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Marking Guide. June 2017

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After the administration of this test, print copies of this resource will be available for purchase from the Manitoba Learning Resource Centre. Order online at www.mtbb.mb.ca.

This resource will also be available on the Manitoba Education and Training website at www.edu.gov.mb.ca/k12/assess/archives/index.html.

Websites are subject to change without notice.

Disponible en français.

While the department is committed to making its publications as accessible as possible, some parts of this document are not fully accessible as this time.

Available in alternate formats upon request.
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Marking Guidelines
Marking Guidelines


Please ensure that
• the student booklet number matches the number on the Scoring Sheet
• only a pencil is used to complete the Scoring Sheet
• the final test mark is recorded on the Scoring Sheet
• the Scoring Sheet is complete and a copy has been made for school records

Please make no marks in the student test booklets. If the booklets have marks in them, the marks need to be removed by departmental staff prior to sample marking should the booklet be selected.

Once marking is completed, please forward the Scoring Sheets to Manitoba Education and Training using the envelope provided (for more information, see the administration manual).

Marking

The recommended procedure for scoring student responses is as follows:

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

The marks allocated to questions are based on the concepts associated with the learning outcomes in the curriculum. For each question, shade in the circle on the Scoring Sheet that represents the mark awarded based on the concepts. A total of these marks will provide the preliminary mark.

Errors

Marks are deducted if conceptual or communication errors are committed.

Conceptual Errors

As a guiding principle, students should only be penalized once for each error committed in the context of a test question. For example, students may choose an inappropriate strategy for a question, but carry it through correctly and arrive at an incorrect answer. In such cases, students should be penalized for having selected an inappropriate strategy for the task at hand, but should be given credit for having arrived at an answer consistent with their choice of strategy.
Communication Errors

Errors not conceptually related to the learning outcomes associated with the question are called “Communication Errors” (see Appendix C). These errors result in a 0.5 mark deduction. Each type of error can only be deducted once per test and is tracked in a separate section on the Scoring Sheet.

When a given response includes multiple types of communication errors, deductions are indicated in the order in which the errors occur in the response. No communication errors are recorded for work that has not been awarded marks. The total deduction may not exceed the marks awarded.

The student’s final mark is determined by subtracting the communication errors from the preliminary mark.

Example:

A student has a preliminary mark of 56. The student committed two E1 errors (0.5 mark deduction) and three E4 errors (0.5 mark deduction).

<table>
<thead>
<tr>
<th>COMMUNICATION ERRORS/ERREURS DE COMMUNICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shade in the circles below for a maximum total deduction of 2.5 marks (0.5 mark deduction per error type). Refer to Marking Guide for details.</td>
</tr>
<tr>
<td>Noircir les cercles ci-dessous pour une déduction maximale totale de 2,5 points (déduction de 0,5 point par type d’erreur). Consultez le Guide de Correction pour plus de détails.</td>
</tr>
<tr>
<td>E1</td>
</tr>
<tr>
<td>Rounding/Arrondissement</td>
</tr>
</tbody>
</table>

Test mark / Note au test: 56 - 1 = 55

Preliminary Mark/Note préliminaire
Communication Errors (maximum 2.5 marks)
Erreurs de communication (maximum 2,5 points)

Marking Guidelines

Table Values

One mark will be awarded to a student that circles the correct value in a given table. In other words, this will be considered the equivalent of the student writing the correct value in the space provided.
Follow-through errors

Generally, a student will not be penalized more than once for the same error. A final answer will be deemed to be correct if it follows correctly from an incorrect intermediate step where marks were already lost. In multiple-part questions, if an error was made in Part A, but subsequent parts were completed appropriately based on the incorrect information in Part A, full marks will be awarded in subsequent parts.

Marks for follow-through errors will not be awarded if
- the answer is wrong and there are no part-mark increments available
- the error is conceptual in nature (e.g., the student used the simple Cosine ratio when the question called for the use of the Cosine Law)

Additional-information errors

Students can occasionally provide too much information in their answers. When additional information is provided, it must be clearly indicated as such. For example, if a student is asked to calculate a probability, then full marks are awarded for a correct answer even if the odds are also present—provided this additional information is labelled “odds.”

Irregularities in Provincial Tests

During the administration of provincial tests, supervising teachers may encounter irregularities. Markers may also encounter irregularities during local marking sessions. The appendix 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.

Assistance

If any issue arises that cannot be resolved locally during marking, please call Manitoba Education and Training at the earliest opportunity to advise us of the situation and seek assistance if necessary.

You must contact the person responsible for this project before making any modifications to the marking keys.

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Grade 12 Essential Mathematics
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Toll-Free: 1-800-282-8069, ext. 5886
Email: jennifer.maw@gov.mb.ca
Alain’s total portioned assessment for his property is $83,750. His municipality uses the following tax rates:

General Municipal: 21.01 mills
Provincial Education: 8.113 mills
Local School: 18.264 mills
Local Improvements: none

Calculate the total property tax that Alain will pay if he receives a provincial tax credit of $700.

Answer:

General Municipal: $\frac{83,750 \times 21.01}{1000} = $1759.59 \leftarrow 1 \text{ mark for process}

Provincial Education: $\frac{83,750 \times 8.113}{1000} = $679.46

Local School: $\frac{83,750 \times 18.264}{1000} = $1529.61 \leftarrow 1 \text{ mark}

Total Property Taxes Due: $1759.59 + $679.46 + $1529.61 - $700 = $3268.66 \leftarrow 1 \text{ mark}
Exemplar 1

\[ \frac{GM}{1000} = \frac{83,750}{1000} \times 21.01 = \$ 1754.58 \]

\[ PE = \frac{83,750}{1000} \times 19.264 = 1524.61 \]

\[ \text{Total} \quad 1754.58 + 1524.61 - 700 \]

\[ = \$ 2589.19 \]

Mark: 1 out of 2
Rationale: Incorrect process (did not calculate provincial education tax)
E1 (rounds incorrectly) (General Municipal)
Note: No E1 deduction because no mark is awarded for this step.
Correct property tax (follow-through error) (1 mark)

Exemplar 2

\[ \frac{83,750}{1000} \times 47.4 = \$ 3969.75 \]

Mark: 1 out of 2
Rationale: Correct process (alternate method) (1 mark)
E1 (rounds too soon) (mill rate)
Incorrect property tax (did not subtract the provincial tax credit)

Exemplar 3

\[ \frac{83,750}{1000} = 83.75 \]

\[ \text{Total} \quad 1759.60 + 629.46 = 1599.61 - 700 \]

\[ \text{Total} \quad \$ 268.61 \]

Mark: 2 out of 2
Rationale: Correct process (1 mark)
E1 (rounds incorrectly) (General Municipal)
Correct property tax (1 mark)
Manitoba recently recorded one of the coldest winters on record.

State one energy-efficient improvement a homeowner could make to their home to reduce their heating bill.

**Sample Answers:**
- installing new windows
- installing weather stripping around doors
- installing a high-efficiency furnace
- re-insulating attic or walls
Exemplar 1

Install and use a wood burning fireplace.

Mark: 0 out of 1
Rationale: Incorrect response

Exemplar 2

Bundle up at night and turn the heat down 2 degrees or more.

Mark: 0 out of 1
Rationale: Incorrect response
Bahari has $40,000 worth of contents he would like to insure. He purchases a comprehensive tenant’s insurance policy with a $200 deductible.

Calculate his annual premium.

