Grade 12
Essential Mathematics
Achievement Test

Marking Guide

June 2018

Manitoba

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.manitobalrc.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.

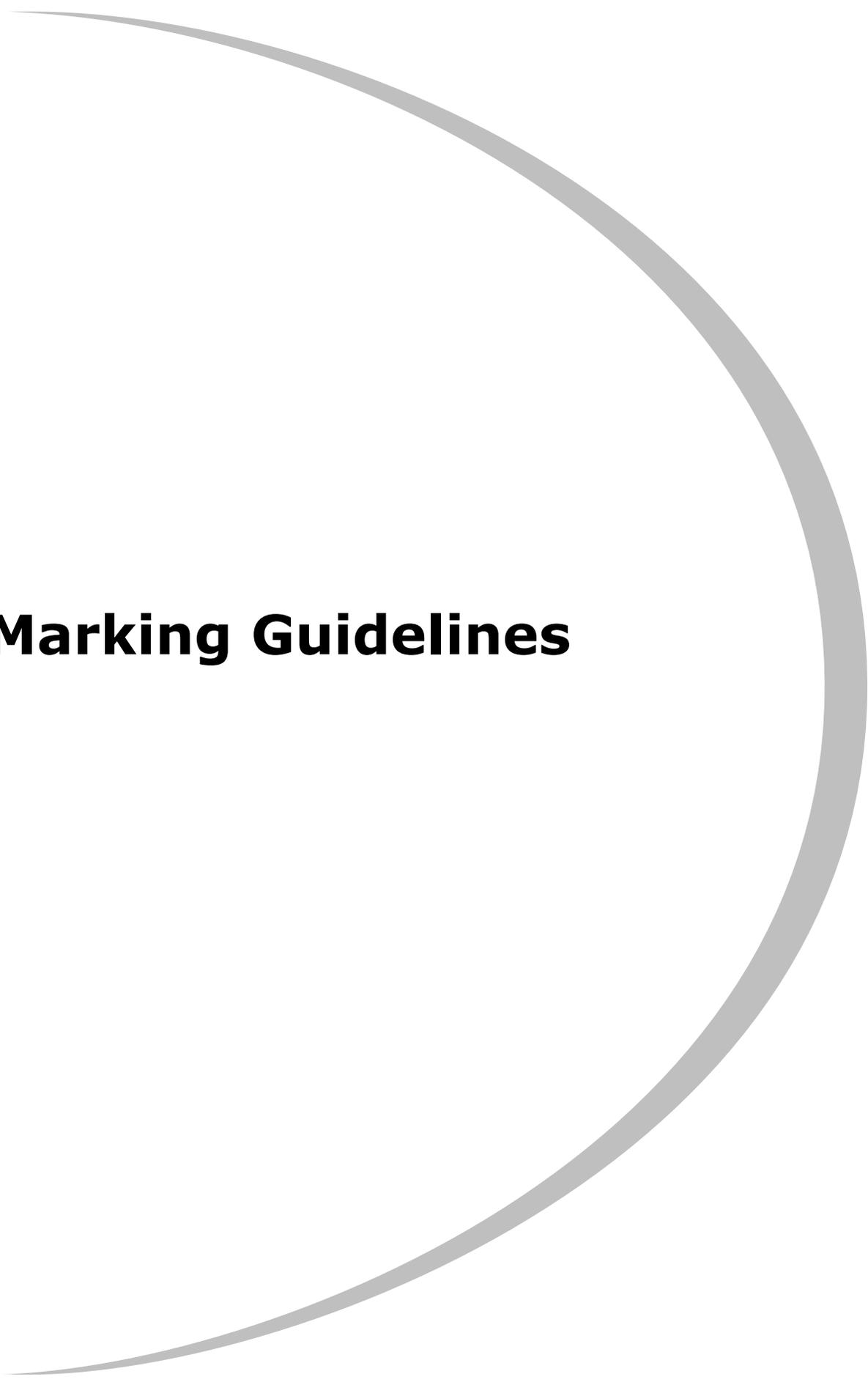Websites are subject to change without notice.

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

The *Grade 12 Essential Mathematics Achievement Test: Marking Guide (June 2018)* is based on *Grades 9 to 12 Mathematics: Manitoba Curriculum Framework of Outcomes* (2014).

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 E6 errors (0.5 mark deduction).

COMMUNICATION ERRORS/ERREURS DE COMMUNICATION	
Shade in the circles below for a maximum total deduction of 3 marks (0.5 mark deduction per error type). Refer to *Marking Guide* for details	Noircir les cercles ci-dessous pour une déduction maximale totale de 3 points (déduction de 0,5 point par type d'erreur). Consultez le *Guide de Correction* pour plus de détails

E1 ●	E2 ○	E3 ○	E4 ○	E5 ○	E6 ●
Final Answer/ Réponse finale	Notation	Transcription/ Transposition	Whole Units/ Unités entières	Units/ Unités	Rounding/ Arrondissement

Test mark / Note au test : $\underline{\quad 56 \quad}$ **–** $\underline{\quad 1 \quad}$ **=** $\underline{\quad 55 \quad}$
76

Preliminary Mark
Note préliminaire

Communication Errors
(maximum 3 marks)
Erreurs de communication
(maximum 3 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.

