
Grade 12
Consumer Mathematics
Standards Test

Written Test Marking Guide

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Contents

Marking Guidelines.....	ii
Presentation of the Student Samples.....	1
Personal Finance.....	2
Government Finances	10
Statistics	18
Design and Measurement.....	28
Variation and Formulas.....	30
Investments	40
Appendix A Irregularities in Standards Tests	49
<i>Irregular Test Paper Report</i>	51

Marking Guidelines

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

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-C2	Restricted Response	(2 Marks)
Test Item and Marking Guide	Joe borrows \$150 000 to buy a house. He has an interest rate of 6.5% on a mortgage amortized over 25 years.		
	A) Calculate Joe's monthly mortgage payment. (1 mark)		
	$\text{Answer: } \frac{\$150\,000}{1\,000} \times \frac{6.70}{0.5\ \text{mark}} = \frac{\$1\,005}{0.5\ \text{mark}} \text{ monthly mortgage payment}$		
	B) Calculate the total amount of the mortgage payments made, over the 25 year mortgage. (0.5 mark)		
	$\text{Answer: } \$1\,005 \times 12 \times 25 = \$301\,500 \text{ total payments}$		
	C) Calculate the total interest paid over the life of the mortgage. (0.5 mark)		
	$\text{Answer: } \$301\,500 - \$150\,000 = \$151\,500 \text{ interest}$		

Sample 2

Restricted Response

(2 Marks)

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

A) $150\,000 \times \frac{0.065}{12} = \812.50 per month

B) $\$812.50 \times 12 \times 25 = \$243\,750 \text{ in 25 years}$

C) $\$243\,750 - \$150\,000 = \$93\,750 \text{ in interest}$

Mark: 1 out of 2

Rationale:

- Incorrect solution in Part A
- Correct answer in Part B (follow-through error) (0.5 mark)
- Correct answer in Part C (follow-through error) (0.5 mark)

Personal Finance

Question 1

V-C2

Restricted Response

(2 Marks)

Joe borrows \$150 000 to buy a house. He has an interest rate of 6.5% on a mortgage amortized over 25 years.

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

$$\text{Answer: } \frac{\$150\,000}{1\,000} \times \underbrace{6.70}_{0.5 \text{ mark}} = \underbrace{\$1\,005}_{0.5 \text{ mark}} \text{ monthly mortgage payment}$$

- B) Calculate the total amount of the mortgage payments made, over the 25-year mortgage. (0.5 mark)

$$\text{Answer: } \$1\,005 \times 12 \times 25 = \$301\,500 \text{ total payments}$$

- C) Calculate the total interest paid over the life of the mortgage. (0.5 mark)

$$\text{Answer: } \$301\,500 - \$150\,000 = \$151\,500 \text{ interest}$$

Test Item and Marking Guide

Sample 1

Restricted Response

(2 Marks)

- A) $6.70 \times 150 = \$1\,005$
- B) $\$1\,005 \times 25 \text{ years} = \$25\,125$
- C) $\$150\,000 - \$25\,125 = \$124\,875$

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

Restricted Response

(2 Marks)

- A) $150\,000 \times \frac{0.065}{12} = \812.50 per month
- B) $\$812.50 \times 12 \times 25 = \$243\,750 \text{ in 25 years}$
- C) $\$243\,750 - \$150\,000 = \$93\,750 \text{ in interest}$

Mark: 1 out of 2

Rationale: - Incorrect solution in Part A
 - Correct answer in Part B (follow-through error) (0.5 mark)
 - Correct answer in Part C (follow-through error) (0.5 mark)

Sample 3

Restricted Response

(2 Marks)

- A) $\frac{150\,000}{1\,000} \times 6.07 = 910.50$
- B)
$$\begin{array}{r} 910.50 \\ \times 300 \\ \hline 273\,150 \text{ paid} \end{array}$$
- C)
$$\begin{array}{r} 273\,150 \\ - 150\,000 \\ \hline 123\,150 \text{ more than cost} \end{array}$$

Mark: 1.5 out of 2

Rationale: - Incorrect rate in Part A
 - Correct solution in Part A (follow-through error) (0.5 mark)
 - Correct solution in Part B (follow-through error) (0.5 mark)
 - Correct solution in Part C (follow-through error) (0.5 mark)

Question 2

V-C1

Restricted Response with Explanation

(1.5 Marks)

Test Item and Marking Guide

Roberta, a female smoker, and Doug, a male non-smoker, are 20-year-old twins. They each purchase whole-life insurance policies.

- A) State Roberta's and Doug's issue rates per \$1 000 of insurance. (1 mark)

Roberta: _____

Doug: _____

Answer:

Roberta: \$3.26 ← 0.5 mark

Doug: \$3.60 ← 0.5 mark

- B) Explain why Roberta's issue rate per \$1 000 unit is lower than Doug's. (0.5 mark)

Sample answers: There is a greater chance the sister (female) will live longer than her brother.

Doug will not live as long as Roberta, so his premiums are higher.

Note to marker: "she is female" or "he is male" are not correct responses

Sample 1

Restricted Response with Explanation

(1.5 Marks)

- A) Roberta: \$1.32 each unit
Doug: \$0.85 each unit
- B) Roberta's isn't lower than Doug's, it's more

Mark: 0 out of 1.5**Rationale:** - Incorrect responses**Sample 2**

Restricted Response with Explanation

(1.5 Marks)

- A) ROBERTA: 2.89
Doug: 3.60
- B) ROBERTA WILL PROBABLY LIVE LONGER THAN DOUG, SO SHE PAYS LESS EACH MONTH.

Mark: 1 out of 1.5**Rationale:** - Correct rate for Doug in Part A (0.5 mark)
- Correct response in Part B (0.5 mark)**Sample 3**

Restricted Response with Explanation

(1.5 Marks)

- A) Roberta: \$3.26 per 1 000
Doug: \$3.60 per 1 000
- B) Roberta is female, and they pay less.

Mark: 1 out of 1.5**Rationale:** - Correct answers in Part A (2×0.5 mark)

Question 3

V-C3

Restricted Response

(1 Mark)

Cynthia was approved for a \$150 000 mortgage. In addition to her down payment she has \$600 saved for additional costs involved in purchasing this home. Justify why \$600 is not enough money to pay for the initial costs in purchasing a home.

- Sample answers:*
- *The \$600 barely covers the legal fees and there are many more costs to buying a home.*

 - *There are additional costs such as movers and utility hookups that will easily exceed \$600.*

 - *The land transfer tax alone would be more than the \$600.*

Test Item and Marking Guide

Sample 1

Restricted Response

(1 Mark)

\$600 is not enough because you have to pay for heating, water, plumbing, etc. and I don't think that will cost under \$600.