<table>
<thead>
<tr>
<th>Coverage Amount</th>
<th>Standard Form</th>
<th>Comprehensive Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>$25,000</td>
<td>$158.00</td>
<td>$200.00</td>
</tr>
<tr>
<td>$30,000</td>
<td>$174.00</td>
<td>$226.00</td>
</tr>
<tr>
<td>$35,000</td>
<td>$199.00</td>
<td>$252.00</td>
</tr>
<tr>
<td>$40,000</td>
<td>$212.00</td>
<td>$269.00</td>
</tr>
<tr>
<td>$45,000</td>
<td>$235.00</td>
<td>$298.00</td>
</tr>
<tr>
<td>$50,000</td>
<td>$254.00</td>
<td>$324.00</td>
</tr>
<tr>
<td>$55,000</td>
<td>$272.00</td>
<td>$346.00</td>
</tr>
<tr>
<td>$60,000</td>
<td>$293.00</td>
<td>$373.00</td>
</tr>
<tr>
<td>$65,000</td>
<td>$315.00</td>
<td>$400.00</td>
</tr>
<tr>
<td>$70,000</td>
<td>$337.00</td>
<td>$427.00</td>
</tr>
<tr>
<td>$75,000</td>
<td>$359.00</td>
<td>$454.00</td>
</tr>
<tr>
<td>Each additional $1,000</td>
<td>$4.50</td>
<td>$5.50</td>
</tr>
</tbody>
</table>

$200 deductible: increase premium by 10%

Answer:

Annual premium ($500 deductible): $269 ← 1 mark
Annual premium ($200 deductible): $269 × 1.10 = $295.90 ← 1 mark

Note to marker: Award 1 mark if the correct table value is indicated.
Exemplar 1

\[ 269.00 \times 1.10 = 295.900 \]

Mark: 1 out of 2
Rationale: Incorrect table value
Correct final answer (follow-through error) (1 mark)

Exemplar 2

\[ 269.00 \times 1.10 = 269.10 \]

Mark: 1 out of 2
Rationale: Correct table value (1 mark)
Incorrect final answer
E2 (does not include units in final answer)
Note: No E2 deduction because no mark is awarded for this step.

Exemplar 3

\[ 269.00 + 10 = 269.1 \]

Mark: 1 out of 2
Rationale: Correct table value (1 mark)
Incorrect final answer
E4 (does not express the answer to the appropriate number of decimal places)
Note: No E4 deduction because no mark is awarded for this step.
State 2 initial (one-time) costs when purchasing a house.

Place one response per line.

1. _________________________________________________________

2. _________________________________________________________

Sample answers:
- home inspection fees
- land transfer tax
- lawyer fees
- down payment
- movers
- utility hook-up fees
- insurance adjustment
- decorating/renovating costs
- appliances

(2 x 1 mark)

Note to marker: Award a maximum of 1 mark for each line.
Exemplar 1  
(2 marks)

1. insurance

2. cost of water

Mark: 0 out of 2  
Rationale: Two incorrect responses (ongoing costs)

Exemplar 2  
(2 marks)

1. renovations

2. realtor

Mark: 1 out of 2  
Rationale: One correct response (renovations) (1 mark)

Exemplar 3  
(2 marks)

1. Moving truck

2. The purchase of the house

Mark: 1 out of 2  
Rationale: One correct response (moving truck) (1 mark)
Choose the letter that best completes the statement below.

When calculating property taxes, the cost of local improvements is based on:

A) the area of the city  
B) the frontage  
C) the square footage of the house  
D) the distance from the fire hydrant

Answer: B)
This page was intentionally left blank.
Paco earns $3100 monthly and would like to purchase a new house. The monthly mortgage payment will be $797, the monthly heating costs will be $150 and the annual property taxes are $2400.

Calculate Paco’s Gross Debt Service Ratio (GDSR).

**Answer:**

Monthly property taxes: $2400 \div 12 = $200

\[
GDSR = \left( \frac{\text{Monthly mortgage} + \text{Monthly property taxes} + \text{Monthly heating costs}}{\text{Gross monthly income}} \right) \times 100
\]

\[
= \left( \frac{$797 + $200 + $150}{3100} \right) \times 100
\]

No mark for 1 correct substitution

1 mark for 2 or 3 correct substitutions

2 marks for all correct substitutions

= 37% ← 1 mark
**Exemplar 1**

\[ \text{GDSR} = \frac{797 + 2400 + 150}{3100} \times 100 \]
\[ \text{GDSR} = 107\% \]

**Mark:** 2 out of 3  
**Rationale:** 3 correct substitutions (1 mark)  
Correct GDSR (follow-through error) (1 mark)  
E1 (rounds incorrectly)  
E4 (does not express the answer to the appropriate number of decimal places)

**Exemplar 2**

\[ \text{GDSR} = \left( \frac{797 + 2400 + 150}{3100} \right) \times 100 \]
\[ \text{GDSR} = 107.98\% \]

**Mark:** 2 out of 3  
**Rationale:** 3 correct substitutions (1 mark)  
Correct GDSR (follow-through error) (1 mark)  
E1 (rounds incorrectly)  
E2 (uses incorrect units of measure)

**Exemplar 3**

\[ \text{GDSR} = \frac{797 + 150 + 200}{3100} \times 100 \]
\[ \text{GDSR} = 37\% \]

**Mark:** 3 out of 3  
**Rationale:** All correct substitutions (2 marks)  
Correct GDSR (1 mark)  
E2 (does not include units in final answer)
Andy is buying a house and needs a mortgage.

State 2 ways he can lower the total interest paid on the mortgage of the house.

Place one response per line.

1. __________________________________________________________

2. __________________________________________________________

Sample answers:

– make a larger down payment
– shorten his amortization period
– get a lower interest rate
– increase payment frequency
– make a lump sum payment

(2 x 1 mark)

Note to marker: Award a maximum of 1 mark for each line.
Exemplar 1 (2 marks)

1. make a larger down payment

2. purchase a less expensive house

Mark: 1 out of 2
Rationale: One correct response (larger down payment) (1 mark)

Exemplar 2 (2 marks)

1. higher down payment

2. increase amortization period

Mark: 1 out of 2
Rationale: One correct response (higher down payment) (1 mark)

Exemplar 3 (2 marks)

1. find a better interest rate

2. ask for a raise or get a better paid job

Mark: 1 out of 2
Rationale: One correct response (find a better interest rate) (1 mark)
The probability of Jen winning a swimming race is 1 out of 7.

State the probability of winning as a decimal and a percent.

Decimal: ________________

Percent: ________________

Answer:

Decimal: _______ 0.14 _______ ← 1 mark

Percent: _____ 14.29% _____ ← 1 mark
**Exemplar 1**

(2 marks)

Decimal: 14.28

Percent: 14%

**Mark:** 1 out of 2

**Rationale:** Incorrect decimal
- E1 (rounds incorrectly)
- Note: No E1 deduction because no mark is awarded for this step.
- Correct percent (1 mark)
- E4 (does not express the answer to the appropriate number of decimal places)

**Exemplar 2**

(2 marks)

Decimal: 8.143

Percent: 14.3%

**Mark:** 2 out of 2

**Rationale:** Correct decimal (1 mark)
- E4 (does not express the answer to the appropriate number of decimal places)
- Correct percent (1 mark)
- E4 (does not express the answer to the appropriate number of decimal places)
The following spinner is divided into 4 colours.

The spinner was spun 40 times and the results are shown in the table below.

