

Grade 12
Essential Mathematics
Achievement Test

Marking Guide

January 2016

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Contents

Marking Guidelines.....	ii
Irregularities in Provincial Tests	ii
Presentation of the Student Samples	1
Home Finance	2
Probability	14
Vehicle Finance.....	26
Geometry and Trigonometry	40
Precision Measurement.....	52
Statistics.....	62
Appendix: Irregularities in Provincial Tests.....	72
<i>Irregular Test Booklet Report</i>	74

Marking Guidelines

The *Grade 12 Essential Mathematics Achievement Test: Marking Guide (January 2016)* is based on *Grades 9 to 12 Mathematics: Manitoba Curriculum Framework of Outcomes (2014)*.

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.

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 scores.
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.

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*.

Presentation of the Student Samples

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

Test Item
Number

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 2

(2 marks)

Test Item and Marking Guide

A homeowner wants to purchase comprehensive insurance with a \$200 deductible. Her house is valued at \$195 000 and is located in Area 2. Calculate the total cost of her insurance.

Answer:

Table value: \$554 *← 1 mark*

Total cost: \$554 + 10%
 $= \$554 + \55.40
 $= \$609.40$ *← 1 mark*

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

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

Exemplar 1

(2 Marks)

$554 \times 0.10 = 55.4$ $554 - 55.4 = \$498.60$

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

Home Finance

Question 1

(4 Marks)

David is planning on purchasing a house. The monthly mortgage payment will be \$925 and the monthly heating costs will be \$235. The annual property taxes will be \$3180.

- A) Calculate David's Gross Debt Service Ratio (GDSR) if his gross monthly income is \$3958. (3 marks)

Answer:

Monthly property taxes: $\$3180 \div 12 = \265

$$\begin{aligned}
 & \text{Monthly mortgage payment} + \text{Monthly property taxes} + \text{Monthly heating costs} \\
 \text{GDSR} &= \frac{\text{Monthly mortgage payment} + \text{Monthly property taxes} + \text{Monthly heating costs}}{\text{Gross monthly income}} \times 100 \\
 &= \left(\frac{\$925 + \$265 + \$235}{\$3958} \right) \times 100 \left\{ \begin{array}{l} 0 \text{ marks for 1 correct substitution} \\ \text{OR} \\ 1 \text{ mark for 2 or 3 correct substitutions} \\ \text{OR} \\ 2 \text{ marks for 4 correct substitutions} \end{array} \right. \\
 &= 36\% \qquad \leftarrow 1 \text{ mark}
 \end{aligned}$$

Note to marker: Units are not required.

- B) Explain whether David will be approved for the home mortgage. (1 mark)

Answer:

David will not be approved for the mortgage because his GDSR is above 32%. $\leftarrow 1 \text{ mark}$

Note to marker: Student must refer to 32%.

Exemplar 1

(4 Marks)

A)
$$GDSR = \frac{925 + 235 + 3180}{3958} \times 100 = 109.65$$

B) he has higher than 32% so he'll be approved

Mark: 2 out of 4

Rationale:

- Three correct substitutions in Part A (1 mark)
- Correct answer in part A (follow-through error) (1 mark)
- Incorrect explanation in Part B

Exemplar 2

(4 Marks)

A)
$$\frac{925 + 235 \times 1.13}{3958} \times 100 = 30\%$$

B) He can afford it because it is under 32% if it was over He would not be able to afford it

Mark: 2 out of 4

Rationale:

- Three correct substitutions in Part A (1 mark)
- Incorrect answer in part A (conceptual error—incorrect use of tax)
- Correct explanation in Part B (1 mark)

Exemplar 3

(4 Marks)

A)
$$\begin{aligned} \$925 + \$235 &= \$1160 \\ 1160 \div 3180 &= 36.47\% \end{aligned}$$

B) It will not be approved because his % is over 32%

Mark: 3 out of 4

Rationale:

- Two correct substitutions in Part A (1 mark)
- Correct answer in part A (follow-through error) (1 mark)
- Correct explanation in Part B (1 mark)

Question 2

(2 Marks)

A homeowner wants to purchase comprehensive insurance with a \$200 deductible. Her house is valued at \$195 000 and is located in Area 2. Calculate the total cost of her insurance.

Answer:

Table value: \$554 ← 1 mark

Total cost: $\$554 + 10\%$
 $= \$554 + \55.40
 $= \$609.40$ ← 1 mark

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

Exemplar 1

(2 Marks)

$$554 \times 0.10 = 55.4 \quad 554 - 55.4 = \$498.60$$

Mark: 1 out of 2

Rationale: - Correct table value (1 mark)
- Incorrect answer

Exemplar 2

(2 Marks)

$$\begin{aligned} \$195\,000 \times 10\% &= \$19\,500 \\ \$19\,500 + \$554 &= \$20\,054 \end{aligned}$$

Mark: 1 out of 2

Rationale: - Correct table value (1 mark)
- Incorrect answer

Exemplar 3

(2 Marks)

$$\$554 \times 1.10 = \$609.40$$

Mark: 2 out of 2

Rationale: - Correct table value (1 mark)
- Correct answer (1 mark)

Question 3

(2 Marks)

Test Item and Marking Guide

A couple has purchased a house in Brandon for their son to live in while he attends university. State 2 on-going expenses related to home ownership.

1. _____

2. _____

Sample answers:

- *property taxes*
- *insurance*
- *utilities*
- *mortgage*
- *budgeting for unforeseen expenses*

(2 × 1 mark)

Note to marker: Award a maximum of 1 mark for each line.

Exemplar 1

(2 Marks)

1. daily food
2. Gas to get to work and back, or bus money

Mark: 0 out of 2**Rationale:** - Two incorrect responses**Exemplar 2**

(2 Marks)

1. HEAT AND WATER
2. REPAIRS-FURNACE & BURST PIPES

Mark: 1 out of 2**Rationale:** - One correct response (line 1) (1 mark)
- Incorrect response (line 2) (one-time cost)**Exemplar 3**

(2 Marks)

1. He'll have to pay utilities
2. He'll have to pay the property taxes

Mark: 2 out of 2**Rationale:** - Two correct responses (2×1 mark)

Question 4

(4 Marks)

Test Item and Marking Guide

Sherry will need a \$245 000 mortgage to purchase a house.

- A) Determine her monthly mortgage payment if she gets an interest rate of 5.25% and amortizes the mortgage over 20 years. (2 marks)

Answer:

Table value: 6.71 ← 1 mark

$$\begin{aligned}\text{Monthly mortgage payment: } & \frac{\$245\,000}{1000} \times 6.71 \\ & = \$1643.95 \quad \leftarrow 1 \text{ mark}\end{aligned}$$

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

- B) Calculate the total interest paid over the 20-year mortgage. (2 marks)

Answer:

$$\begin{aligned}\text{Total payment: } & \$1643.95 \times 12 \times 20 \\ & = \$394\,548.00 \quad \leftarrow 1 \text{ mark}\end{aligned}$$

$$\begin{aligned}\text{Total interest: } & \$394\,548.00 - \$245\,000.00 \\ & = \$149\,548.00 \quad \leftarrow 1 \text{ mark}\end{aligned}$$

Exemplar 1

(4 Marks)

A) $245\,000 \times 10.525 \div 240 = \$1\,074.42$

B) $257\,862.50 - 245\,000 = \$12\,862.50$

Mark: 1 out of 4

- Rationale:**
- Incorrect table value in Part A (table value not indicated)
 - Incorrect answer in Part A
 - Incorrect total payment in Part B
 - Correct total interest in Part B (follow-through error) (1 mark)

Exemplar 2

(4 Marks)

A) $\$6.71 \text{ so } \frac{245\,000}{20} = \frac{\$12\,250}{12} = \$1\,020.83$

B) $\$6.71 \times 12 \times 20 = \$1\,610.40$

Mark: 1 out of 4

- Rationale:**
- Correct table value in Part A (1 mark)
 - Incorrect answer in Part A
 - Incorrect total payment in Part B
 - Incorrect total interest in Part B

Exemplar 3

(4 Marks)

A) $\frac{245\,000}{1000} \times 6.71 = \$1\,643.95$

B) $1\,643.95 \times 240 = \$394\,548$

Mark: 3 out of 4

- Rationale:**
- Correct table value in Part A (1 mark)
 - Correct monthly mortgage payment in Part A (1 mark)
 - Correct total payment in Part B (1 mark)
 - Incorrect total interest in Part B

Question 5

(2 Marks)

Test Item and Marking Guide

State 2 costs related to preventative home maintenance.