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

Restricted Response

(1 Mark)

\$600 is not enough to pay for additional costs, as necessities such as groceries should be taken into consideration - as well as furniture and other items for the home. She would not have enough to purchase both luxuries and necessities in her financial situation.

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

Restricted Response

(1 Mark)

\$600 is not enough money to pay for additional costs because there could be repairs on the house you have to do, designing/decorating costs, also the taxes raise up the price, and all together it will equal more than \$600.

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

Question 4

V-C4

Restricted Response with Explanation

(2.5 Marks)

Elmer wants to make monthly payments of \$2 127.60 on a house. His gross monthly income is \$8 000, the monthly property taxes are \$300 and the monthly heating is \$150.

- A) Calculate Elmer's Gross Debt Service Ratio (GDSR). (1.5 marks)

Answer:

$$GDSR = \frac{\text{Monthly mortgage payment} + \text{Monthly heating cost} + \text{Monthly property taxes}}{\text{Gross monthly income}} \times 100$$

$$= \frac{\$2\,127.60 + \$150 + \$300}{\$8\,000} \times 100$$

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

$$= 32.2\% \quad \leftarrow 0.5 \text{ mark}$$

- B) Elmer really wants this house. Identify what he could do to lower his GDSR. (1 mark)

Sample answers:

- amortize the mortgage over a longer period of time
- find a lower interest rate
- increase gross monthly income
- decrease monthly heating

Sample 1

Restricted Response with Explanation

(2.5 Marks)

$$A) \frac{(2127.60 + 150 + 300)}{8000} = 3.2\%$$

B) Make lower payments?

Mark: 1 out of 2.5

Rationale: - All correct substitutions in Part A (1 mark)
- Incorrect response in Part B

Sample 2

Restricted Response with Explanation

(2.5 Marks)

$$A) \frac{2127.60 + 150 + 300}{8000} = 32.2 \text{ GDSR}$$

B) He should cut down on things like eating out and entertainment to save money.

Mark: 1.5 out of 2.5

Rationale: - Correct solution in Part A (1.5 marks)
- Incorrect response in Part B

Sample 3

Restricted Response with Explanation

(2.5 Marks)

$$A) \frac{2127.60 + 150 + 300}{8000} \times 100 = 32.9\%$$

B) He is right on the limits, but he could ask for a raise if he wants to lower the GDSR.

Mark: 2.5 out of 2.5

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

Government Finances

Question 5

V-E1

Open Response

(2 Marks)

Test Item and Marking Guide

A) Name one expenditure for each of the three levels of government. (1.5 marks)

Level of Government	Expenditure	
Federal		(0.5 mark)
Provincial		(0.5 mark)
Municipal		(0.5 mark)

Sample answers:

Level of Government	Expenditure	
Federal	<i>RCMP, Defence, Indian Affairs, Industry, etc.</i>	(0.5 mark)
Provincial	<i>Health, Agriculture, Highways, Education, etc.</i>	(0.5 mark)
Municipal	<i>Snow removal, garbage collection, libraries, etc.</i>	(0.5 mark)

B) Identify one source of revenue the government receives to pay for these expenditures. (0.5 mark)

- Sample answers:*
- Taxes
 - Imposed duties
 - Transfers
 - Fees
 - Grants

Sample 1

Open Response

(2 Marks)

A)

Level of Government	Expenditure
Federal	Personal
Provincial	Duty & excise taxes
Municipal	

B) They receive a percentage
off everyone's pay check.

Mark: 0 out of 2**Rationale:** - Incorrect responses**Sample 2**

Open Response

(2 Marks)

A)

Level of Government	Expenditure
Federal	national defense
Provincial	property taxes
Municipal	street repairs

B) Income taxes

Mark: 1.5 out of 2

Rationale: - Two correct answers in Part A (Federal and Municipal) (2×0.5 mark)
- Correct answer in Part B (0.5 mark)

Sample 3

Open Response

(2 Marks)

A)

Level of Government	Expenditure
Federal	police, libraries
Provincial	road repairs, construction
Municipal	public pools, public libraries

B) One source of revenue the
government receives is from
our taxes we pay (PST and
GST).

Mark: 1.5 out of 2

Rationale: - Two correct answers in Part A (Provincial and Municipal) (2×0.5 mark)
- Correct answer in Part B (0.5 mark)

Question 6

V-E4

Restricted Response

(2.5 Marks)

Connie is planning a trip to England.

A) Connie has \$7 000 Canadian. Convert her money into pounds (£). (1 mark)

$$\text{Answer: } \$7\,000 \div \underbrace{1.5843}_{0.5 \text{ mark}} = \underbrace{4\,418}_{0.5 \text{ mark}} \text{ £}$$

B) While on her trip to England, Connie spent 3 100 pounds (£). When she arrives home she converts the money she has left into Canadian dollars. Calculate the amount of money Connie has left. (1.5 marks)

$$\text{Answer: } 4\,418 - 3\,100 = 1\,318 \text{ £} \qquad \leftarrow 0.5 \text{ mark}$$

$$1\,318 \times \underbrace{1.4402}_{0.5 \text{ mark}} = \underbrace{\$1\,898.18}_{0.5 \text{ mark}} \text{ Canadian}$$

Note to marker: accept rounded or truncated answers

Sample 1

Restricted Response

(2.5 Marks)

A) $7\ 000 \times 1.58 = 11\ 060$

B) $11\ 060 - 3\ 100 = 7\ 960$

$$\frac{7\ 960}{1.44} = 5\ 527.78$$

Mark: 0.5 out of 2.5**Rationale:** - Correct difference in Part B (follow-through error) (0.5 mark)**Sample 2**

Restricted Response

(2.5 Marks)

A) $7\ 000 \times 1.5843 = \text{£} 11\ 090.10$

B) $\text{£} 11\ 090.10$

$$\begin{array}{r} \text{£} 11\ 090.10 \\ - 3\ 100.00 \\ \hline \end{array}$$

$$\text{£} 7\ 990.10$$

$$\text{£} 7\ 990.10 \div 1.4402 = \$5\ 479.91 \text{ CDN}$$

Mark: 1.5 out of 2.5

Rationale: - Correct rate in Part A (0.5 mark)
 - Correct difference in Part B (follow-through error) (0.5 mark)
 - Correct rate in Part B (0.5 mark)

Sample 3

Restricted Response

(2.5 Marks)

A) $\frac{\text{Can}}{\text{Eng}} = \frac{7\ 000}{1.5843} = 4\ 418.36$

B) $4\ 418.36 - 3\ 100 = \text{£} 1\ 318.36$

$$\frac{\text{Eng}}{\text{Can}} = \frac{1\ 318.36}{1.4402} = \$915.40$$

*Connie is left with \$915.40***Mark: 2 out of 2.5**

Rationale: - Correct solution in Part A (2×0.5 mark)
 - Correct difference in Part B (0.5 mark)
 - Correct rate in Part B (0.5 mark)

Question 7

V-E6

Restricted Response

(2.5 Marks)

Doreen's property has a portioned assessed value of \$140 000 and the municipal mill rate is 16.12.