<table>
<thead>
<tr>
<th>Colour</th>
<th>Number of Times</th>
</tr>
</thead>
<tbody>
<tr>
<td>green</td>
<td>16</td>
</tr>
<tr>
<td>yellow</td>
<td>11</td>
</tr>
<tr>
<td>white</td>
<td>8</td>
</tr>
<tr>
<td>blue</td>
<td>5</td>
</tr>
</tbody>
</table>

A) State the experimental probability of spinning white. (1 mark)

Answer:

\[
\frac{1}{5} \quad \text{or} \quad 0.2 \quad \text{or} \quad 20\% \quad \text{or} \quad \text{one out of five}
\]

Note to marker: Accept equivalent representations.

B) State the theoretical probability of spinning white. (1 mark)

Answer:

\[
\frac{1}{4} \quad \text{or} \quad 0.25 \quad \text{or} \quad 25\% \quad \text{or} \quad \text{one out of four}
\]

Note to marker: Accept equivalent representations.
Exemplar 1

(2 marks)

A) \[
\frac{16}{\text{M}0}
\]

\text{change for green}

B) \[
\text{change for any color}
\]

Mark: 1 out of 2

Rationale: Incorrect answer in Part A
Correct answer in Part B (1 mark)

Exemplar 2

(2 marks)

A) \[
8 \text{ times of the 40 times}
\]

B) \[
8 \text{ or more times}
\]

Mark: 1 out of 2

Rationale: Correct answer in Part A (1 mark)
Incorrect answer in Part B
The probability of a baseball team winning a tournament is 15%. The entry fee is $200. If they win the tournament, the team will receive a cash prize of $1000.

Calculate the expected value (EV).

**Answer:**

$\text{gain: } 1000 - 200 = 800$

$\text{loss: } 200$

$EV = P(\text{win}) \times \text{gain} - P(\text{lose}) \times \text{loss}$

$= (0.15)(800) - (0.85)(200)$

No mark for 1 correct substitution

1 mark for 2 or 3 correct substitutions

2 marks for all correct substitutions

$= -50$

$\leftrightarrow 1$ mark

OR

**Answer:**

Average gain: $(0.15)(1000)$

$= 150$

$\leftrightarrow 2$ marks

$EV = 150 - 200$

$= -50$

$\leftrightarrow 1$ mark
**Exemplar 1**

\[
EV = 0.15 \times 1000 = 150 \\
EV = 150 \\
200 + 150 = 350
\]

Mark: 2 out of 3  
**Rationale:** Correct average gain (2 marks)  
Incorrect final answer

**Exemplar 2**

\[
\text{Prize: } 1000 \\
\text{fee: } 200 \\
\text{probability: } 15\%
\]

\[
EV = \text{(win)} \times \text{gain} - \text{(lose)} \times \text{loss} \\
(0.15 \times 1000) - (0.85) \times 200 \\
150 - 170 = -20 \\
EV = -20
\]

Mark: 2 out of 3  
**Rationale:** 3 correct substitutions (1 mark)  
Correct final answer (follow-through error) (1 mark)  
E2 (does not include units in final answer)

**Exemplar 3**

\[
0.15 \times 900 = 135 \\
0.75 \times 200 = -150 + \\
-150
\]

Mark: 2 out of 3  
**Rationale:** 2 correct substitutions (1 mark)  
Correct final answer (follow-through error) (1 mark)
Akuna is the manager of an assembly line that makes compact fluorescent light bulbs. Workers on the assembly line randomly chose 250 light bulbs to test and found 1 defective light bulb.

A) State the experimental probability, in fraction form, of a light bulb being defective. (1 mark)

**Answer:**

\[
\frac{1}{250}
\]

**Note to marker:** Accept equivalent representations.

B) State the number of defective light bulbs that are expected in a shipment of 5000 light bulbs. (1 mark)

**Answer:**

Defective light bulbs = \(\frac{1}{250} \times 5000\)

\[= 20 \text{ bulbs} \]

← 1 mark
**Exemplar 1**

A) \( \frac{1}{250} \) \( \Rightarrow \) 4 being defective

B) \( \frac{250}{5000} = 0.05 \times 100 = 5 \) defective light bulbs

Mark: 0 out of 2  
Rationale: Incorrect answer in Part A  
Incorrect answer in Part B

**Exemplar 2**

A) \( \frac{1}{249} \)

B) \( \frac{1}{249} \times 5000 = 20.08 \)  
\( \Rightarrow 20 \) light bulbs

Mark: 1 out of 2  
Rationale: Incorrect answer in Part A  
Correct answer in Part B (follow-through error) (1 mark)

**Exemplar 3**

A) \( \frac{1}{250} \)

B) \( 20 : 5000 \)

Mark: 2 out of 2  
Rationale: Correct answer in Part A (1 mark)  
Correct answer in Part B (1 mark)  
E4 (final answer not clearly indicated in Part B)
The odds against hitting a deer on the highway each year are $49 : 1$.

State the probability of hitting a deer this year.

Answer:

$$\frac{1}{50} \text{ or } 0.02 \text{ or } 2\% \text{ or one out of fifty}$$

Note to marker: Accept equivalent representations.
Exemplar 1  

\[ \alpha \cdot \beta \gamma \delta \]  

Mark: 0 out of 1  
Rationale: Incorrect answer

Exemplar 2  

\[ 501 \]  

Mark: 0 out of 1  
Rationale: Incorrect answer
A car has a value of $23 000. It depreciates at a rate of 20% per year.

Calculate the value of the car at the end of 2 years.

**Answer:**

Value at end of 1st year: $23 000 \times 0.8$

\[ = \$18 400 \]

\[ \leftarrow 1 \text{ mark} \]

Value at end of 2nd year: $18 400 \times 0.8$

\[ = \$14 720 \]

\[ \leftarrow 1 \text{ mark} \]

**OR**

**Answer:**

Depreciation amount after 1st year: $23 000 \times 0.2$

\[ = \$4600 \]

Value at end of 1st year: $23 000 - $4600$

\[ = \$18 400 \]

\[ \leftarrow 1 \text{ mark} \]

Depreciation amount after 2nd year: $18 400 \times 0.2$

\[ = \$3680 \]

Value at end of 2nd year: $18 400 - $3680$

\[ = \$14 720 \]

\[ \leftarrow 1 \text{ mark} \]

**OR**

**Answer:**

Value at end of 2nd year: $23 000 \times (1 - 0.2)^2$

\[ = \$14 720 \]

\[ \leftarrow 1 \text{ mark} \]
Exemplar 1

Mark: 1 out of 2
Rationale: Incorrect 1st year value
Correct 2nd year value (follow-through error) (1 mark)
E2 (does not include units in final answer)

Exemplar 2

Mark: 2 out of 2
Rationale: Correct 1st year value (1 mark)
Correct 2nd year value (1 mark)

Exemplar 3

Mark: 2 out of 2
Rationale: Correct 1st year value (1 mark)
Correct 2nd year value (1 mark)
E2 (does not include units in final answer)
Saar wants to buy a new car for $23,500 after taxes. He gets a 4-year loan at an annual interest rate of 6.75%.

A) Calculate the amount of interest paid for the first month. (2 marks)

**Answer:**

\[ I = Prt \]

\[ = 23,500 \times 0.0675 \times \frac{1}{12} \quad \leftarrow 1 \text{ mark for all correct substitutions} \]

\[ = 132.19 \quad \leftarrow 1 \text{ mark} \]

**Note to marker:** Award a mark for a follow-through error only if two of three correct substitutions are made.

B) Saar’s monthly car payment is $560.01.