Jennifer Maw
Assistant Coordinator
Grade 12 Essential Mathematics
Telephone: 204-945-5886
Toll-Free: 1-800-282-8069, ext. 5886
Email: jennifer.maw@gov.mb.ca

Home Finance

Satram's home has an assessed value of $430 000.

A) Calculate the total portioned assessment for the property if the portioned percentage is 45%. (1 mark)

Answer:

$430\ 000 \times 0.45$

$= \$193\ 500$ ← 1 mark

B) The mill rate for the Municipal tax is 24 mills on the portioned assessment.

Calculate the Municipal tax. (1 mark)

Answer:

$\$193\ 500 \times \dfrac{24}{1000}$

$= \$4644$ ← 1 mark

C) In addition to the Municipal tax, there is an Education tax of $3870 and a provincial tax credit of $700.

Calculate the total amount of property tax to be paid. (1 mark)

Answer:

$\$4644 + \$3870 - \$700$

$= \$7814$ ← 1 mark

Note to marker: Award a follow-through mark only if the student adds $3870 to their answer from Part B and subtracts $700. The calculation must be correct.

Exemplar 1 (3 marks)

A) $430\ 000 \times .45 = 193,500$ [E5]

B) $24 \times 193\ 500 = \$4\ 644\ 000$

C) $\$4\ 644\ 000 + 700 = \$4\ 644\ 700$

Mark: 1 out of 3
Rationale: Correct answer in Part A (1 mark)
E5 (does not include units in final answer)
Incorrect answer in Part B
Incorrect answer in Part C

Exemplar 2 (3 marks)

A) $100 \div 45 = 2.22$

$2.22 \div 100 = 0.02$

$430,000 \times .02 = 8600$ (PA)

B) $\dfrac{8600}{1000} \times 24 = 206.40$ [E5]

C) $8600 + 206.40 = \$8806.40$

Mark: 1 out of 3
Rationale: Incorrect answer in Part A
Correct answer in Part B (follow-through error) (1 mark)
E5 (does not include units in final answer)
Incorrect answer in Part C

Exemplar 3   (3 marks)

A) $430\,000 \cdot 0.45 = \$193\,500$

B) $\dfrac{193\,500 \times 24}{1000} = \$4687.20$

C) $\$4687.20$

    $+3870.00$

    $\underline{-\ 700}$

    $\$7857.20$

Mark: 2 out of 3

Rationale: Correct answer in Part A (1 mark)

                Incorrect answer in Part B

                Correct answer in Part C (follow-through error) (1 mark)

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Question 2   E6.H.1   3 marks

George is considering purchasing a home. He earns a gross income of $44 400 annually. The monthly heating costs are $140, the monthly property taxes are $200, and the monthly mortgage payment is $940.

Calculate George's Gross Debt Service Ratio (GDSR).

Answer:

Gross monthly income: $44\ 400 \div 12 = \$3700$

$$GDSR = \frac{\left(\begin{array}{ccc} \text{Monthly} & \text{Monthly} & \text{Monthly} \\ \text{mortgage} + & \text{property} + & \text{heating} \\ \text{payment} & \text{taxes} & \text{costs} \end{array}\right)}{\text{Gross monthly income}}$$

$$= \frac{\$940 + \$200 + \$140}{\$3700} \begin{cases} \text{No mark for 1 correct substitution} \\ \qquad\qquad \textbf{or} \\ \text{1 mark for 2 or 3 correct substitutions} \\ \qquad\qquad \textbf{or} \\ \text{2 marks for all correct substitutions} \end{cases}$$

$$= 0.35 \qquad\qquad \leftarrow 1 \text{ mark}$$

Note to marker: Accept 34.59%. Award a follow-through mark only if a minimum of 2 values are substituted correctly. The calculation must be correct.

Exemplar 1 (3 marks)

$$\frac{940 + 140 + 200}{44\,000} = 0.029$$

Mark: 2 out of 3

Rationale: 3 correct substitutions (1 mark)

Correct final answer (follow-through error) (1 mark)

Note: More than two decimal places are acceptable if rounded correctly.

Exemplar 2 (3 marks)

$$\frac{140 + 200 + 928}{3700} \times 100 = 34\% \quad \boxed{E6}$$

Mark: 2 out of 3

Rationale: 3 correct substitutions (1 mark)

Correct final answer (follow-through error) (1 mark)

E6 (does not express the answer to the appropriate number of decimal places)

Exemplar 3 (3 marks)

$$GDSR = \frac{\$940 + \$140 + \$200}{\$3700} = 0.35 \times 100 = 35\% \quad \boxed{E6}$$

Cannot afford to purchase home.