- A) Calculate the amount of property tax Doreen will pay. (1 mark)

$$\text{Answer: } \$140\,000 \times \underbrace{\frac{16.12}{1\,000}}_{0.5 \text{ mark}} = \underbrace{\$2\,256.80}_{0.5 \text{ mark}} \text{ property tax}$$

- B) The property has a 50-foot frontage and the local improvement tax for street lighting is \$3.50 per foot. Calculate the cost of local improvements for Doreen's property. (0.5 mark)

$$\text{Answer: } 50 \text{ feet} \times \$3.50/\text{foot} = \$175 \text{ local improvements} \quad \leftarrow 0.5 \text{ mark}$$

- C) Doreen paid a total of \$4 881.50 for municipal and education taxes. Calculate the amount of education tax she paid. (1 mark)

$$\begin{aligned} \text{Answer: } \$2\,256.80 + \$175 &= \$2\,431.80 \text{ municipal tax} && \leftarrow 0.5 \text{ mark} \\ \$4\,881.50 - \$2\,431.80 &= \$2\,449.70 \text{ education tax} && \leftarrow 0.5 \text{ mark} \end{aligned}$$

Sample 1

Restricted Response

(2.5 Marks)

$$A) 140\,000 \times 0.45 = 63\,000 \times \frac{16.12}{1\,000} = 1\,015.56$$

$$B) 50 \times 3.50 = \$175$$

$$C) 4\,881.50 + 175 + 1\,015.56 = 6\,072.06 \text{ total}$$

Mark: 1 out of 2.5

- Rationale:**
- Correct rate in Part A (0.5 mark)
 - Correct answer in Part B (0.5 mark)
 - Incorrect solution in Part C (conceptual error)

Sample 2

Restricted Response

(2.5 Marks)

$$A) 140\,000 \times \frac{16.12}{100} = 22\,568.00$$

$$B) 175 \text{ improvement tax}$$

$$C) 4\,881.50 - 175 = \$4\,706.50$$

Mark: 1.5 out of 2.5

- Rationale:**
- Incorrect rate in Part A
 - Correct solution in Part A (follow-through error) (0.5 mark)
 - Correct answer in Part B (0.5 mark)
 - Correct solution in Part C (follow-through error) (0.5 mark)

Sample 3

Restricted Response

(2.5 Marks)

$$A) 140 \times 16.12 = 2\,256.80 \text{ property}$$

$$B) 50 \times 3.50 = 175 \text{ for lighting}$$

$$C) 4\,881.50 - 2\,256.80 = \$2\,624.70 \text{ education tax}$$

Mark: 2 out of 2.5

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

Question 8

V-E6

Restricted Response

(1.5 Marks)

A Manitoba municipality has a total taxable portioned assessment base of \$525 000 000. The municipality requires revenue of \$13 000 000 to meet its budget requirements.

- A) Calculate the property tax rate in mills. (1 mark)

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

$$\begin{aligned} PTR &= \frac{\$13\,000\,000}{\$525\,000\,000} \times 1\,000 \leftarrow 0.5 \text{ mark for substitution} \\ &= 24.762 \text{ mills} \qquad \qquad \qquad \leftarrow 0.5 \text{ mark} \end{aligned}$$

- B) Express this mill rate as a percentage. (0.5 mark)

$$\text{Answer: } 2.5\% \qquad \qquad \qquad \leftarrow 0.5 \text{ mark}$$

Sample 1

Restricted Response

(1.5 Marks)

$$A) \$525\,000\,000 - 13\,000\,000 = \frac{512\,000\,000}{1\,000} = 512\,000$$

$$B) 512\,000$$

Mark: 0 out of 1.5**Rationale:** - Incorrect responses**Sample 2**

Restricted Response

(1.5 Marks)

$$A) \frac{13\,000\,000}{525\,000\,000} \times 1\,000 = 25$$

$$B) \frac{25}{1\,000} \times 10 = 0.25\%$$

Mark: 1 out of 1.5**Rationale:** - Correct solution in Part A (2 × 0.5 mark)**Sample 3**

Restricted Response

(1.5 Marks)

$$A) \frac{\$13\,000\,000}{\$525\,000\,000} \times 1\,000 = 24.76 \text{ ml/l}$$

$$B) \$24.76 \div 10 = 2.48\%$$

Mark: 1.5 out of 1.5**Rationale:** - Correct solution in Part A (2 × 0.5 mark)

- Correct answer in Part B (0.5 mark)

Statistics

Question 9

V-F1

Restricted Response

(2 Marks)

Tyler is one of 360 players in a basketball league. He is six feet seven inches tall. There are 31 other players who are the same height as Tyler and 316 players that are shorter than Tyler.

A) Calculate Tyler's percentile rank. (1.5 marks)

Answer:

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

$$P = \left(\frac{316 + 0.5(32)}{360} \right) \times 100 \quad \left\{ \begin{array}{l} \text{No mark for 1 correct substitution} \\ \text{OR} \\ 0.5 \text{ mark for 2 correct substitutions} \\ \text{OR} \\ 1 \text{ mark for all correct substitutions} \end{array} \right.$$

$$= 92.2 \quad \leftarrow 0.5 \text{ mark}$$

OR

$$92 \text{ or } 92\text{nd or } P_{92} \quad \leftarrow 0.5 \text{ mark}$$

OR

$$93 \text{ or } 93\text{rd or } P_{93} \quad \leftarrow 0.5 \text{ mark}$$

B) How tall is the tallest player in the basketball league? (0.5 mark)

Answer: Impossible to tell $\leftarrow 0.5 \text{ mark}$

Test Item and Marking Guide

Sample 1

Restricted Response

(2 Marks)

$$A) \mathcal{P} = \left(\frac{316 + 0.5(31)}{361} \right) \times 100$$

B) *I would need more info*

$$\mathcal{P} = \left(\frac{331.5}{361} \right) \times 100$$

$$\mathcal{P} = 91.82$$

Mark: 1 out of 2

- Rationale:**
- One correct substitution
 - Correct answer in Part A (follow-through error) (0.5 mark)
 - Correct response in Part B (0.5 mark)