Calculate the amount of interest paid over the life of the loan. (2 marks)

**Answer:**

Total paid: $560.01 \times 12 \times 4

\[ = 26,880.48 \quad \leftarrow 1 \text{ mark} \]

Total interest: $26,880.48 – $23,500

\[ = 3,380.48 \quad \leftarrow 1 \text{ mark} \]
**Exemplar 1**

(4 marks)

A) \( 23500 \div 12 \times 4 = 7833.33 \)

B) \( 3380.64 \)

**Mark: 1 out of 4**

**Rationale:** Incorrect substitution (interest rate) in Part A
Correct final answer in Part A (follow-through error) (1 mark)
E2 (does not include units in final answer in Part A)
Incorrect answer in Part B
E2 (does not include units in final answer in Part B)

Note: No E2 deduction because no mark is awarded for this step.

**Exemplar 2**

(4 marks)

A) \( 23500 \times 0.0675 = 1586.25 \)

B) \( 1128000 - 23500 = 1104500 \)

**Mark: 2 out of 4**

**Rationale:** Incorrect substitution (time) in Part A
Correct answer in Part A (follow-through error) (1 mark)
E2 (does not include units in final answer in Part A)
Incorrect total paid in Part B
Correct interest in Part B (follow-through error) (1 mark)

**Exemplar 3**

(4 marks)

A) \[ I = Prt \]
\[ = 23500 \times 0.0675 \times \frac{1}{100} \times \frac{4}{12} \]
\[ = 526.75 \]

B) \( 560.01 \times 48 = 26580.48 \)
\( \frac{23.80}{336.48} \)

**Mark: 3 out of 4**

**Rationale:** Incorrect substitution (time) in Part A
Correct answer in Part A (follow-through error) (1 mark)
Two correct answers in Part B (2 marks)
E2 (does not include units in final answer in Part B)
Jersey wants to buy a used car from her friend, Jack. The price of the car is $7000. She needs to fix a few things on the car.

The book value of the car is $5000. She needs to get a lien search worth $18 and a $40 safety inspection before taxes.

Calculate the **total tax** she will pay for this car.

**Answer:**

Repairs: \((500 + 110) \times 0.13\)

\[= 79.30 \quad \leftarrow 1 \text{ mark}\]

Safety inspection: \(40 \times 0.05\)

\[= 2.00 \quad \leftarrow 1 \text{ mark}\]

PST: \(7000 \times 0.08\)

\[= 560.00 \quad \leftarrow 1 \text{ mark}\]

Total tax: \(79.30 + 2.00 + 560.00\)

\[= 641.30 \quad \leftarrow 1 \text{ mark}\]

**Note to marker:** If the total cost ($8309.30) is calculated instead of the total tax, award 3 marks.
Exemplar 1

(4 marks)

\[
\begin{align*}
\text{tax on repairs} & = 40 \times 1.05 = 42 + 40 + 700 = 742 \\
\text{PST} & = 7400 + 400 + 400 + 18 = 8052
\end{align*}
\]

Mark: 0 out of 4
Rationale: Did not calculate tax on repairs
Incorrect tax on safety
Incorrect PST
Incorrect total tax

Exemplar 2

(4 marks)

\[
\begin{align*}
7000 \times 0.05 & = 350 \\
40 \times 1.05 & = 42 \\
610 \times 1.13 & = 703.3
\end{align*}
\]

\$432.5

Mark: 2 out of 4
Rationale: Incorrect PST
Incorrect tax on safety
Correct tax on repairs (1 mark)
Correct final answer (follow-through error) (1 mark)
E4 (does not express the answer to the appropriate number of decimal places)

Exemplar 3

(4 marks)

\[
\begin{align*}
7000(0.08) & = 560 \\
40(0.05) & = 2 \\
500(0.15) & = 75 \\
100(0.3) & = 30 \\
\text{She will pay} & = 1329.30
\end{align*}
\]

Mark: 2 out of 4
Rationale: Incorrect tax on repairs
Correct tax on safety (1 mark)
Correct PST (1 mark)
Incorrect total tax
A retired couple drives 500 km each month to go to the dog park, the grocery store, and the mall. State the type of car insurance policy their agent would recommend.

**Answer:**

pleasure

**Note to marker:** Award 1 mark if student refers to “pleasure” (e.g., for pleasure).
Mabon was told by a dealership that his new car would use 5.5 L of fuel for every 100 km driven. In reality, the car is using 8 L of fuel for every 100 km he drives.

Calculate how much more fuel is used than expected if he drives 1500 km.

**Answer:**

Extra litres used per 100 km: $8 \text{ L/100 km} - 5.5 \text{ L/100 km}$

$= 2.5 \text{ L/100 km}$ ← 1 mark

Extra fuel used for 1500 km: $\frac{1500 \text{ km}}{100} \times 2.5 \text{ L/100 km}$

$= 37.5 \text{ L}$ ← 1 mark

**OR**

**Answer:**

Fuel consumption: $1500 \text{ km} \times \frac{8 \text{ L}}{100 \text{ km}}$

$= 120 \text{ L}$ ← 1 mark for correct calculation of either the car’s consumption or the posted consumption

Dealership’s posted consumption: $1500 \text{ km} \times \frac{5.5 \text{ L}}{100 \text{ km}}$

$= 82.5 \text{ L}$

Extra fuel used for 1500 km: $120 - 82.5$

$= 37.5 \text{ L}$ ← 1 mark
Exemplar 1

\[8 \times 15 = 120 \text{ liters of fuel is used}\]

\[15000 \div 100 = 15\]

Mark: 1 out of 2
Rationale: Correct process (1 mark)
Incorrect final answer
E2 (does not include units in final answer)
Note: No E2 deduction because no mark is awarded for this step.

Exemplar 2

The car would use an extra 37.5 L of fuel for 1500 km

Mark: 1 out of 2
Rationale: No process shown
Correct answer (1 mark)

Exemplar 3

\[0.5 \times 15 = 37.5 \text{ L}\]

Mark: 2 out of 2
Rationale: Correct process (1 mark)
Correct answer (1 mark)
Choose the letter that best completes the statement below.

Your car insurance premium is **not** affected by:

A) moving to the city from the country  
B) changing the amount of deductible  
C) being in a demerit position on the Driver Safety Rating scale (DSR)  
D) changing the type of insurance

**Answer:** C)
This page was intentionally left blank.
Jonas is purchasing a car. The following table shows the various details of his purchase.

<table>
<thead>
<tr>
<th>Value of Car</th>
<th>$23 000</th>
<th>Number of Payments</th>
<th>48</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tax</td>
<td>$2990</td>
<td>Amount Borrowed</td>
<td>$22 990</td>
</tr>
<tr>
<td>Down Payment</td>
<td>$3000</td>
<td>Cost of Financing</td>
<td>$1840</td>
</tr>
</tbody>
</table>

A) Calculate the total cost of the car after taxes and financing. (2 marks)

**Answer:**

- Value of car: $23 000
- Tax: $2990 ← 1 mark
- Cost of financing: $1840
- Cost after financing: $27 830 ← 1 mark

OR

**Answer:**

- Amount borrowed: $22 990
- Down payment: $3000 ← 1 mark
- Cost of financing: $1840
- Cost after financing: $27 830 ← 1 mark

B) Jonas paid a total of $24 830 in monthly car payments.