1. _____

2. _____

Sample answers:

- *furnace inspection*
- *change air filter on furnace*
- *re-shingle roof before it starts leaking*

(2 × 1 mark)

Note to marker: Award a maximum of 1 mark for each line.

Exemplar 1

(2 Marks)

1. Replace downspouts
2. The roof is leaking after a storm has come.

Mark: 1 out of 2

Rationale: - One correct response (line 1) (1 mark)
- Incorrect response (line 2) (emergency repair)

Exemplar 2

(2 Marks)

1. home inspection
2. the cost of re-shingling a roof

Mark: 2 out of 2

Rationale: - Two correct responses (2 × 1 mark)

Exemplar 3

(2 Marks)

1. if you live in a place where earth quaks happen often
you could earth quak proof your heavier items (it's a
thing I swear)
2. flood proof your doors and windows to keep basements
from flooding

Mark: 2 out of 2

Rationale: - Two correct responses (2 × 1 mark)

Question 6

(2 Marks)

A house and land have an assessed value of \$225 000. The portion percentage is 45%. The municipality has a tax rate of 32 mills. Calculate the general municipal tax.

Answer:

$$\begin{aligned} \text{Total portioned assessment: } & \$225\,000 \times 0.45 \\ & = \$101\,250 \quad \leftarrow 1 \text{ mark} \end{aligned}$$

$$\begin{aligned} \text{Municipal tax: } & \$101\,250 \times \frac{32}{1000} \\ & = \$3240 \quad \leftarrow 1 \text{ mark} \end{aligned}$$

OR

$$\begin{aligned} \text{Municipal tax: } & \$225\,000 \times 0.45 \times \frac{32}{1000} \quad \leftarrow 1 \text{ mark} \\ & = \$3240 \quad \leftarrow 1 \text{ mark} \end{aligned}$$

Exemplar 1

(2 Marks)

$$\frac{101\,250}{225\,000} \times 1000 = \$450$$

Mark: 1 out of 2

Rationale: - Correct total portioned assessment (1 mark)
- Incorrect municipal tax

Exemplar 2

(2 Marks)

$$0.45 \times 225\,000 = \frac{101\,250}{1000} \times 32 = \$3240.00$$

Mark: 2 out of 2

Rationale: - Correct total portioned assessment (1 mark)
- Correct municipal tax (1 mark)

Exemplar 3

(2 Marks)

$$\begin{aligned} 32 \times .45 / 1000 &= \\ 14.4 / 1000 &= 0.0144 \\ 0.0144 \times 225\,000 &= 3240 \end{aligned}$$

Mark: 2 out of 2

Rationale: - Correct total portioned assessment (1 mark)
- Correct municipal tax (1 mark)

Probability

Question 7

(1 Mark)

Emerito has to write a math quiz at the end of every week. Each quiz is out of 10 marks. His marks on the last 6 weeks' quizzes were as follows:

4	7	8	6	8	7
---	---	---	---	---	---

State the probability that a randomly chosen quiz has a mark of 70% or more.

Answer:

$\frac{4}{6}$ or 0.67 or 67% or 4 out of 6

Note to marker: Accept equivalent representations.

Exemplar 1

(1 Mark)

6 Quizzes

2 have marks of 70%

probability = $\frac{2}{6}$ or it can be reduced to $\frac{1}{3}$

Mark: 0 out of 1**Rationale:** - Incorrect answer**Exemplar 2**

(1 Mark)

$$\frac{4}{6} = \frac{2}{3} = 0.\overline{6}$$

Mark: 1 out of 1**Rationale:** - Correct answer (1 mark)**Exemplar 3**

(1 Mark)

$$\frac{4}{10} \times 100 = 40\%$$

$$P = \frac{4}{6}$$

$$\frac{7}{10} \times 100 = 70\%$$

$$\frac{8}{10} \times 100 = 80\%$$

$$\frac{6}{10} \times 100 = 60\%$$

$$\frac{8}{10} \times 100 = 80\%$$

$$\frac{7}{10} \times 100 = 70\%$$

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

Question 8

(2 Marks)

State 63% as a fraction and as a decimal.

Fraction: _____

Decimal: _____

Answer:

Fraction: $\frac{63}{100}$ ← 1 mark

Decimal: 0.63 ← 1 mark

Exemplar 1

(2 Marks)

Fraction: $\frac{63}{100} = \frac{21}{25}?$ Decimal: 0.63 **Mark: 1 out of 2****Rationale:** - Incorrect answer (fraction not clearly indicated)
- Correct answer (decimal) (1 mark)**Exemplar 2**

(2 Marks)

Fraction: $\frac{189}{3} \quad \frac{63}{1}$ Decimal: 0.63 **Mark: 1 out of 2****Rationale:** - One correct answer (decimal) (1 mark)**Exemplar 3**

(2 Marks)

Fraction: $\frac{63}{100}$ Decimal: $63 \div 100 = 0.63$ **Mark: 2 out of 2****Rationale:** - Two correct answers (2×1 mark)

Question 9

(4 Marks)

A company wishes to advertise a new type of breakfast cereal by sending out small samples through the mail to potential customers. There is a 7% chance that a potential customer will like the cereal and buy a full box for \$6.00.

- A) Calculate the expected value for the company if the samples cost \$0.40 each to produce and distribute. (3 marks)

Answer:

$$\begin{aligned} \$gain &= \$6.00 - \$0.40 \\ &= \$5.60 \end{aligned}$$

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

$$= (0.07)(\$5.60) - (0.93)(\$0.40) \left\{ \begin{array}{l} 0 \text{ marks for 1 correct substitution} \\ \text{OR} \\ 1 \text{ mark for 2 or 3 correct substitutions} \\ \text{OR} \\ 2 \text{ marks for 4 correct substitutions} \end{array} \right.$$

$$= \$0.02 \quad \leftarrow 1 \text{ mark}$$

OR

$$\begin{aligned} \text{Average earnings: } &(0.07)(\$6.00) \\ &= \$0.42 \quad \leftarrow 2 \text{ marks} \end{aligned}$$

$$\begin{aligned} EV &= \$0.42 - \$0.40 \\ &= \$0.02 \quad \leftarrow 1 \text{ mark} \end{aligned}$$

- B) Justify whether the company should try this form of advertising based on your answer in Part A. (1 mark)

Answer:

The company should advertise this way since the $EV > 0$.

Note to marker: Justification must refer to positive or negative expected value.

Exemplar 1

(4 Marks)

A) $(7) \times (6.00) - (93) \times (0.40)$

$$EV = \$4.8$$

B) No because there is a small % of customers that will like the cereal and buy full box and expected value is low.