Sample 2

Restricted Response

(2 Marks)

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

$$\left(\frac{316 + 0.5(32)}{360} \right) \times 100$$

$$\left(\frac{316 + (16)}{360} \right) \times 100 \quad (0.922\bar{2}) \times 100 = 92.2\bar{2}\%$$

B) *Taller than 6'7", that's all we know.***Mark: 1.5 out of 2**

- Rationale:**
- All correct substitutions in Part A (1 mark)
 - Incorrect answer (percent) in Part A
 - Correct response in Part B (0.5 mark)

Sample 3

Restricted Response

(2 Marks)

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

$$B) 5'7" \rightarrow 79" \div 0.92 = 86" = 7'2"$$

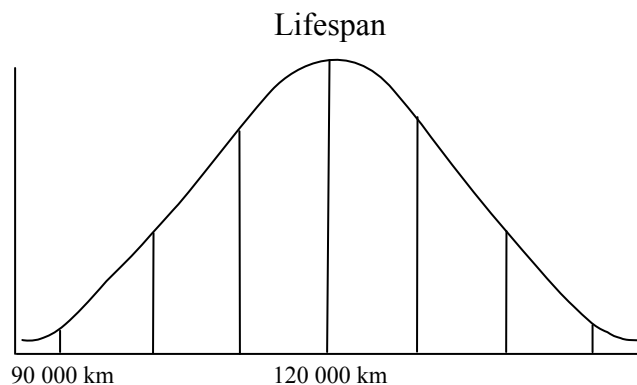
$$\mathcal{P} = \left(\frac{316 + 0.5(32)}{360} \right) \times 100$$

$$\mathcal{P} = 92 \quad \mathcal{P}_{92}$$

Mark: 1.5 out of 2

- Rationale:**
- Correct solution in Part A (1.5 marks)

A car manufacturer builds the Nano, a small car that is economical to drive. A specific car part in the Nano has a lifespan that follows a normal distribution as shown in the diagram below.



Determine the standard deviation of the car part's lifespan in km.

Answer: $120\,000 - 90\,000 = 30\,000 \text{ (km)}$ ← 0.5 mark

$$\frac{30\,000}{3} = 10\,000 \text{ (km)} \quad \leftarrow 0.5 \text{ mark}$$

OR

$$10\,000 \text{ (km)} \quad \leftarrow 1 \text{ mark}$$

Sample 1

Restricted Response

(1 Mark)

10. 110 000 km

Mark: 0 out of 1

Rationale: - Incorrect answer

Sample 2

Restricted Response

(1 Mark)

Each deviation is 10 000 km

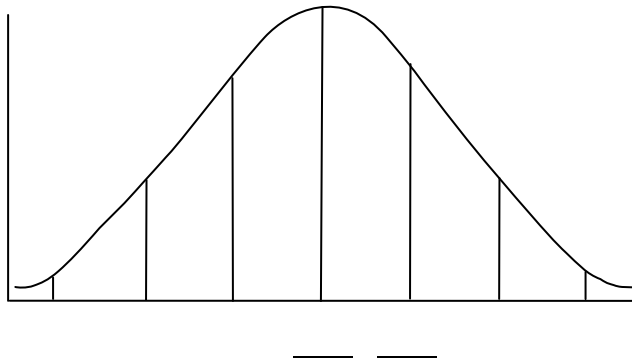
Mark: 1 out of 1

Rationale: - Correct answer (1 mark)

A college course entrance test was used to sort the applicants. The mean on the test was 74 and the standard deviation was 5. The scores followed a normal distribution pattern.

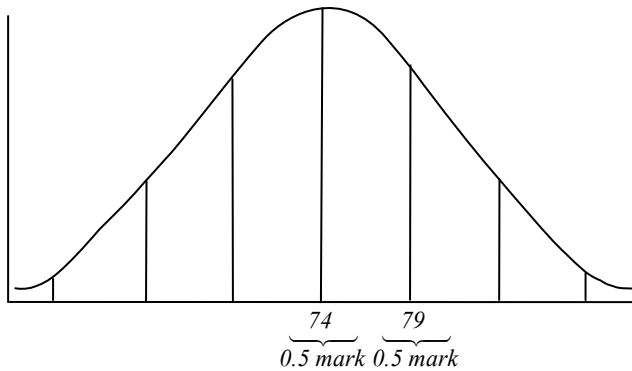
A) State the scores for the spaces given below the curve. (1 mark)

Distribution of Student Scores



Answer:

Distribution of Student Scores



B) Calculate the number of students that scored between 69 and 79, if 300 students wrote the test. (1 mark)

Answer: $34\% + 34\% = 68\%$ ← 0.5 mark

$300 \times 0.68 = 204$ students ← 0.5 mark

OR

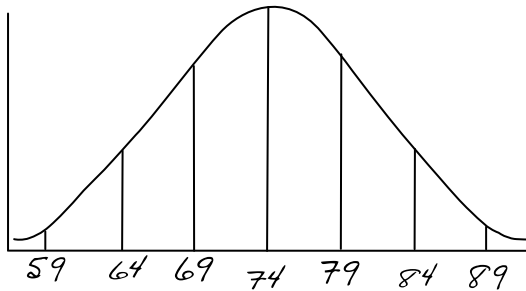
$300 \times \underbrace{0.68}_{0.5 \text{ mark}} = \underbrace{204}_{0.5 \text{ mark}} \text{ students}$

Sample 1

Restricted Response

(2 Marks)

A)



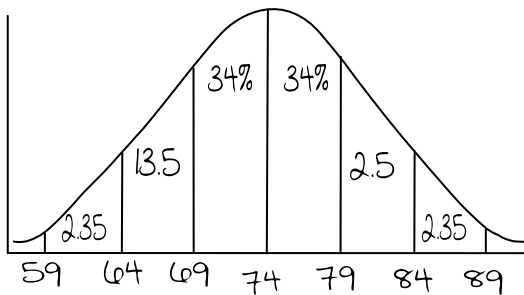
B) $79 - 69 = 10$

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

Restricted Response

(2 Marks)

A)



B)

$$300 \times 0.64$$

$$= 192 \text{ students}$$

Mark: 1.5 out of 2**Rationale:** - Correct answers in Part A (2×0.5 mark)

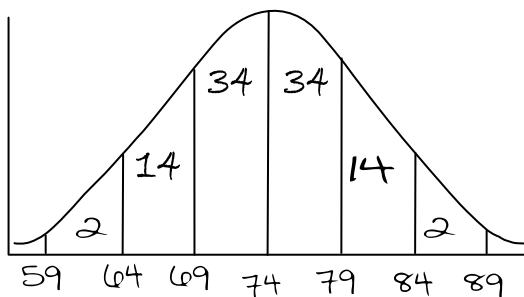
- Correct solution in Part B (follow-through error) (0.5 mark)

Sample 3

Restricted Response

(2 Marks)

A)



B) 68% 210 students

Mark: 1.5 out of 2**Rationale:** - Correct answers in Part A (2×0.5 mark)

- Correct percent in Part B (0.5 mark)

Question 12

V-F6

Restricted Response

(1 Mark)

A study shows a positive correlation between the number of sugared drinks consumed by young people and the onset of Type II diabetes. Carolyn is a teenager concerned about her health. According to this study, describe a change she can make to decrease her chances of developing Type II diabetes.