State the amount he paid each month. (1 mark)

**Answer:**

\[
\text{Monthly payment} = \frac{24 830}{48} = 517.29
\]← 1 mark
Exemplar 1

A) \[ 22,990 + 3000 + 2990 + 1840 = 30,820 \]

B)

Mark: 1 out of 3
Rationale: Incorrect process in Part A (1 additional value)
Correct answer in Part A (follow-through error) (1 mark)
No response in Part B

Exemplar 2

A) \[ 27,830 \]

B) \[ 517 \text{ } \frac{29}{30} \]

Mark: 2 out of 3
Rationale: No process shown
Correct answer in Part A (1 mark)
Correct answer in Part B (1 mark)
E2 (does not include units in final answer in Part B)

Exemplar 3

A) \[ 23,000 + 2990 + 1840 \]

B) \[ 24,820 \div 4 = 6,205 \]

Mark: 2 out of 3
Rationale: Correct process in Part A (1 mark)
Incorrect answer in Part A
Correct answer in Part B (1 mark)
E3 (makes a transcription error in Part B) (total monthly payment)
Wilma needs to get one of her car’s headlights replaced. The headlight will cost $200. It will take 1.5 hours of labour to replace the headlight at a rate of $90 an hour.

Calculate the total cost, after taxes, of replacing the headlight.

**Answer:**

Labour: $90 \times 1.5 \\
\quad = $135

Parts: $200

Subtotal: $135 + $200 \\
\quad = $335

Taxes: $335.00 \times 0.13 \\
\quad = $43.55

Total cost: $335.00 + $43.55 \\
\quad = $378.55

$\leftarrow 1$ mark for process

$\leftarrow 1$ mark
Exemplar 1

\[90 \times 1.13 = 926\]

\[200 \times 1.13 = 226\]

**Mark:** 1 out of 2  
**Rationale:** Incorrect process  
Correct final answer (follow-through error) (1 mark)

Exemplar 2

\[1.5 \times 90 = 135 \times 1.13 = 152.55\]

\[400 \times 1.13 = 452\]

\[\text{Total} = 152.55 + 452 = 604.55\]

**Mark:** 1 out of 2  
**Rationale:** Incorrect process  
Correct final answer (follow-through error) (1 mark)

Exemplar 3

\[200 \times 1.13 = 226\]

\[\frac{1}{6} = 9.6\]

\[0.5 \times 45 = 22\]

\[\text{\$361}\]

**Mark:** 1 out of 2  
**Rationale:** Incorrect process  
Correct final answer (follow-through error) (1 mark)
A community group is building bird houses.

A) State the type of triangle that is shaded in the diagram. (1 mark)

Sample answers:

- isosceles
- obtuse

B) State the measure of \( \angle C \) in triangle ABC. (1 mark)

Answer:

\[
\angle C = \frac{180^\circ - 120^\circ}{2} = 30^\circ \quad \leftarrow \text{1 mark}
\]
Exemplar 1

A) 
Obtuse

Angle A is greater than 90

B) 
\[ a^2 = 36^2 + 36^2 - 2(36)(36) \cos 120 \]
\[ a^2 = 2592 - 2(36)(36) \cos 120 \]
\[ \sqrt{a^2} = \sqrt{3888} \]
\[ a = 62.3 \]
\[ \frac{\sin 120}{62.3} = \frac{\sin C}{36} \]
\[ C = 30.02^\circ \]

Mark: 2 out of 2
Rationale: Correct answer in Part A (1 mark)
Correct answer in Part B (1 mark)
E1 (rounds too soon in Part B)

Exemplar 2

A) 
Obtuse

B) 
\[ 120 - 180 = 60 \]
\[ 60 \times 2 = 30 \]
\[ C = 30 \]

Mark: 2 out of 2
Rationale: Correct answer in Part A (1 mark)
Correct answer in Part B (1 mark)
E2 (does not include units in final answer in Part B)
Bartholomew is solving a math problem involving a truss bridge. The 30 metre bridge is made of 5 equilateral triangles of the same size and has 2 braces as shown in the diagram.

A) State the measure of angle A. (1 mark)

**Answer:**

\[ \angle A = \frac{180^\circ}{3} = 60^\circ \]

B) Calculate the length of the brace. (2 marks)

**Answer:**

\[ a^2 = b^2 + c^2 - (2bc \cos A) \]
\[ a^2 = 10^2 + 20^2 - (2(10)(20) \cos 60^\circ) \]
\[ a^2 = 100 + 400 - (400 \cos 60^\circ) \]
\[ a^2 = 300 \]
\[ a = \sqrt{300} \]
\[ a = 17.32 \text{ m} \]

**Note to marker:** Accept equivalent solutions.
Exemplar 1

Exemplar 1

(3 marks)

A) \[
\begin{align*}
\triangle ABC &\quad \angle A = 60^\circ \\
\end{align*}
\]

B) \[
\begin{align*}
\triangle ABC &\quad \angle A = 60^\circ \\
\end{align*}
\]

\[\cos 60^\circ = \frac{5}{x}\]
\[x = 10\]

\[\cos 30^\circ = \frac{15}{y}\]
\[y = 17.32\text{ cm}\]

The length of the base is 17.32 cm.

Mark: 3 out of 3

Rationale:
Correct answer in Part A (1 mark)
Correct answer in Part B (2 marks)
E2 (uses incorrect units of measure in Part B)

Exemplar 2

Exemplar 2

(3 marks)

A) \[
\begin{align*}
\frac{180}{2} &\quad = 90^\circ = \angle A \\
\end{align*}
\]

B) \[
\begin{align*}
\sin 60^\circ = \frac{\sin 90^\circ}{10} \\
x = 11.5\text{ m} \\
\sin 30^\circ = \frac{\sin 120^\circ}{10} \\
y = 5.77\text{ m} \\
x + y = 11.5m + 5.77m = 17.27m \\
The tower is 17.3\text{ m long}
\end{align*}
\]

Mark: 3 out of 3

Rationale:
Correct answer in Part A (1 mark)
Correct answer in Part B (2 marks)
E1 (rounds too soon in Part B)
E4 (does not express the answer to the appropriate number of decimal places)
Exemplar 3

(3 marks)

A) \( \angle A = 60^\circ \)

B) \( \sin 60^\circ = \frac{x}{10} = 8.6 \times 2 \)

Length of brace is 17.3 m long

Mark: 3 out of 3
Rationale: Correct answer in Part A (1 mark)
Correct answer in Part B (2 marks)
E4 (does not express the answer to the appropriate number of decimal places)
Question 23  E6.G.2  1 mark

Identify which of the following is a property of a kite:

A) the lengths of the opposite sides are congruent
B) opposite angles are congruent
C) diagonals are congruent
D) diagonals intersect at 90°

Answer: D)
Abia is measuring the distance a gondola travels between the base and the cabin at the top of the mountain. The angle of elevation from the base to the cabin is 46°. The angle of elevation from Abia to the cabin is 70°.

