisted a student during test administration
- student offering that he or she received assistance on a question from a teacher
- student submitting work on unauthorized paper
- evidence of cheating or plagiarism
- disturbing or offensive content
- no responses provided by the student (all “NR”) or only incorrect responses (“0”)

Student comments or responses indicating that the student may be at personal risk of being harmed or of harming others are personal safety issues. This type of student response requires an immediate and appropriate follow-up at the school level. In this case, please ensure the Department is made aware that follow-up has taken place by completing an *Irregular Test Booklet Report*.

Except in the case of cheating or plagiarism where the result is a standards test mark of 0%, it is the responsibility of the division or the school to determine how they will proceed with irregularities. Once an irregularity has been confirmed, the marker prepares an *Irregular Test Booklet Report* documenting the situation, the people contacted, and the follow-up. The original copy of this report is to be retained by the local jurisdiction and a copy is to be sent to the Department along with the test materials.

Irregular Report

Test: _____

Date marked: _____

Booklet ID No.: _____

Problem noted: _____

Question(s) affected: _____

Action taken or rationale for assigning marks: _____

Follow-up: _____

Decision: _____

Marker's Signature: _____

Principal's Signature: _____

<p>For Department Use Only—After Marking Complete</p> <p>Consultant: _____</p> <p>Date: _____</p>
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