Mark: 1 out of 4

Rationale:

- One correct substitution in Part A (0 marks)
- Correct answer in Part A (follow-through error) (1 mark)
- Incorrect response in Part B

Exemplar 2

(4 Marks)

A) $EV = 0.07 \times 6 - 0.93 \times 4$

$$0.0294 - 3.72$$

$$EV = -3.69$$

B) Due To The expected value being below 0, no, They will lose money if They try.

Mark: 2 out of 4

Rationale:

- Two correct substitutions in Part A (1 mark)
- Incorrect answer in Part A
- Correct response in Part B (1 mark)

Exemplar 3

(4 Marks)

A) $(5.60 \times 0.07) - (0.40 \times 0.93) = 0.02$

$$0.392 - 0.372$$

B) They shouldn't because the expected value is very low

Mark: 3 out of 4

Rationale:

- Four correct substitutions in Part A (2 marks)
- Correct answer in Part A (1 mark)
- Incorrect response in Part B

Question 10

(1 Mark)

State the probability of a baseball player hitting a ball given that the odds for this event are 1 : 4.

Answer:

$\frac{1}{5}$ or 0.2 or 20% or 1 out of 5

Note to marker: Accept equivalent representations.

Test Item and Marking Guide

Exemplar 1

(1 Mark)

of ways to win = 1

of ways to lose = 4

Odds $\rightarrow 1: 4$

$$P = \frac{1}{4} = 0.25\%$$

Mark: 0 out of 1**Rationale:** - Incorrect answer**Exemplar 2**

(1 Mark)

$$\frac{1}{5} \times 100 = 20\%$$

Mark: 1 out of 1**Rationale:** - Correct answer (1 mark)**Exemplar 3**

(1 Mark)

a baseball player will hit a fly ball 1 in 5 times

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

Question 11

(2 Marks)

Ten cards, numbered 1 to 10, are placed in a bag. A student pulls a card from the bag, records the number, and puts the card back in the bag. The student repeats this process 9 more times. The table below shows the results.

3	6	8	4	4	1	10	6	2	5
---	---	---	---	---	---	----	---	---	---

- A) State the experimental probability of a student pulling out a card with a number greater than 7. (1 mark)

Answer:

$\frac{2}{10}$ or 0.20 or 20% or 2 out of 10 or 2 : 10

- B) State the theoretical probability of a student pulling out a card with a number greater than 7. (1 mark)

Answer:

$\frac{3}{10}$ or 0.30 or 30% or 3 out of 10 or 3 : 10

Note to marker: Accept equivalent representations.

Exemplar 1

(2 Marks)

A) $\frac{2}{10} = \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$
 $= \frac{10}{5} (=2)$

B) $\frac{1}{5} = .20 = 20\%$
 $P = 20\%$

Mark: 0 out of 2

Rationale: - Incorrect answer in Part A
- Incorrect answer in Part B

Exemplar 2

(2 Marks)

A) $\frac{2}{10} = \frac{2}{10} = \frac{4}{20} = 0.2$

B) 2:10

Mark: 1 out of 2

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

Exemplar 3

(2 Marks)

A) The experimental probability of a student pulling out a card with a number greater than 7 is $\frac{2}{10}$ or $\frac{1}{5}$.

B) The theoretical probability of a student pulling out a card with a number greater than 7 is $\frac{3}{10}$.

Mark: 2 out of 2

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

Question 12

(1 Mark)

Choose the letter that best completes the statement below.

The probability of a tadpole surviving to become an adult frog is 90%. The odds **against** this happening are:

- a) 1 : 9
- b) 9 : 1
- c) 1 : 10
- d) 10 : 1

Answer: a)



Vehicle Finance

Question 13

(4 Marks)

Test Item and Marking Guide

State 2 advantages and 2 disadvantages of buying a used car rather than buying a similar new car.

Advantages	Disadvantages
1.	1.
2.	2.

Sample answers:

Advantages	Disadvantages
<ul style="list-style-type: none"> – cheaper to buy – cheaper to insure – less taxes (if private) – less depreciation loss 	<ul style="list-style-type: none"> – more potential problems – could be no warranty – fewer safety features – fewer technological features (e.g., built-in DVD) – you don't know how it was driven

(4 × 1 mark)

Note to marker: Award a maximum of 1 mark for each box.

Exemplar 1

(4 Marks)

Advantages	Disadvantages
1. It immediately becomes yours to modify.	1. Once it becomes yours any damage or malfunctions won't be covered.
2. You don't need to worry about payments.	2. You aren't guaranteed anything.

Mark: 0 out of 4**Rationale:** - Four incorrect responses**Exemplar 2**

(4 Marks)

Advantages	Disadvantages
1. It is cheaper and might be in a good condition.	1. Might be a stolen car being sold.
2. You can just pay them up front and own the car.	2. It might need some maintenance repair.

Mark: 3 out of 4**Rationale:** - Three correct responses (no mark awarded for Advantage 2) (3 marks)**Exemplar 3**

(4 Marks)

Advantages	Disadvantages
1. Prices will be lower	1. There is no warranty
2. Pay Taxes on its valued price	2. The car could have a lot of problems

Mark: 4 out of 4**Rationale:** - Four correct responses (4 marks)

Question 14

(2 Marks)

Mark wants to buy a new truck worth \$25 500. The dealership offers him a trade-in value of \$3500 for his used car. Calculate the purchase price of the new truck after taxes.

Answer:

$$\begin{aligned} \text{Purchase price before taxes: } & \$25\,500 - \$3\,500 \\ & = \$22\,000 \qquad \leftarrow 1 \text{ mark} \end{aligned}$$

$$\begin{aligned} \text{Purchase price after taxes: } & \$22\,000 \times 1.13 \\ & = \$24\,860 \qquad \leftarrow 1 \text{ mark} \end{aligned}$$

Exemplar 1

(2 Marks)

$$\begin{array}{r} 25\,500 \\ - 3\,500 \\ \hline 21\,500 \\ \times 1.13 \\ \hline \$24\,295 \end{array}$$

Mark: 1 out of 2

- Rationale:**
- Incorrect purchase price before taxes
 - Correct purchase price after taxes (follow-through error) (1 mark)

Exemplar 2

(2 Marks)

$$\begin{aligned} \text{Taxes } & \$25\,500 \times 0.13 = \$3\,315 \\ & \$25\,500 + \$3\,315 - \$3\,500 = \$25\,315 \end{aligned}$$

Mark: 1 out of 2

- Rationale:**
- Incorrect purchase price before taxes
 - Correct purchase price after taxes (follow-through error) (1 mark)

Exemplar 3

(2 Marks)

$$\begin{aligned} & \$25\,500 - 3\,500 = \$22\,000 \\ & \text{tax} \rightarrow \$22\,000 \times 0.13 = \$2\,860 \\ & \$22\,000 + 2\,860 = \$24\,860 \end{aligned}$$

Mark: 2 out of 2

- Rationale:**
- Correct purchase price before taxes (1 mark)
 - Correct purchase price after taxes (1 mark)

Question 15

(1 Mark)

State 1 way to decrease the total amount paid to finance the car you have decided to buy.

Sample answers:

- *increase down payment*
- *decrease amortization period*
- *lower interest rate*
- *buy it outright*

Exemplar 1

(1 Mark)

get a cheaper car

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

(1 Mark)

don't pick a high insurance rate to pay for your car

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

(1 Mark)

Constantly seek new rates and charges to apply them to the vehicles financing charges.

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

Test Item and Marking Guide

Nancy is purchasing a new vehicle for \$26 500 after taxes at 4.5% for 5 years.