Answer: Reduce the amount of sugared drinks consumed.

Test Item and Marking Guide

Sample 1

Restricted Response

(1 Mark)

According to this study, if Carolyn increases the amount of fruit drinks that she consumes, she will have a lower chance of getting type II diabetes.

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

Restricted Response

(1 Mark)

She can cut down the amount of sugared drinks she consumes.

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

Restricted Response

(1 Mark)

Carolyn can do some changes by

- exercising more often
- consume less sugared drinks
- increase the amount of water she drinks.
- get her blood pressure/sugar levels checked
- add more fruit/vegetables that are in their natural state

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

Question 13

V-F6

Restricted Response

(1 Mark)

Scores on math and language arts exams have a correlation coefficient of $r = -0.15$. Identify the strength and type of this correlation.

Answer: This is a weak negative correlation.
0.5 mark 0.5 mark

Test Item and Marking Guide

Sample 1

Restricted Response

(1 Mark)

It is a strong correlation.

Mark: 0 out of 1

Rationale: - Incorrect response

Sample 2

Restricted Response

(1 Mark)

The strength of this is a strong negative direct variation correlation.

Mark: 0.5 out of 1

Rationale: - Correct type (0.5 mark)

Sample 3

Restricted Response

(1 Mark)

NEGATIVE CORRELATION BUT A VERY SMALL ONE.

Mark: 1 out of 1

Rationale: - Correct response (2 × 0.5 mark)

Design and Measurement

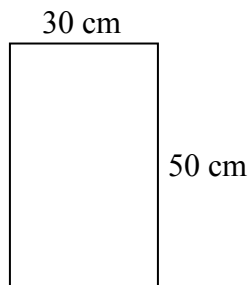
Question 14

V-D5

Restricted Response

(3 Marks)

A manufacturer purchases a rectangular sheet of cardboard that has dimensions of $30\text{ cm} \times 50\text{ cm}$.



The manufacturer cuts $5\text{ cm} \times 5\text{ cm}$ squares out of each corner. The sides are folded up to create an open-top box.

- A) State the length, width, and height of the box and calculate its volume in cm^3 . (2 marks)

Answer: length: 40 (cm) ← 0.5 mark

width: 20 (cm) ← 0.5 mark

height: 5 (cm) ← 0.5 mark

$$\text{Volume} = l \times w \times h$$

$$= 40\text{ cm} \times 20\text{ cm} \times 5\text{ cm} = 4\,000\text{ (cm}^3\text{)} \quad \leftarrow 0.5\text{ mark}$$

- B) Calculate the percent of the original sheet that was wasted in cutting out the corners. (1 mark)

Answer: $5\text{ cm} \times 5\text{ cm} \times 4 = 100\text{ (cm}^2\text{)}$ ← 0.5 mark

$$\frac{100\text{ cm}^2}{1\,500\text{ cm}^2} = 6.7\% \quad \leftarrow 0.5\text{ mark}$$

Test Item and Marking Guide

Sample 1

Restricted Response

(3 Marks)

A) $5 \times 25 \times 45 = 5\,625 \text{ cm}^3$

B) 10%

Mark: 1 out of 3

- Rationale:** - Correct height in Part A (0.5 mark)
 - Correct volume in Part A (follow-through error) (0.5 mark)

Sample 2

Restricted Response

(3 Marks)

A) $L = 40 \text{ cm}$ $V = L \times W \times H$
 $W = 20 \text{ cm}$ $V = 40 \times 20 \times 5$
 $H = 5 \text{ cm}$ $V = 4\,000 \text{ cm}^3$

B) $\text{Waste} = 5 \times 5 = 25 \text{ cm}^2 \times 4 = 100 \text{ cm}^2$
 $\text{Total} = 50 \times 30 = 1\,500 \text{ cm}^2$
 $\frac{1\,500}{100} = 15\% \text{ wasted}$

Mark: 2.5 out of 3

- Rationale:** - Correct solution in Part A (4×0.5 mark)
 - Correct amount wasted in Part B (0.5 mark)

Sample 3

Restricted Response

(3 Marks)

A) $30 - (5 \times 2) = 20$
 $50 = (5 \times 2) = 40$
 $40 \times 20 \times 5 = 4\,000 \text{ cm}^3$

B) $30 \times 50 = 1\,500 \text{ cm}^2$
 $5 \times 5 = 25 \times 4 = 100$
 $\frac{100}{1\,500} = 0.066 \times 100 = 7\%$

Mark: 3 out of 3

- Rationale:** - Correct solution in Part A (4×0.5 mark)
 - Correct solution in Part B (2×0.5 mark)

Variation and Formulas

Question 15

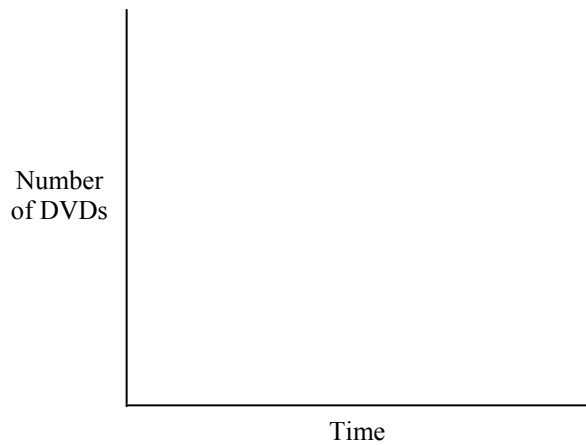
VI-F1

Restricted Response

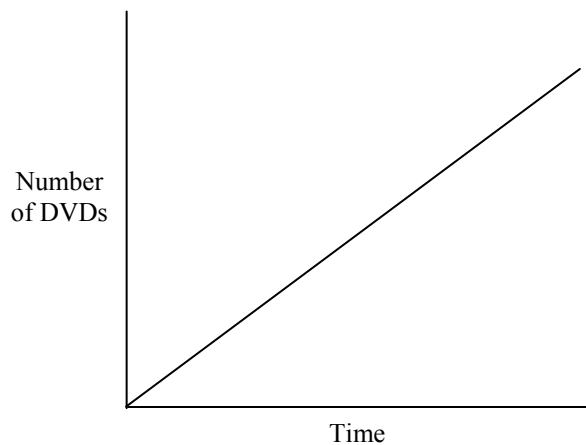
(1 Mark)

The time needed to manufacture DVDs varies directly with the number of DVDs manufactured.