A) Calculate the measures of angle A and angle C. (2 marks)

**Answer:**

\[ \angle A = 180° - 70° \]
\[ = 110° \quad \leftarrow 1 \text{ mark} \]

\[ \angle C = 180° - (46° + 110°) \quad \text{or} \quad 180° - 46° - 110° \]
\[ = 24° \quad \leftarrow 1 \text{ mark} \]

B) Determine the distance between the base and the cabin if Abia is 1000 m from the base. (3 marks)

**Answer:**

\[
\frac{\sin A}{a} = \frac{\sin C}{c} \quad \leftarrow 1 \text{ mark for sine law}
\]
\[
\frac{\sin 110°}{a} = \frac{\sin 24°}{1000} \]
\[
a = \frac{1000 \cdot (\sin 110°)}{\sin 24°} \quad \leftarrow 1 \text{ mark for process}
\]
\[
a = 2310.32 \text{ m} \quad \leftarrow 1 \text{ mark} \]
**Exemplar 1**

(5 marks)

\[ \angle A = 140 \degree - 70 \degree = 110 \degree \]

A) \[ \angle C = 140 \degree - 40 \degree - 110 \degree = 20 \degree \]

B) \[ \frac{\sin 40 \degree}{100} = \frac{\sin 110 \degree}{x} \]

\[ (\sin 40 \degree)(x) = (\sin 110 \degree)(100) \]

\[ (\sin 40 \degree)(x) = 93.9, 64 \]

\[ x = 2310.52 \text{ m} \]

Mark: 4 out of 5

Rationale: Correct answers in Part A (2 marks)
Correct use of sine law in Part B (1 mark)
Correct process in Part B (1 mark)
Incorrect final answer in Part B

**Exemplar 2**

(5 marks)

A) \[ 80 \degree - 70 \degree = 110 \degree \]

\[ \angle A = 110 \degree \]

\[ \angle C = (80 \degree - 4 \degree) - 110 \degree = 24 \degree \]

B) \[ \frac{1000}{\sin 40 \degree} = \frac{x}{\sin 110 \degree} \]

\[ (1000)(\sin 40 \degree) = x (\sin 110 \degree) \]

\[ 719 = x (\sin 29 \degree) \]

\[ \frac{719}{\sin 29 \degree} = \frac{1767.73}{\sin 46 \degree} \]

\[ 1767.73 = \frac{x (\sin 46 \degree)}{\sin 46 \degree} \]

\[ 1767.73 \text{ m} \]

\[ 2309.2 \text{ m} \text{ is the unknown distance.} \]

Mark: 5 out of 5

Rationale: Correct answers in Part A (2 marks)
Correct answer in Part B (follow-through error) (3 marks)
E1 (rounds too soon in Part B)
E4 (does not express the final answer to the appropriate number of decimal places)
Mark: 5 out of 5
Rationale: Correct answers in Part A (2 marks)
Correct answer in Part B (3 marks)
E4 (does not express the final answer to the appropriate number of decimal places)
Identify which of the following diagrams best illustrates an isosceles trapezoid.

A)  
B)  
C)  
D)  

Answer: **B)**
An engineer is designing a building in the form of a regular polygon that has a central angle of $24^\circ$.

She is using the formula $S = \frac{64800}{C} - 360^\circ$, where $S$ is the sum of the interior angles of a polygon and $C$ is the central angle of the regular polygon.

State the sum of the interior angles of the polygon.

**Answer:**

$$S = \frac{64800}{C} - 360^\circ$$

$$= \frac{64800}{24^\circ} - 360^\circ$$

$$= 2700^\circ - 360^\circ$$

$$= 2340^\circ$$

$\leftarrow 1$ mark

**OR**

$$C = \frac{360^\circ}{n}$$

$$24^\circ = \frac{360^\circ}{n}$$

$$n = 15$$

$$S = 180^\circ(n - 2)$$

$$S = 2340^\circ$$

$\leftarrow 1$ mark
Exemplar 1

\[
\left( 180 \right) \left( 15 - 2 \right) \div 16
\]

\[= 156^\circ\]

Mark: 0 out of 1
Rationale: Incorrect answer

Exemplar 2

\[
\left( \frac{6480}{24} \right) - 360 = 2340
\]

Mark: 1 out of 1
Rationale: Correct answer (1 mark)
E2 (does not include units in final answer)

Exemplar 3

\[
S = 180^\circ (15 - 2)
\]

\[\text{sum of interior angles is } 2340\]

Mark: 1 out of 1
Rationale: Correct answer (1 mark)
E2 (does not include units in final answer)
Leanne measures her height to be 168 cm.

State the uncertainty of the measurement.

Do not round the final answer.

Uncertainty: ________________

**Answer:**

Uncertainty: ______ ± 0.5 cm

**Note to marker:** ± not required.
Exemplar 1

Uncertainty: $16.8 \pm 0.5\text{cm}$

Mark: 1 out of 1
Rationale: Correct uncertainty (1 mark)
E4 (too much information is presented in the answer)

Exemplar 2

Uncertainty: $5\text{mm}$

Mark: 1 out of 1
Rationale: Correct uncertainty (1 mark)

Exemplar 3

Uncertainty: $\frac{\pm\alpha}{\text{cert imed}}$

Mark: 1 out of 1
Rationale: Correct uncertainty (1 mark)
Explain why a pharmacist must use accurate dosages when preparing medications.

**Sample answers:**

- A pharmacist must be accurate so the medication can be most effective.
- A pharmacist must be accurate to prevent an overdose.
- A pharmacist must be accurate to ensure a sufficient quantity of medication (to prevent an under dose).
- The pharmacy would lose money if extra medication was dispensed.
Exemplar 1

You don't want to give too little pills so it doesn't solve the problem, and too many will allow your body to get used to the drug and it won't have the same effect anymore.

Mark: 0 out of 1
Rationale: Incorrect answer

Exemplar 2

A pharmacist must be accurate when preparing medications because they must take into account the actual measured valued compared to the real value.

Mark: 0 out of 1
Rationale: Incorrect response

Exemplar 3

He or she must be accurate because if you give too much when preparing meds you could make that person have an overdose so you need to be accurate.

Mark: 1 out of 1
Rationale: Correct response (1 mark)
Given the following measurement:

\[ 56.0 \pm 0.3 \text{ mm} \]

A) State the minimum value. Do not round the final answer. (1 mark)

**Answer:**

55.7 mm

B) State the tolerance of the measurement. Do not round the final answer. (1 mark)

**Answer:**

0.6 mm
**Exemplar 1**

A) $55.7\text{mm}$

B) $0.3\text{mm}$

Mark: 1 out of 2  
**Rationale:** Correct answer in Part A (1 mark)  
Incorrect answer in Part B

**Exemplar 2**

A) $55.7\text{mm}$

B) $\text{tolerance} = \pm \frac{0.3}{2}$

Mark: 1 out of 2  
**Rationale:** Correct answer in Part A (1 mark)  
Incorrect answer in Part B  
E2 (does not include units in final answer in Part B)  
Note: No E2 deduction because no mark is awarded for this step.

**Exemplar 3**

A) $55.7$

B) $56.3$

Mark: 1 out of 2  
**Rationale:** Correct answer in Part A (1 mark)  
E2 (does not include units in final answer)  
Incorrect answer in Part B  
E2 (does not include units in final answer)  
Note: No E2 deduction because no mark is awarded for this step.
Three of the four forms of tolerance listed below indicate the same measurement in megahertz.

Choose the form of tolerance that indicates a different measurement.

A) \( 16 \pm 0.3 \text{ MHz} \)

B) \( \frac{16.3}{15.7} \text{ MHz} \)

C) \( 15.7^{+0.3}_{-0.3} \text{ MHz} \)

D) \( 15.7^{+0.6}_0 \text{ MHz} \)

Answer: C)
This page was intentionally left blank.
The recommended oil capacity of an engine has a maximum volume of 52.5 mL and a minimum volume of 47.5 mL.