Monthly Vehicle Loan Payments per \$1000 borrowed					
Interest Rate (%)	Years to Repay Loan				
	1	2	3	4	5
4.00	85.15	43.42	29.52	22.58	18.42
4.25	85.26	43.54	29.64	22.69	18.53
4.50	85.38	43.65	29.75	22.80	18.64
4.75	85.49	43.76	29.86	22.92	18.76
5.00	85.61	43.87	29.97	23.03	18.87
5.25	85.72	43.98	30.08	23.14	18.99
5.50	85.84	44.10	30.20	23.26	19.10
5.75	85.95	44.21	30.31	23.37	19.22
6.00	86.07	44.32	30.42	23.49	19.33

- Answer:**

$$\text{Monthly payment: } \frac{\$26\,500}{1000} \times 18.64 = \$493.96 \quad \leftarrow 1 \text{ mark}$$

- Sample answers:***

- *The first option because the total paid is less.*
- *The second option because the monthly payment is less.*

Note to marker: Total paid: Option 1 \$29 637.60
Option 2 \$33 600.00
Monthly: Option 1 \$493.96
Option 2 \$400.00

Exemplar 1

(3 Marks)

A) $26\,500 \times \frac{18.64}{1000} = 493.95 \times 12 \times 5 = \2963.76

B) $400 \times 12 \times 7 = \$33,600$ which is greater than \$2963.76

Mark: 1 out of 3

- Rationale:**
- Correct table value in Part A (1 mark)
 - Incorrect answer in Part A (monthly payment not clearly indicated)
 - Incorrect response in Part B (option not clearly indicated)

Exemplar 2

(3 Marks)

A) $18.64 \times 26\,500 \div 1000 = \493.96

B) $400 \times 12 \times 7 = 33\,600$

She should choose the first option.

Mark: 2 out of 3

- Rationale:**
- Correct table value in Part A (1 mark)
 - Correct monthly payment in Part A (1 mark)
 - Incorrect response in Part B (no justification)

Exemplar 3

(3 Marks)

A) $26\,500 \times 18.64 \div 1000 = \493.96
 $\$493.96 \times 12 \times 5 = 29\,637.60 - 26\,500$
 $3137.6 \leftarrow \text{interest}$
 $400 \times 12 \times 7 = 33\,600 - 26\,500$
 $= 7100$

B) the first option is better because in the end she will be paying less interest.

Mark: 3 out of 3

- Rationale:**
- Correct value in Part A (1 mark)
 - Correct monthly payment in Part A (1 mark)
 - Correct response in Part B (1 mark)

Question 17

(3 Marks)

Test Item and Marking Guide

On average, the fuel economy of Jasmine's vehicle is 8.5 L/100 km. In the past month, Jasmine has travelled a total of 2800 km.

- A) Calculate the total litres of gas Jasmine's vehicle used for the month based on the average fuel economy. (2 marks)

Answer:

$$\frac{8.5 \text{ L}}{100 \text{ km}} = \frac{L}{2800 \text{ km}} \quad \leftarrow 1 \text{ mark for process}$$

$$\text{Fuel used in litres} = 238 \text{ L} \quad \leftarrow 1 \text{ mark}$$

OR

$$\begin{aligned} \frac{8.5 \text{ L}}{100 \text{ km}} \times 2800 \text{ km} & \quad \leftarrow 1 \text{ mark for process} \\ = 238 \text{ L} & \quad \leftarrow 1 \text{ mark} \end{aligned}$$

Note to marker: Units are not required.

- B) State the total cost of fuel used if it costs \$1.23 per litre. (1 mark)

Answer:

$$\begin{aligned} \text{Total cost: } 238 \times \$1.23/\text{L} \\ = \$292.74 \quad \leftarrow 1 \text{ mark} \end{aligned}$$

Exemplar 1

(3 Marks)

A) 238 L

B) $238 \times 1.23 = \$242.74$

Mark: 1 out of 3

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

Exemplar 2

(3 Marks)

A) 8.5 L/100km
 238 L/2800km

B) $238 \text{ L} \times \$1.23 = \292.72

Mark: 2 out of 3

Rationale: - Correct process in Part A (1 mark)
- Correct litres used in Part A (1 mark)
- Incorrect answer in Part B

Exemplar 3

(3 Marks)

A) $8.5 \times 28 = 238 \text{ L used}$

B) $238 \times 1.23 = \$292.74$

Mark: 3 out of 3

Rationale: - Correct process in Part A (1 mark)
- Correct litres used in Part A (1 mark)
- Correct answer in Part B (1 mark)

Question 18

(1 Mark)

Choose the letter that best completes the statement below.

When insuring a vehicle in Manitoba, the factor that does **not** affect your premium is:

- a) your driving record
- b) your gender
- c) the type of vehicle
- d) the use of vehicle

Answer: b)



Question 19

(4 Marks)

Test Item and Marking Guide

Bryan's 20-year-old vehicle has broken down. He therefore pushes it into a repair shop in Manitoba. His car needs to have the radiator (\$500) and timing belt (\$450) replaced. The labour cost is \$120 per hour and it takes 4 hours to repair his vehicle. Calculate how much it costs to have his vehicle repaired after taxes.

Answer:

Parts: $\$500 + \450
 $= \$950$ $\leftarrow 1 \text{ mark}$

Labour: $\$120 \times 4$
 $= \$480$ $\leftarrow 1 \text{ mark}$

Subtotal: $\$950 + \480
 $= \$1430$ $\leftarrow 1 \text{ mark}$

Total with taxes: $\$1430 \times 1.13$
 $= \$1615.90$ $\leftarrow 1 \text{ mark}$

Exemplar 1

(4 Marks)

$$\$120 \text{ hr} \times 4 \text{ hrs} = 480$$

$$\$500 \times 1.13 = 565$$

$$\$450 \times 1.13 + 508.50$$

$$\underline{\$1553.50}$$

Mark: 3 out of 4**Rationale:** - Incorrect calculation of taxes (3 marks)**Exemplar 2**

(4 Marks)

$$1073.50 + 480$$

$$=\underline{\$1553.50}$$

Mark: 3 out of 4

Rationale: - Correct parts calculation (1 mark)
- Correct labour calculation (1 mark)
- Correct subtotal (follow-through errors) (1 mark)
- Incorrect total with taxes

Exemplar 3

(4 Marks)

$$500$$

$$450$$

$$(4)120$$

$$\underline{\$1430}$$

$$\times .13$$

$$185.9$$

$$1430 + 185.90 = \underline{\$1615.90}$$

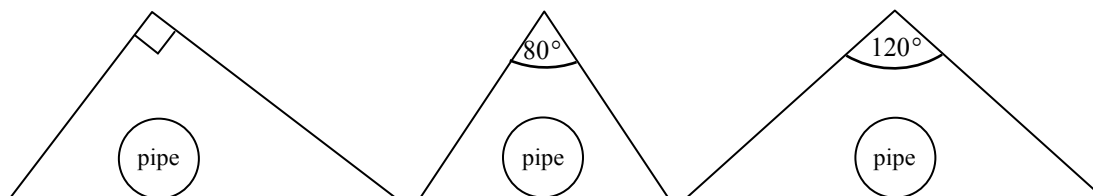
Mark: 4 out of 4**Rationale:** - Correct answer (4 × 1 mark)

Geometry and Trigonometry

Question 20

(2 Marks)

Martha is building a triangular ramp over a drainage pipe. She is considering the following designs:



A) Choose the letter that best completes the statement below. (1 mark)

The type of triangular ramp that allows a wheelbarrow to be pushed smoothly over the pipe with the least amount of effort from either side is:

- a) acute
- b) equilateral
- c) obtuse
- d) right

Answer: c)

B) Justify why this type of triangle should be used for the ramp, making reference to the base angles. (1 mark)

Answer:

An obtuse triangle provides the smallest base angles and will be the easiest over which to push the wheelbarrow.