Sketch this variation.



Answer:



← 0.5 mark for straight line sketch

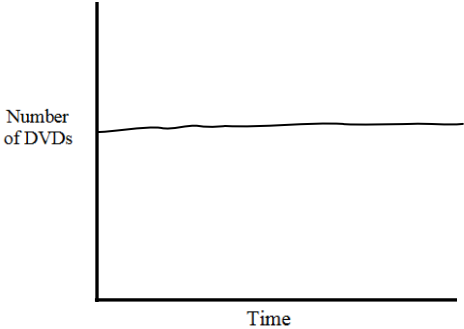
← 0.5 mark for intercept of zero

Test Item and Marking Guide

Sample 1

Restricted Response

(1 Mark)



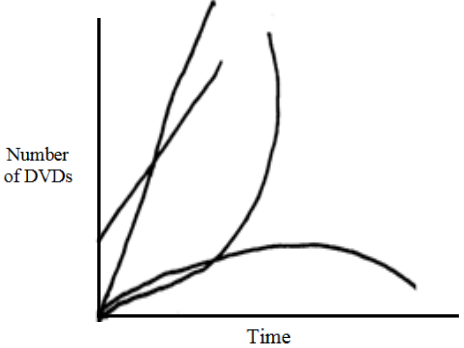
Mark: 0 out of 1

Rationale: - Incorrect answer (conceptual error)

Sample 2

Restricted Response

(1 Mark)



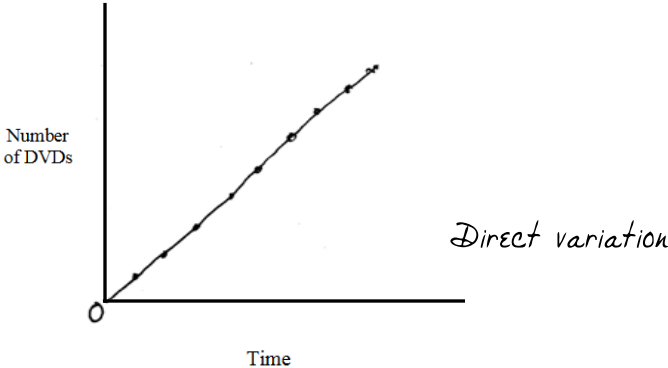
Mark: 0 out of 1

Rationale: - Incorrect answer

Sample 3

Restricted Response

(1 Mark)



Mark: 1 out of 1

Rationale: - Correct answer (2×0.5 mark)

Question 16

VI-F2

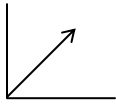
Restricted Response

(2 Marks)

Identify the type of variation that matches each table.

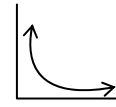
A)

x	y
2	22
3	33
6	66

*Sample Answers:**direct variation or $y = kx$ or $y = 11x$ or*  *← 0.5 mark*


B)

x	y
2	2
4	1
8	0.5

*Sample Answers:**inverse variation or $y = \frac{k}{x}$ or $y = \frac{4}{x}$ or*  *← 0.5 mark*

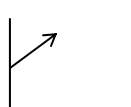
C)

x	y
0	0
2	4
6	36

*Sample Answers:**direct squared variation or $y = kx^2$ or $y = x^2$ or*  *← 0.5 mark*

D)

x	y
0	6
2	8
10	16

*Sample Answers:**partial variation or $y = kx + f$ or $y = x + 6$ or*  *← 0.5 mark*



Question 17

VI-F2

Restricted Response

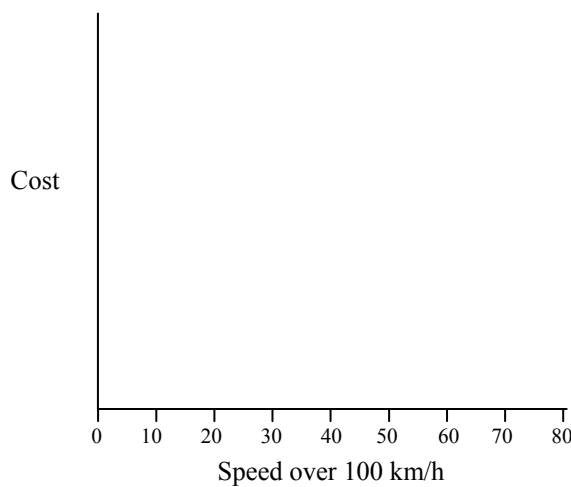
(1.5 Marks)

Allen was stopped for driving at a speed of 120 km/h in a 100 km/h zone. His fine for speeding is based on a flat rate of \$100 for exceeding the limit and \$10 for every km/h over the limit.

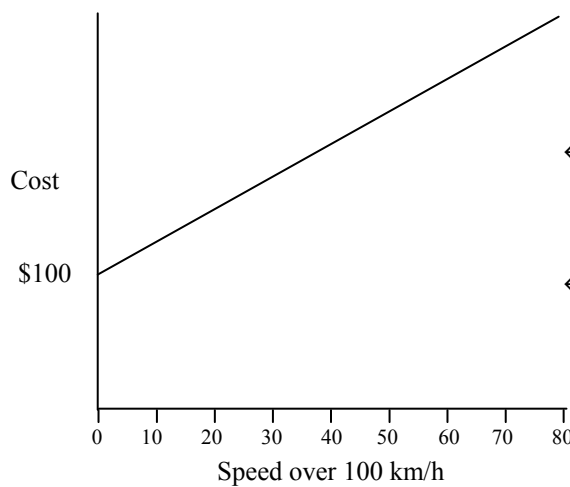
A) Identify the type of variation represented. (0.5 mark)

Answer: partial variation

B) Sketch the variation that represents this situation. (1 mark)



Answer:



← 0.5 mark for
correct non-zero intercept
("\$100" is not required)

← 0.5 mark for
straight line sketch

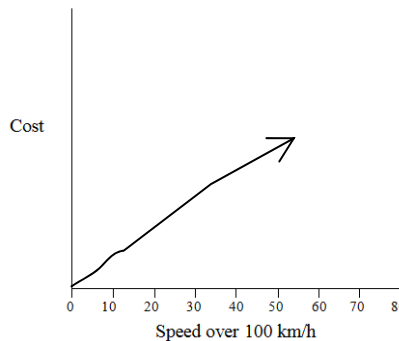
Sample 1

Restricted Response

(1.5 Marks)