State the measurement in the form: nominal value $\pm \frac{1}{2}$ (tolerance).

**Answer:**

$$50 \pm \frac{2.5}{2} \text{ mL}$$

1 mark for nominal value
1 mark for half tolerance
Exemplar 1  (2 marks)

\[ \begin{array}{c}
3.5 \text{ ml} \\
4.5 \text{ ml} \\
5.5 \text{ ml} \\
7 \text{ ml}
\end{array} \]

\[ \text{tolerance} = 3.5 \text{ ml} \]

nominal value = 49 ml

Mark: 2 out of 2
Rationale: Correct answers (follow-through error) (2 marks)
   E3 (makes a transcription error)

Exemplar 2  (2 marks)

\[ \begin{array}{c}
\text{max} = 52.5 - 2.5 = 50 \\
\text{min} = 47.5 + 2.5 = 50
\end{array} \]

\[ \frac{50 + 2.5}{2} = 25 \]

Mark: 2 out of 2
Rationale: Correct answers (2 marks)
   E2 (does not include units in final answer)

Exemplar 3  (2 marks)

\[ \text{tol} = 5 \]

\[ \text{nom} = 50 \]

\[ 50 \pm \frac{1}{2} \{5\} \]

Mark: 2 out of 2
Rationale: Correct answers (2 marks)
   E2 (does not include units in final answer)
Explain why the tolerance of an oven’s temperature needs to be considered when baking a cake for 30 minutes.

Sample answers:

– There is a range of acceptable temperatures so that the cake will not be underdone.
– There is a range of acceptable temperatures so that the cake will not be overdone.
Exemplar 1

Baking is a science so if you’re baking a cake and the instructions say ”30 minutes”, it’s not smart to put it in for any less/more time or else the tolerance will be off and so will the cake.

Mark: 0 out of 1
Rationale: Incorrect response (refers to time not temperature)

Exemplar 2

If your tolerance is too high your cake could burn and if it’s too low your cake won’t cook at all.

Mark: 0 out of 1
Rationale: Incorrect response

Exemplar 3

Because usually an oven goes up by 5 so the tolerance could be ±5

Mark: 0 out of 1
Rationale: Incorrect response
Question 33

State the precision of the oven dial.

Answer:

25° F
**Exemplar 1**  
(1 mark)

Mark: 0 out of 1  
Rationale: Incorrect response  
   E2 (uses incorrect units of measure)  
   Note: No E2 deduction because no mark is awarded for this step.

**Exemplar 2**  
(1 mark)

Mark: 1 out of 1  
Rationale: Correct answer (1 mark)  
   E2 (uses incorrect units of measure)
Doug is a welder who is looking for employment. Hourly rates for available jobs are shown in the table below:

| $22.50 | $29.50 | $18.50 | $26.75 | $26.75 | $17.59 | $26.75 |
| $26.75 | $28.25 | $17.50 | $24.25 | $18.50 | $24.00 | $26.75 |

A) State the mean hourly rate. (1 mark)

\[
\text{Answer:} \\
\text{Mean: } \frac{\$334.34}{14} = \$23.88 \quad \leftarrow 1 \text{ mark}
\]

B) State the mode of the hourly rate. (1 mark)

\[
\text{Answer:} \\
\text{Mode: } \$26.75
\]

C) Explain why the mode may be a better indicator than the mean of the hourly rate Doug could expect. (1 mark)

\[
\text{Answer:} \\
The \text{mode is the most common hourly rate.}
\]
### Exemplar 1

(A)  

\[
\begin{array}{cccccccc}
$22.50 & $29.50 & $18.50 & $26.75 & $26.75 & $17.50 & $26.75 \\
\frac{4}{3} & \frac{3}{5} & \frac{3}{3} & \frac{1}{3} & \frac{1}{3} & \frac{1}{3} & \frac{1}{3} \\
$28.75 & $28.25 & $17.50 & $24.25 & $18.50 & $24.00 & $26.75 \\
\end{array}
\]

\[\text{add together ÷ 14 = 23.9}\]

B)  26.50

C)  because it’s the most used #

**Mark:** 2 out of 3  
**Rationale:** Correct answer in Part A (1 mark)  
E2 (does not include units in final answer in Part A)  
E4 (does not express the answer to the appropriate number of decimal places in Part A)  
Incorrect answer in Part B  
E2 (does not include units in final answer in Part B)  
Note: No E2 deduction because no mark is awarded for this step.  
Correct answer in Part C (1 mark)

---

### Exemplar 2

(A)  $23.07/h

B)  $26.75/h

C)  The mode is better because the mean uses the low rates which makes the mean lower

**Mark:** 1 out of 3  
**Rationale:** Incorrect answer in Part A  
Correct answer in Part B (1 mark)  
Incorrect answer in Part C
Exemplar 3

(3 marks)

A) $23.95

B) 26.75

C) because more employees are making 26.75 than other wages

Mark: 2 out of 3

Rationale: Incorrect answer in Part A
Correct answer in Part B (1 mark)
E2 (does not include units in final answer in Part B)
Correct answer in Part C (1 mark)
E2 (does not include units in final answer in Part C)
This page was intentionally left blank.
The table below indicates the hours (per week) that each student in a band practices their instrument:

<table>
<thead>
<tr>
<th>Practice</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Student</td>
<td>Hours per Week</td>
</tr>
<tr>
<td>Anna</td>
<td>0.25</td>
</tr>
<tr>
<td>Beth</td>
<td>2.5</td>
</tr>
<tr>
<td>Cassie</td>
<td>3.0</td>
</tr>
<tr>
<td>Dave</td>
<td>0.5</td>
</tr>
<tr>
<td>Ed</td>
<td>1.5</td>
</tr>
<tr>
<td>Fiona</td>
<td>1.25</td>
</tr>
<tr>
<td>Gordon</td>
<td>1.75</td>
</tr>
<tr>
<td>Hanna</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Calculate Beth’s percentile rank for the time she spends practising her instrument.

**Answer:**

\[
PR = \frac{b}{n} \times 100
\]

\[
= \frac{6}{8} \times 100
\]

\[
= 75
\]

\[\therefore 75 \text{ or } 75\text{th} \text{ or } PR_{75} \leftarrow 1 \text{ mark}\]
Exemplar 1

\[ PR = \left( \frac{2.5}{8} \right) \times 100 \]
\[ PR = 31.25 \]

Mark: 1 out of 2
Rationale: Incorrect substitution
Correct answer (follow-through error) (1 mark)

Exemplar 2

\[ \left( \frac{8 + 0.5 \cdot E}{n} \right) \times 100 = 93.75 \]
\[ \frac{7 + 0.5 \times E}{8} \times 100 = 93.75 \]
She is in the 94th percentile rank

Mark: 1 out of 2
Rationale: Incorrect substitution
Correct answer (follow-through error) (1 mark)

Exemplar 3

\[ PR = \frac{n}{n} \times 100 \]
\[ PR = \frac{5}{8} \times 100 = 62.50 \]
62.50th percentile

Mark: 1 out of 2
Rationale: Incorrect substitution
Correct answer (follow-through error) (1 mark)
E5 (does not use whole units in contextual questions involving discrete data)
Choose the letter that best completes the statement below.