Exemplar 1

(2 Marks)

A) _____

B) It takes less effort to push it up a 10° angle than an 80° angle. A right angle wouldn't even be possible.

Mark: 1 out of 2

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

Exemplar 2

(2 Marks)

A) C

B) because an obtuse triangle's point isn't upright so it would allow the wheelbarrow to have a smoother ride.

Mark: 1 out of 2

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

Exemplar 3

(2 Marks)

A) C

B) The ramp should be in the shape of an obtuse triangle because it will be easier to push the wheelbarrow.

Mark: 1 out of 2

Rationale: - Correct answer in Part A (1 mark)
- Incorrect justification in Part B (no reference to base angles)

Question 21

(3 Marks)

A manufacturer of solar panels states that panels should be installed at a 70° angle with the horizontal base of the roof. Calculate the length of the roof as identified in the diagram.

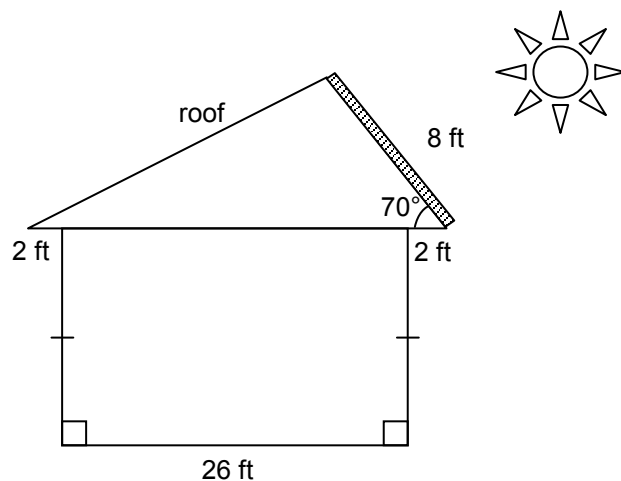


Diagram is not to scale

Answer:

$$\begin{aligned} \text{Base of the roof: } & 26 \text{ ft} + 2 \text{ ft} + 2 \text{ ft} \\ & = 30 \text{ ft} \quad \leftarrow 1 \text{ mark} \end{aligned}$$

$$x^2 = 8^2 + 30^2 - 2(8)(30) \cos 70^\circ \quad \leftarrow 1 \text{ mark for all correct substitutions}$$

$$x^2 = 64 + 900 - 480 \cos 70^\circ$$

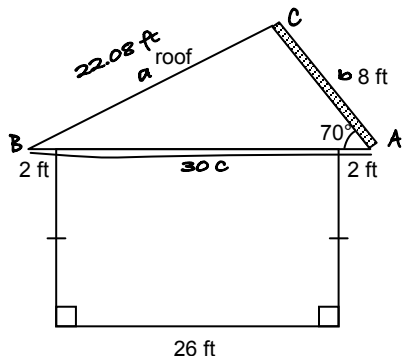
$$\sqrt{x^2} = \sqrt{799.83}$$

$$x = 28.3 \text{ ft} \quad \leftarrow 1 \text{ mark}$$

Note to marker: Allow for various roundings. Units are not required.

Exemplar 1

(3 Marks)



$$a^2 = 8^2 + 30^2 - 2(8)(30)\cos 70$$

$$a^2 = 64 + 900 - 476.42$$

$$a^2 = 964 - 476.42$$

$$a^2 = \sqrt{487.58}$$

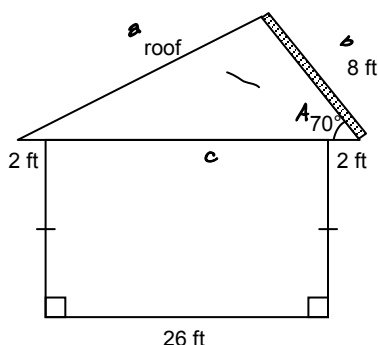
$$a = 22.08 \text{ ft}$$

Note : 2 out 3

Justification : - Correct calculation of the base of the roof (1 mark)
 - Correct substitution (1 mark)
 - Incorrect answer

Exemplar 2

(3 Marks)



Cosine Law

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$a^2 = 8^2 + 26^2 - (2)(8)(26)(\cos 70)$$

$$a^2 = 64 + 676 - (416)(\cos 70)$$

$$a^2 = 740 - (416)(\cos 70)$$

$$\sqrt{a^2} = \sqrt{597.72}$$

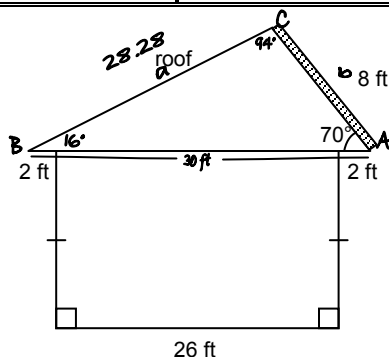
$$a = 24.45 \text{ ft}$$

Mark: 2 out of 3

Rationale: - Incorrect calculation of the base of the roof
 - Correct substitution (follow-through error) (1 mark)
 - Correct answer (follow-through error) (1 mark)

Exemplar 3

(3 Marks)



$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$a^2 = 64 + 900 - 2 \times 8 \times 30$$

$$a^2 = 964 - 480 \cos 70$$

$$= 28.28$$

$$\frac{\sin B}{8} = \frac{\sin 70}{28.28}$$

$$\frac{8 \sin 70}{28.28 \sin 70}$$

$$28.28 \sin$$

$$B = 15.66$$

$$180 - 16 - 70 = 94^\circ$$

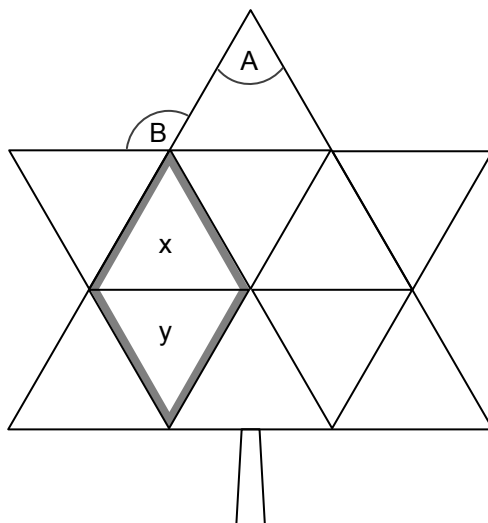
Mark: 3 out of 3

Rationale: - Correct calculation of base of the roof (1 mark)
 - Correct substitution (1 mark)
 - Correct answer (1 mark)

Question 22

(3 Marks)

Canada's Centennial Maple Leaf is made up of 11 equilateral triangles.



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

Answer:

$$\frac{180^\circ}{3}$$

$$= 60^\circ \quad \leftarrow 1 \text{ mark}$$

Note to marker: Units are not required.

- B) State the measure of angle B. (1 mark)

Answer:

$$180^\circ - 60^\circ$$

$$= 120^\circ \quad \leftarrow 1 \text{ mark}$$

Note to marker: Units are not required.