A) *Direct*

B)



Mark: 0.5 out of 1.5

Rationale: - Correct shape in Part B (0.5 mark)

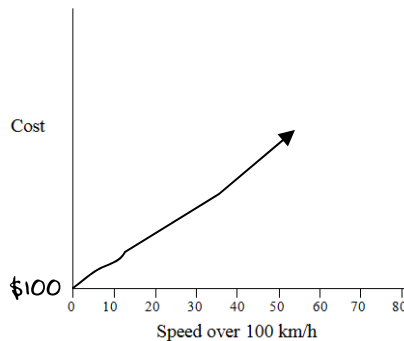
Sample 2

Restricted Response

(1.5 Marks)

A) *Partial*

B)



Mark: 1.5 out of 1.5

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

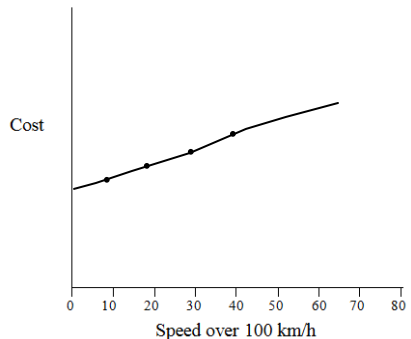
Sample 3

Restricted Response

(1.5 Marks)

A) *Partial variation*

B)



Mark: 1.5 out of 1.5

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

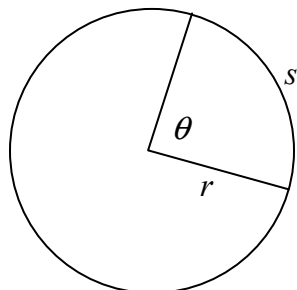
Question 18

VI-F3

Restricted Response

(1 Mark)

The length of an arc can be found using the formula:



$$s = \frac{\pi \cdot \theta \cdot r}{180}$$

where s is the arc length

θ is the angle measure in degrees

r is the radius of the circle

Find the arc length, in centimetres, of the circle if the angle is 30° and the radius is 12 cm.

Answer: $s = \frac{\pi \cdot \theta \cdot r}{180}$

$$= \frac{(\pi) \cdot (30) \cdot (12)}{180} \quad \leftarrow 0.5 \text{ mark for substitution}$$
$$= 6.28 \text{ (cm)} \quad \leftarrow 0.5 \text{ mark}$$

Test Item and Marking Guide

Sample 1

Restricted Response

(1 Mark)

$$s = ?$$

$$s = \frac{\pi \cdot 30^\circ \cdot 12}{180} = 30.2$$

$$s = 30 \text{ cm}$$

Mark: 0.5 out of 1**Rationale:** - Correct substitution (0.5 mark)**Sample 2**

Restricted Response

(1 Mark)

$$s = \frac{3.14 (30^\circ) (12)}{180}$$

$$\frac{1130.40}{180} = 6.28 \text{ cm}^3$$

Mark: 0.5 out of 1**Rationale:** - Correct substitution (0.5 mark)
- Incorrect answer (units)**Sample 3**

Restricted Response

(1 Mark)

$$\frac{3.14 \times 30 \times 12}{180} \quad s = 6.28$$

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

Question 19

VI-F4

Restricted Response

(2 Marks)

A solid cone is to be completely covered in paint. Calculate the surface area to be painted if the cone has a diameter of 5 cm and a slant height of 7 cm.

Answer: radius = 2.5 cm ← 0.5 mark

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

$$SA = \pi(2.5)(7) + \pi(2.5)^2 \leftarrow 0.5 \text{ mark for substitution}$$

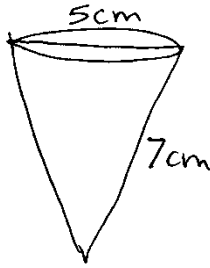
$$SA = \underbrace{74.58}_{0.5 \text{ mark}} \underbrace{\text{cm}^2}_{0.5 \text{ mark}}$$

Test Item and Marking Guide

Sample 1

Restricted Response

(2 Marks)



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

$$SA = 3.14(2.5)(7) + 3.14(2.5)^2$$

Mark: 0.5 out of 2**Rationale:** - Correct radius (0.5 mark)**Sample 2**

Restricted Response

(2 Marks)

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

$$SA = 3.14 \times 5 \times 7 + 3.14 \times 5^2$$

$$SA = 125.6^2$$

$$SA = 15775.36 \text{ cm}^2$$

Mark: 1 out of 2**Rationale:** - Incorrect radius
- Correct substitution (follow-through error) (0.5 mark)
- Correct units (0.5 mark)**Sample 3**

Restricted Response

(2 Marks)

$$SA = \pi(2.5)(7) + \pi(2.5)^2$$

$$54.95 + 19.63 = 74.58 \text{ surface area}$$

Mark: 1.5 out of 2**Rationale:** - Correct solution (3×0.5 mark)
- Incorrect units

Investments

Question 20

VI-D1

Open Response

(1 Mark)

A young couple both have well-paying jobs. Their main financial goal is to retire early.

State one type of investment that could meet their financial goal and explain why it is a good choice.

Sample answers: Stocks would be a good choice because of the high potential return

OR

GICs would allow the couple to ensure that their money is available at retirement

Note to marker: Explanation must match investment choice

Test Item and Marking Guide

Sample 1

Open Response

(1 Mark)

Savings account

Mark: 0 out of 1

Rationale: - Incorrect response (no explanation)

Sample 2

Open Response

(1 Mark)

A high interest savings account will safely build up their finances.

Mark: 1 out of 1

Rationale: - Correct response (1 mark)

Sample 3

Open Response

(1 Mark)

Stock market because they can make a lot of money quickly.