Removing a high outlier:

A) increases the mean
B) lowers the mean
C) has no effect on the mean
D) increases the median

**Answer:** B)
This page was intentionally left blank.
The test results from Jeremy’s Statistics course are listed below.

<table>
<thead>
<tr>
<th>Test Results</th>
<th>50%</th>
<th>65%</th>
<th>70%</th>
<th>95%</th>
<th>40%</th>
<th>55%</th>
</tr>
</thead>
</table>

His final grade in the course will be calculated using a trimmed mean.

Calculate Jeremy’s final grade after eliminating his highest and lowest test mark.

**Answer:**

Trimmed total: $50 + 55 + 65 + 70$

$$= 240$$

Number of marks remaining after trim: 4

Trimmed mean: $\frac{240}{4}$ ← 1 mark for process

$$= 60\%$$ ← 1 mark
Exemplar 1

Mark: 1 out of 2
Rationale: Incorrect process
Correct answer (follow-through error) (1 mark)

Exemplar 2

Mark: 1 out of 2
Rationale: Incorrect process
Correct answer (follow-through error) (1 mark)
E1 (rounds incorrectly)
E2 (does not include units in final answer)

Exemplar 3

Mark: 1 out of 2
Rationale: No process shown
Correct answer (1 mark)
E2 (does not include units in final answer)
Megan is taking a Psychology class at university. The table below shows her marks and their corresponding weights.

<table>
<thead>
<tr>
<th>Category</th>
<th>Average Mark (%)</th>
<th>Weight (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects</td>
<td>75</td>
<td>10</td>
</tr>
<tr>
<td>Assignments</td>
<td>85</td>
<td>30</td>
</tr>
<tr>
<td>Tests</td>
<td>73</td>
<td>40</td>
</tr>
<tr>
<td>Exam</td>
<td>?</td>
<td>20</td>
</tr>
</tbody>
</table>

Calculate the mark Megan needs on her final exam to receive a final mark of 80%.

**Answer:**

Projects: \(75 \times 0.10 = 7.5\)  
Assignments: \(85 \times 0.30 = 25.5\) \(\leftarrow 1 \text{ mark for process}\)  
Tests: \(73 \times 0.40 = 29.2\)  
Subtotal: 62.2 \(\leftarrow 1 \text{ mark}\)  

Exam mark: \(\frac{(80 - 62.2)}{20} \times 100\)  
\[= 89\% \leftarrow 1 \text{ mark}\]
Exemplar 1

\[
\begin{align*}
\frac{75}{7.5} \times \frac{85}{85.5} \times \frac{73}{29.2} \times \frac{90}{18} = 62.2 \\
62.2 + 18 = 80.2\% 
\end{align*}
\]

Mark: 2 out of 3
Rationale: Correct process (1 mark)
Correct subtotal (1 mark)
Incorrect exam mark

Exemplar 2

Mark: 3 out of 3
Rationale: Correct answer (3 marks)
E2 (does not include units in final answer)
Appendices
## Appendix A:
### Table of Questions by Unit and Learning Outcome

#### Home Finance

<table>
<thead>
<tr>
<th>Question</th>
<th>Learning Outcome</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>E.6.H.1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>E.6.H.1</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>E.6.H.1</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>E.6.H.1</td>
<td>2</td>
</tr>
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<td>5</td>
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<tr>
<td>6</td>
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<td>3</td>
</tr>
<tr>
<td>7</td>
<td>E.6.H.1</td>
<td>2</td>
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</table>

**Total = 13**

#### Probability

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<th>Mark</th>
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<tbody>
<tr>
<td>8</td>
<td>E6.P.1</td>
<td>2</td>
</tr>
<tr>
<td>9 a)</td>
<td>E6.P.1</td>
<td>1</td>
</tr>
<tr>
<td>9 b)</td>
<td>E6.P.1</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>E6.P.1</td>
<td>3</td>
</tr>
<tr>
<td>11 a)</td>
<td>E6.P.1</td>
<td>1</td>
</tr>
<tr>
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<td>1</td>
</tr>
<tr>
<td>12</td>
<td>E6.P.1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Total = 10**

#### Vehicle Finance

<table>
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<th>Learning Outcome</th>
<th>Mark</th>
</tr>
</thead>
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<tr>
<td>13</td>
<td>E5.V.1</td>
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</tr>
<tr>
<td>14 a)</td>
<td>E5.V.1</td>
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<tr>
<td>14 b)</td>
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<td>E5.V.1</td>
<td>4</td>
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<td>16</td>
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<td>17</td>
<td>E5.V.1</td>
<td>2</td>
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<tr>
<td>18</td>
<td>E5.V.1</td>
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<td>19 a)</td>
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<td>E5.V.1</td>
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</tr>
<tr>
<td>20</td>
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**Total = 19**
### Geometry and Trigonometry

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<tr>
<td>21 b)</td>
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<td>22 b)</td>
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<td>23</td>
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<td>24 a)</td>
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</tr>
<tr>
<td>24 b)</td>
<td>E6.G.1</td>
<td>3</td>
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<td>E6.G.2</td>
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</tr>
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### Precision Measurement

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</tr>
<tr>
<td>29 a)</td>
<td>E5.P.1</td>
<td>1</td>
</tr>
<tr>
<td>29 b)</td>
<td>E5.P.1</td>
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<td>30</td>
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</tr>
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<td><strong>Total</strong></td>
<td></td>
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</table>

### Statistics

<table>
<thead>
<tr>
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<th>Mark</th>
</tr>
</thead>
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<tr>
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</tr>
<tr>
<td>34 b)</td>
<td>E5.S.1</td>
<td>1</td>
</tr>
<tr>
<td>34 c)</td>
<td>E5.S.1</td>
<td>1</td>
</tr>
<tr>
<td>35</td>
<td>E5.S.2</td>
<td>2</td>
</tr>
<tr>
<td>36</td>
<td>E5.S.1</td>
<td>1</td>
</tr>
<tr>
<td>37</td>
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<td>2</td>
</tr>
<tr>
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<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>11</strong></td>
</tr>
</tbody>
</table>
Appendix B:  
Irregularities in Provincial Tests  
A Guide for Local Marking  

During the marking of provincial 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 provincial 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 Booklet 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:  _________________________________________________

For Department Use Only—After Marking Complete
Consultant:  __________________________________________________________

Date:  ________________________________________________________________
Appendix C: Communications Errors

Communication Errors

Communication errors are errors not conceptually related to the learning outcomes associated with the question. The following communication errors will result in a 0.5 mark deduction. Each error can only be deducted once per test and is tracked in a separate section on the Scoring Sheet.

The total mark deduction for communication errors for any student response is not to exceed the marks awarded for that response. For example, there would be no communication error deductions if no marks were awarded for a given response.

E1 (Rounding)

- rounds incorrectly
- rounds too soon

E2 (Units)

- uses incorrect units of measure
- does not include units in final answer
  (e.g., missing $ for monetary values, missing % for GDSR, missing degrees for angles)

E3 (Transcription/Transposition)

- makes a transcription error (inaccurate transferring of information)
- makes a transposition error (changing order of digits)

E4 (Final Answer)

- final answer not clearly indicated
  (e.g., 3/4 and 3:1 presented, but final answer not indicated)
- answer is presented in another part of the question
- does not express the answer to the appropriate number of decimal places
  (e.g., monetary values are not expressed to two decimal places)
- too much information is presented in the answer

E5 (Whole Units)

- does not use whole units in contextual questions involving discrete data
  (e.g., people, cans of paint, percentile rank)