- C) State the type of quadrilateral created by combining triangles x and y. (1 mark)

Answer:

Rhombus or Parallelogram

Exemplar 1

(3 Marks)

- A)
- B)
- C) *a parallelogram*

Mark: 1 out of 3**Rationale:** - Correct response in Part C (1 mark)**Exemplar 2**

(3 Marks)

- A) 60°
- B) $180^\circ - 60^\circ = \underline{120^\circ}$
- C) *diamond*

Mark: 2 out of 3**Rationale:** - Correct answer in Part A (1 mark)
- Correct answer in Part B (1 mark)
- Incorrect response in Part C**Exemplar 3**

(3 Marks)

- A) 60°
- B) $60 + 60 = 120^\circ$
- C) Diamond or kite

Mark: 2 out of 3**Rationale:** - Correct answer in Part A (1 mark)
- Correct answer in Part B (1 mark)
- Incorrect response in Part C

Question 23

(2 Marks)

Test Item and Marking Guide

Squares and parallelograms are geometric figures. Using properties of polygons:

A) Explain why a square is a parallelogram. (1 mark)

Sample answers:

- *A square has 2 sets of parallel sides.*
- *Diagonals bisect each other.*
- *Opposite angles are equal.*
- *Adjacent angles are supplementary.*

B) Explain why a parallelogram is not always a square. (1 mark)

Sample answers:

- *The adjacent sides of a parallelogram do not need to be of equal lengths.*
- *The interior angles of a parallelogram do not need to be 90° .*
- *Diagonals do not need to be perpendicular bisectors.*

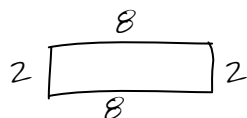
Exemplar 1

(2 Marks)

parraael
/

A) because the sides opposite from each other are almost the same

B) 1 parraael lines might be the same but the other might not be

**Mark: 1 out of 2**

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

Exemplar 2

(2 Marks)

A) because all opposite sides are parallel to each other

B) Rectangles can be a parallelogram because the sides opposite from each other are the same size

Mark: 2 out of 2

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

Exemplar 3

(2 Marks)

A) BECAUSE ITS SIDES RUN parallel to each other.

B) BECAUSE you can have parallelograms that don't form 90° angles to make a square. Like a rhombus

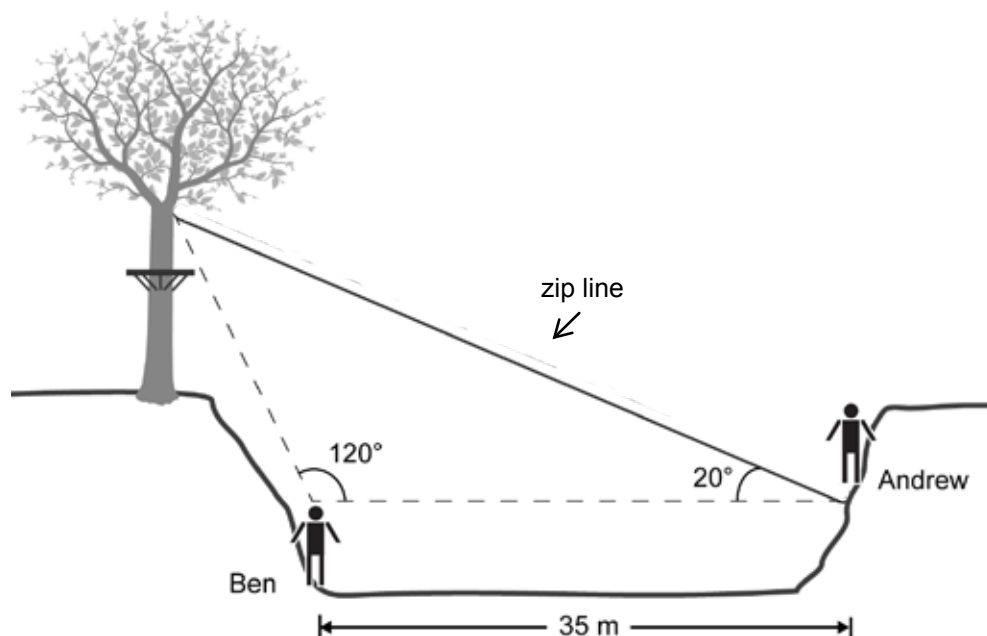
Mark: 2 out of 2

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

Question 24

(3 Marks)

Andrew and Ben are building a zip line across a ravine.



Calculate the length of the zip line.

Answer:

$$\begin{aligned} \text{Third angle: } 180^\circ - 120^\circ - 20^\circ \\ = 40^\circ \quad \leftarrow 1 \text{ mark} \end{aligned}$$

$$\frac{\sin 120^\circ}{x} = \frac{\sin 40^\circ}{35} \quad \leftarrow 1 \text{ mark for all correct substitutions}$$

$$x = 47.16 \text{ m} \quad \leftarrow 1 \text{ mark}$$

Note to marker: Allow for various roundings. Units are not required.

Exemplar 1

(3 Marks)

$$180 - 120 - 20 = 40$$

Mark: 1 out of 3**Rationale:** - Correct third angle (1 mark)**Exemplar 2**

(3 Marks)

$$\frac{a}{\sin A} = \frac{b}{\sin B}$$
$$\frac{a}{\sin 20} = \frac{35}{\sin 20}$$
$$a = \frac{(35)(\sin 20)}{\sin 20} = 88.62311102$$

$a = 88.6 \text{ m}$

Mark: 1 out of 3**Rationale:** - Incorrect third angle (not calculated)
- Incorrect substitution
- Correct final answer (follow-through error) (1 mark)**Exemplar 3**

(3 Marks)

$$\frac{\sin A}{a} = \frac{\sin B}{b}$$
$$\frac{35}{\sin 40} = \frac{b}{\sin 120}$$
$$\sin 120 \times 54.45 = \frac{b}{\sin 120}$$
$$47.155 = b$$

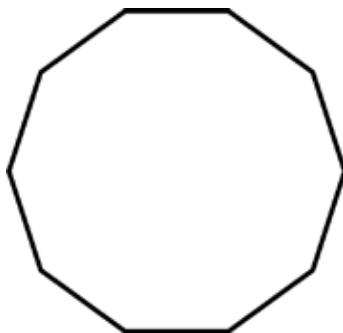
Mark: 3 out of 3**Rationale:** - Correct third angle (1 mark)
- Correct substitution (1 mark)
- Correct answer (1 mark)

Question 25

(2 Marks)

Test Item and Marking Guide

Consider a regular decagon.



- A) State the sum of all interior angles. (1 mark)

Answer:

$$\begin{aligned} S &= 180^\circ(n - 2) \\ &= 180^\circ(10 - 2) \\ &= 1440^\circ \quad \leftarrow 1 \text{ mark} \end{aligned}$$

Note to marker: Units are not required.

- B) State the measure of an interior angle for the regular decagon. (1 mark)

Answer:

Interior angle:

$$\begin{aligned} &\frac{1440^\circ}{10} \\ &= 144^\circ \quad \leftarrow 1 \text{ mark} \end{aligned}$$

Note to marker: Units are not required.