Mark: 1 out of 1

Rationale: - Correct response (1 mark)

Given the following list of investment options:

Investment Options
T-bills
stocks
mutual fund
GIC
savings account
real estate

Choose an investment type that is a:

A) Short-term investment (0.5 mark): _____

Answer: savings account, T-bills, or GIC

B) Long-term investment (0.5 mark): _____

Answer: mutual fund, stocks, or real estate

Sample 1

Restricted Response

(1 Mark)

- A) Short-term investment: savings account or real estate
- B) Long-term investment: mutual funds

Mark: 0.5 out of 1**Rationale:** - Correct answer in Part B (0.5 mark)**Sample 2**

Restricted Response

(1 Mark)

- A) Short-term investment: SAVINGS ACCOUNT OR A GIC
- B) Long-term investment: STOCKS OR REAL-ESTATE

Mark: 1 out of 1**Rationale:** - Correct answers (2 × 0.5 mark)

Wednesday's information from Grinnell Inc. stock is given below:

Symbol	High	Low	Close	Net Change	Volume (000's)
GRI	53.95	52.10	53.50	+1.10	1 123

- A) State the opening price of Grinnell Inc. on Wednesday. (0.5 mark)

Answer: $\$53.50 - \$1.10 = \$52.40 \leftarrow 0.5 \text{ mark}$

- B) State the number of Grinnell Inc. shares sold on Wednesday. (0.5 mark)

Answer: $1\,123\,000 \text{ shares} \leftarrow 0.5 \text{ mark}$

- C) On Wednesday, Michael purchased 600 Grinnell Inc. shares at the highest price and sold them at the lowest price. Calculate the amount he lost, not including commission. (1 mark)

Answer:
$$\left. \begin{array}{l} 600 \times \$53.95 = 32\,370 \\ 600 \times \$52.10 = \underline{31\,260} \end{array} \right\} 0.5 \text{ mark}$$

$$\$1\,110 \leftarrow 0.5 \text{ mark}$$

OR

$\$53.95 - \$52.10 = \$1.85 \leftarrow 0.5 \text{ mark}$

$\$1.85 \times 600 = \$1\,110 \leftarrow 0.5 \text{ mark}$

Sample 1

Restricted Response

(2 Marks)

A) \$52.40

B) 1 123

$$\begin{array}{r}
 \text{C) } (\$53.95)(600) = \$32\,370 \\
 (52.10)(600) = \underline{-\$31\,260} \\
 \qquad \qquad \qquad \$1\,110
 \end{array}$$

Mark: 1.5 out of 2

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

Sample 2

Restricted Response

(2 Marks)

A) \$53.95 High *There is no opening price stated*

B) 1 123 000

$$\begin{array}{r}
 \text{C) } H = 600 \times 53.95 = \$32\,370 \\
 L = 600 \times 52.10 = \underline{-\$31\,260} \\
 \qquad \qquad \qquad \$1\,110
 \end{array}$$

Mark: 1.5 out of 2

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

Sample 3

Restricted Response

(2 Marks)

A) $x + 1.10 = 53.50$ *\$52.40 opening price*

B) 1 123 thousands

$$\begin{array}{r}
 \text{C) } 52.10 \rightarrow 53.95 \quad \$1.85 \text{ gain} \quad 1.85 \\
 \qquad \qquad \qquad \qquad \qquad \qquad \times 600 \\
 \qquad \qquad \qquad \qquad \qquad \qquad 1\,100 \text{ lost} \quad \text{He lost } \$1\,100 \text{ that day.}
 \end{array}$$

Mark: 2 out of 2

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

Braeden's bank has the following information about his financial situation:

Stocks	\$24 000
RSPs	\$64 000
Home	\$225 000
Personal Loan	\$10 000
Car	\$6 500
Car Loan	\$1 800
Mortgage	\$201 000

A) Determine his net worth. (1.5 marks)

<i>Answer:</i>	<u>Assets</u>	<u>Liabilities</u>
	\$24 000	\$201 000
	\$64 000	\$1 800
	\$225 000	\$10 000
	\$6 500	
	<u>\$319 500</u> ← 0.5 mark	<u>\$212 800</u> ← 0.5 mark

$$\begin{aligned}
 \text{Net Worth} &= \text{Assets} - \text{Total Liabilities} \\
 &= \$319\,500 - \$212\,800 \\
 &= \$106\,700 \qquad \leftarrow 0.5 \text{ mark}
 \end{aligned}$$

B) Calculate his Debt-Equity Ratio (DER). (1.5 marks)

$$\text{Answer: } \text{DER} = \frac{\text{Liabilities} - \text{Mortgage}}{\text{Net Worth}} \times 100$$

$$= \frac{\$212\,800 - \$201\,000}{\$106\,700} \times 100 \left\{ \begin{array}{l} \text{No mark for 1 correct substitution} \\ \text{OR} \\ 0.5 \text{ mark for 2 correct substitutions} \\ \text{OR} \\ 1 \text{ mark for all correct substitutions} \end{array} \right.$$

$$= \frac{\$11\,800}{\$106\,700} \times 100$$

$$= 11.1\% \qquad \leftarrow 0.5 \text{ mark}$$

Sample 1

Restricted Response

(3 Marks)

$$\begin{aligned} \text{A) Net} &= 24\,000 + 64\,000 + 225\,000 + 6\,500 - 1\,800 - 201\,000 - 10\,000 \\ \text{Net} &= 106\,700 \end{aligned}$$

$$\begin{aligned} \text{B) Der} &= \frac{1\,800 + 10\,000 - 201\,000}{106\,700} \\ \text{Der} &= 11\,798.12 \end{aligned}$$

Mark: 2 out of 3

Rationale: - Correct solution in Part A (alternate solution) (1.5 marks)
 - Two correct substitutions in Part B (0.5 mark)

Sample 2

Restricted Response

(3 Marks)

$$\begin{aligned} \text{A) Assets} &= 24\,000 + 64\,000 + 225\,000 + 6\,500 = && \$319\,500 \\ \text{Liabilities} &= 10\,000 + 1\,800 + 201\,000 = && \underline{- \$212\,800} \\ &&& \$106\,700 \end{aligned}$$

$$\text{B) } \frac{\text{Liabilities} - \text{mortgage}}{\text{Assets}} \times 100 = \frac{\$212\,800 - \$201\,000}{\$319\,500} \times 100 \quad \text{DER} = 3.69\%$$

Mark: 2.5 out of 3

Rationale: - Correct solution in Part A (3×0.5 mark)
 - Two correct substitutions in Part B (0.5 mark)
 - Correct answer in Part B (follow-through error) (0.5 mark)

Sample 3

Restricted Response

(3 Marks)

$$\text{A) } \begin{array}{r} \text{asset} \\ 319\,500 \end{array} - \begin{array}{r} \text{liabilities} \\ 212\,800 \end{array} = 106\,700 \text{ net worth}$$

$$\text{B) } \frac{212\,800 - 201\,000}{106\,700} \times 100 = 11\% \text{ (handwritten)}$$

Mark: 3 out of 3

Rationale: - Correct solution in Part A (3×0.5 mark)
 - Correct solution in Part B (1.5 marks)

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 Test Paper Report

Test: _____

Date marked: _____

Booklet No.: _____

Problem(s) 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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