Exemplar 1

(2 Marks)

$$\begin{aligned} \text{A) } S &= 180^\circ (n-2) \\ &= 180^\circ (10-2) \\ &= 180^\circ (8) \\ &= 22.5^\circ \end{aligned}$$

$$\text{B) } 180 \div 10 = 18^\circ$$

Mark: 0 out of 2

Rationale:

- Incorrect answer in Part A
- Incorrect answer in Part B

Exemplar 2

(2 Marks)

$$\text{A) } 180^\circ$$

$$\text{B) } 18^\circ$$

Mark: 1 out of 2

Rationale:

- Incorrect answer in Part A
- Correct answer in Part B (follow-through error) (1 mark)

Exemplar 3

(2 Marks)

$$\text{A) } 360$$

$$\begin{aligned} \text{B) } S(n) &= 180(n-2) \\ S(10) &= 180(10-2) \\ &= 144^\circ \end{aligned}$$

Mark: 1 out of 2

Rationale:

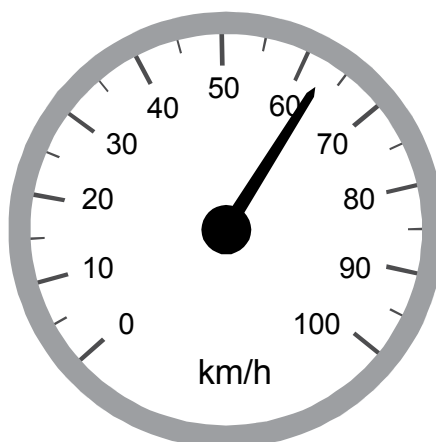
- Incorrect answer in Part A
- Correct answer in Part B (1 mark)

Precision Measurement

Question 26

(2 Marks)

Refer to the following diagram of a speedometer.



- A) State the precision of the speedometer. (1 mark)

Answer:

5 km/h

- B) State the uncertainty of the speedometer. (1 mark)

Answer:

2.5 km/h

Note to marker: \pm not required. Units are not required.

Exemplar 1

(2 Marks)

A) $P=1 \text{ km/h}$ B) $0=0.5 \text{ km/h}$ **Mark: 1 out of 2**

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

Exemplar 2

(2 Marks)

A) 5 km/h B) 25 km/h **Mark: 1 out of 2**

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

Exemplar 3

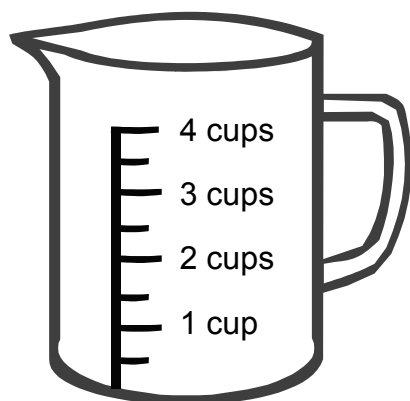
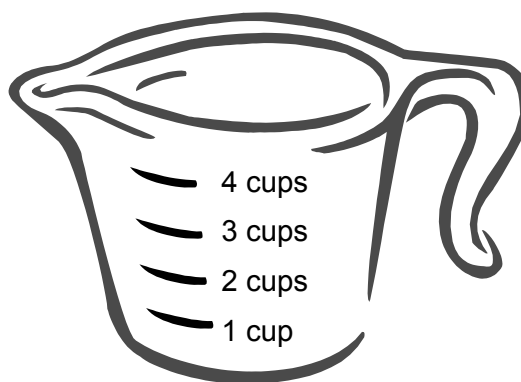
(2 Marks)

A) 5 km/h B) $5 \text{ km/h} \pm 2.5 \text{ km/h}$ **Mark: 1 out of 2**

Rationale: - Correct answer in Part A (1 mark)
- Incorrect answer in Part B (correct answer not clearly indicated)

Question 27**(1 Mark)**

Johnny needs to measure $1\frac{3}{4}$ cups of water to make bread. Justify which of the following measuring cups is more precise.

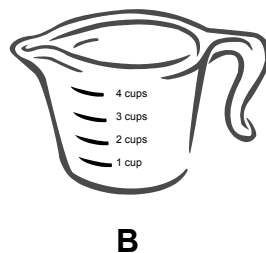
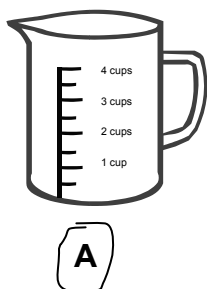
**A****B**

Answer:

Johnny should choose cup A because it has smaller increments shown which makes it more precise.

Exemplar 1

(1 Mark)

**Mark: 0 out of 1****Rationale:** - No justification provided**Exemplar 2**

(1 Mark)

Cup "A" because it is precise to the nearest $\frac{1}{2}$ cup, where as cup "B" is only precise to the nearest cup.

Mark: 1 out of 1**Rationale:** - Correct justification (1 mark)**Exemplar 3**

(1 Mark)

cup A because it gives the half and quarters markings

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

Question 28

(2 Marks)

Test Item and Marking Guide

Jill buys a roll of wallpaper. She uses a measuring device with a precision of 1 cm to measure and cut a 95 cm piece.

- A) State the maximum length of the cut piece of wallpaper. (1 mark)

Answer:

95.5 cm

- B) State the minimum length of the cut piece of wallpaper. (1 mark)

Answer:

94.5 cm

Note to marker: Units are not required.

Exemplar 1

(2 Marks)

A) $95 \text{ cm} \pm 0.5 \text{ mm}$

B) $90 \text{ cm} \pm 0.5 \text{ mm}$

Mark: 0 out of 2

Rationale: - Incorrect answer in Part A
- Incorrect answer in Part B

Exemplar 2

(2 Marks)

A) $95 \text{ cm} + 1 \text{ cm} = 96 \text{ cm}$

B) $95 - 1 \text{ cm} = 94 \text{ cm}$

Mark: 1 out of 2

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

Exemplar 3

(2 Marks)

A) 95 $1 \text{ cm} = 0.5 \text{ cm}$
 $\text{max} = 95 + 0.5 = 95.5$

B) $\text{min} = 95 - 0.5 = 94.5$

Mark: 2 out of 2

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

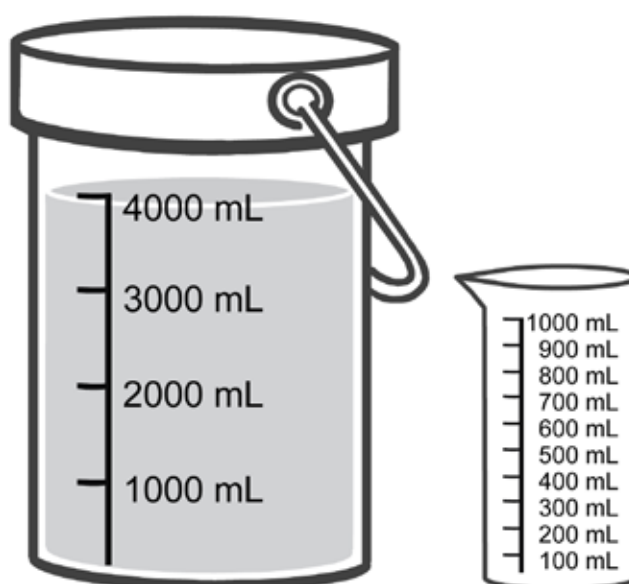
Question 29

(2 Marks)

Colin has a bucket, marked in 1000 mL increments, that he fills with 4000 mL of liquid fertilizer. He wants to remove 300 mL of the liquid fertilizer. He uses a 1000 mL container marked in 100 mL increments.

Calculate the remaining amount of mixture that will be in the bucket in the format:

measurement \pm uncertainty



Answer:

measurement \pm uncertainty

$$4000 \text{ mL} \pm 500 \text{ mL}$$

$$- 300 \text{ mL} \pm 50 \text{ mL}$$

$$\underbrace{3700 \text{ mL}}_{1 \text{ mark}} \pm \underbrace{550 \text{ mL}}_{1 \text{ mark}}$$

Note to marker: Units are not required.

Exemplar 1

(2 Marks)

$$\begin{array}{r} 4000 \text{ ml} \\ - 300 \text{ ml} \\ \hline \pm 3700 \text{ ml} \end{array}$$

Mark: 0 out of 2**Rationale:** - Incorrect answer (uncertainty)**Exemplar 2**

(2 Marks)

$$\begin{array}{ll} p = 100 & u = 50 \\ 4000 - 300 = 3700 & 3700 \pm 50 \text{ ml} \end{array}$$

Mark: 1 out of 2**Rationale:** - Correct answer (measurement) (1 mark)**Exemplar 3**

(2 Marks)

$$\begin{array}{ll} 4000 \text{ ml} & 4000 \pm 0.5 \text{ ml} \\ -300 \text{ ml} & -300 \text{ ml} \pm 0.5 \text{ ml} \\ \hline & 3700 \text{ ml} \pm 1 \text{ ml} \end{array}$$

Mark: 1 out of 2**Rationale:** - Correct answer (measurement) (1 mark)

Question 30

(1 Mark)

Test Item and Marking Guide

Ralph is painting his living room with a custom colour that was created at the paint store by mixing colours. He did not buy enough paint and needs to buy more.

Explain why a degree of accuracy is needed when mixing additional paint to match his original colour.

Answer:

If the colours are not mixed with the correct amounts it will not match the custom colour.

Exemplar 1

(1 Mark)

because it should match the paint of his wall already if it doesn't then his wall will be shaded with lighter/darker spots of the color

Mark: 1 out of 1**Rationale:** - Correct response (1 mark)**Exemplar 2**

(1 Mark)

BECAUSE in order to have the same paint, you must have the same amount of measurements to make the same paint.

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

(1 Mark)

a degree of accuracy is needed because if it is off by a little bit the whole color would be off and Ralph would have to find a new basic color and paint the room all over again for it to match.

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

Statistics

Question 31

(3 Marks)

Test Item and Marking Guide

DBG Manufacturing has 50 employees. The following table shows employee salaries:

Position	Number of Employees	Salary
President	1	\$700 000
Managers	3	\$100 000
Sales Staff	30	\$50 000
Administration	4	\$40 000
Maintenance	5	\$37 000
Secretaries	7	\$35 000

- A) State the mode of the salaries. (1 mark)

Answer:

\$50 000

- B) State which measure of central tendency is most affected by removing the president's salary. Justify your answer. (2 marks)

Answer:

Mean ← 1 mark

The president's large salary increases the total earnings for employees and increases the "average" salary. Mode and median are not affected by the president's salary amount. ← 1 mark

Exemplar 1

(3 Marks)

- A) There will be no mode in this question because no number appears more than once.
- B) When removing the prezidents salary, we are removing the out liar.

Mark: 0 out of 3

Rationale:

- Incorrect answer in Part A
- Incorrect answer in Part B
- Incorrect justification in Part B

Exemplar 2

(3 Marks)

- A) 50 000
- B) mean because then you get the average of everyone's salaries

Mark: 2 out of 3

Rationale:

- Correct answer in Part A (1 mark)
- Correct answer in Part B (1 mark)
- Incorrect justification in Part B

Exemplar 3

(3 Marks)

- A)
- $$\text{Mean} = [(7 \times 35\,000) + (5 \times 37\,000) + (4 \times 40\,000) + (30 \times 50\,000) + (3 \times 100\,000) + 700\,000] \div 50$$
- $$\text{Mean} = [245\,000 + 185\,000 + 160\,000 + 1\,500\,000 + 300\,000 + 700\,000] \div 50$$
- $$\text{Mean} = \$618\,000$$
- $$\text{Mode} = \$50\,000$$
- B) Mean would be most affected because the president's salary is so much more than anybody elses which would significantly drop the mean whereas it wouldn't affect the mode or median at all.

Mark: 3 out of 3

Rationale:

- Correct answer in Part A (1 mark)
- Correct answer in Part B (1 mark)
- Correct justification in Part B (1 mark)

Question 32

(1 Mark)

Connor scored 18/20 on a math test. His mark put him in the 15th percentile. Justify what his percentile rank indicates about the math test.

Answer:

The test was done very well because 85% of the class scored above 18/20.

Exemplar 1

(1 Mark)

15th percentile is really low percentage it was a hard test and most people scored above 18/20.

Mark: 0 out of 1**Rationale:** - Incorrect justification (inconsistent information)**Exemplar 2**

(1 Mark)

that it's easy

Mark: 0 out of 1**Rationale:** - No justification**Exemplar 3**

(1 Mark)

Means the test was easy because he's 15th compared to others

Mark: 0 out of 1**Rationale:** - Incorrect justification

Question 33

(2 Marks)

Ryan has just finished writing a statistics test. There are 40 students in his class and 30 students scored less than Ryan. Calculate Ryan's percentile rank.

Answer:

$$PR = \frac{b}{n} \times 100$$

$$PR = \frac{30}{40} \times 100 \quad \leftarrow 1 \text{ mark for all correct substitutions}$$

$$PR = 75 \quad \text{or} \quad 75th \quad \text{or} \quad PR_{75} \quad \leftarrow 1 \text{ mark}$$

Exemplar 1

(2 Marks)

$$PR = \frac{(30 + 0.5 \times 1)}{40} \times 100$$

$$PR = 31.25$$

$$PR = 32^{\text{th}}$$

Mark: 1 out of 2

Rationale: - Correct substitutions (alternate formula) (1 mark)
- Incorrect answer

Exemplar 2

(2 Marks)

75th percentile**Mark: 1 out of 2**

Rationale: - Correct answer (1 mark)

Exemplar 3

(2 Marks)

$$PR = \frac{b}{n} \times 100$$

$$= \frac{30}{40} = 75\%$$

Mark: 1 out of 2

Rationale: - Correct substitution (1 mark)
- Incorrect answer (incorrect unit)

Exemplar 4

(2 Marks)

$$\frac{30}{40} = 0.75 = 75^{\text{th}} \text{ percentile}$$

Mark: 2 out of 2

Rationale: - Correct substitution (1 mark)
- Correct answer (1 mark)

Question 34

(3 Marks)

Juanita took a Physics course. The following table shows the marks she earned for a project and the weight for each category:

Category	Mark (%)	Weight (%)
Theories	90	40
Communication	60	10
Calculations	70	50

- A) Calculate Juanita's final mark for the project using a weighted mean. (2 marks)

Answer:

Final mark:

$$\begin{array}{rcl} 90 \times 0.40 = 36 & & \\ 60 \times 0.10 = 6 & \left. \vphantom{\begin{array}{l} 90 \times 0.40 = 36 \\ 60 \times 0.10 = 6 \end{array}} \right\} \leftarrow 1 \text{ mark for process} \\ 70 \times 0.50 = \underline{35} & & \\ 77\% & \leftarrow 1 \text{ mark} \end{array}$$

Note to marker: Units are not required.

- B) If Juanita wanted to improve her overall grade, state in which category she should focus her efforts. Justify your answer. (1 mark)

Answer:

Calculations, because they are weighted most heavily.

Exemplar 1

(3 Marks)

- A)
- B) Calculations

Mark: 0 out of 3**Rationale:** - No justification in Part B**Exemplar 2**

(3 Marks)

- A) $90+60+70 \div 3 = 73.33\%$
- B) *She should focus her efforts on calculations. Improving her communication would be a good idea too, but they are only worth 10% of her mark.*

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

(3 Marks)

- A) $36+6+35=77\%$
 \therefore her final mark is 77%
- B) *Calculations because even though it is not the lowest mark it is still lower than some and it counts for more than the others.*

Mark: 3 out of 3**Rationale:** - Correct process in Part A (1 mark)
- Correct answer in Part A (1 mark)
- Correct justification in Part B (1 mark)

Appendix:

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: _____