Mark: 3 out of 3

Rationale: Correct substitutions (2 marks)

Correct final answer (1 mark)

E6 (does not express the answer to the appropriate number of decimal places)

Question 3   E6.H.1   2 marks

Sam is moving out. She must pick between the following two options:

Option	Size	Cost per month
House purchase	1200 square feet	$1400 mortgage payment
Apartment rental	1200 square feet	$1400 rent

A) Explain one possible advantage of purchasing the house. (1 mark)

Sample Answers:

– renovation/customization
– no sharing services (storage space, laundry, etc.)
– building equity
– fewer restrictions (pets, noise, BBQ, etc.)
– private yard

B) Explain one possible advantage of renting the apartment. (1 mark)

Sample Answers:

– repairs are covered by owner
– only have to insure contents
– utilities included in rent
– no yard care
– small initial costs
– easy to relocate if short-term residence is expected

Note to marker: Do not accept "don't have to pay for damages".

Exemplar 1

(2 marks)

A) Can one day own the home.

B) Is an temporary lease because she's only renting

Mark: 0 out of 2
Rationale: Insufficient response in Part A (no reference to why owning is an advantage)

Insufficient response in Part B

Exemplar 2

(2 marks)

A) soon u wont have to pay the mortgage

B) utilitys

Mark: 1 out of 2
Rationale: Correct response in Part A (1 mark)

Insufficient response in Part B

Exemplar 3

(2 marks)

A) You can renovate and make any changes to your house.

B) Don't have to pay property tax or home owner's insurance.

Mark: 2 out of 2
Rationale: Correct response in Part A (1 mark)

Correct response in Part B (1 mark)

Jing-Wei is purchasing a home for $310 000 and will make a down payment of 5%. She will finance the mortgage over 25 years.

A)   Calculate the amount borrowed for the mortgage. (1 mark)

Answer:

Amount borrowed: $310 000 × 0.95
$$= \$294\,500 \qquad \leftarrow 1 \text{ mark}$$

OR

Down payment: $310 000 × 0.05
$$= \$15\,500$$

Amount borrowed: $310 000 − $15 500
$$= \$294\,500 \qquad \leftarrow 1 \text{ mark}$$

B)   Calculate the monthly mortgage payment if it costs $5.26 per month for each $1000 borrowed. (1 mark)

Answer:

Monthly payment: $\dfrac{\$294\,500}{1000} \times 5.26$
$$= \$1549.07 \qquad \leftarrow 1 \text{ mark}$$

C)   Calculate the cost of financing (interest) paid on the 25-year mortgage. (2 marks)

Answer:

Total paid: $1549.07 × 12 × 25 ⎤
$$= \$464\,721 \qquad\qquad ⎦$$
$\leftarrow$ 1 mark (award a follow-through mark only if the monthly payment from Part B is multiplied by 12 and 25)

Total Interest: $464 721 − $294 500
$$= \$170\,221$$
$\leftarrow$ 1 mark (award a follow-through mark only if the amount borrowed from Part A is subtracted from the total paid in Part C)

OR

Total interest paid: $\big(\$1549.07 \times 300\big) - \$294\,500$ $\leftarrow 1$ mark
$$= \$170\,221 \qquad\qquad\qquad\quad \leftarrow 1 \text{ mark}$$

Exemplar 1 (4 marks)

A) $310\,000 \times 0.05 = \$15500$

B) $310\,000 \div 300 + 5.26 = \boxed{\$1038 59} \text{/a month}$

   25 years = 300 months

C) $300 \times 5.26 = \$1578$

   $1578 \times 25 = \$39450$ in interest

Mark: 0 out of 4

Rationale: Incorrect amount borrowed in Part A

Incorrect monthly mortgage calculation in Part B

Incorrect interest in Part C

Exemplar 2 (4 marks)

A) $\$310,000 \times 0.05 = \$15,500$ (downpayment

   $\$310,000 - \$15,500 = \$294,500$

B) $\$294,500/1000 = \$294.50$

   $\$294.50 \times 5.26$

   $= \$1549.07$ monthly mortgage payment

C) Total Interest $\qquad$ $25 \times 12 = 300$ months in 25 years

   (Payments^x = months) - loan

   $(\$1549.07 \times 300) - \$310,000$

   $= \$154,721$

Mark: 3 out of 4

Rationale: Correct amount borrowed in Part A (1 mark)

Correct monthly payment Part B (1 mark)

Correct total paid in Part C (1 mark)

Incorrect total interest in Part C

Exemplar 3

A)

310,000
- 15,500
= $294,500

B)

$$\frac{294.500}{1.000} \times 5.26 \qquad = \$1549.07$$

E6

C) 1549 × 12 × 25 − 294,500

= $170,200

Mark: 4 out of 4

Rationale: Correct amount borrowed in Part A (1 mark)

Correct mortgage payment in Part B (1 mark)

Correct total paid in Part C (1 mark)
E6 (rounds too soon)
Correct interest in Part C (follow-through error) (1 mark)

Question 5   E6.H.1   1 mark

Choose which one of the following costs is an ongoing home ownership cost.

A) moving expenses

B) lawyer fees

C) land transfer tax

D) property tax

Answer: ___D)___

Steve is purchasing a property valued at $230 000. As shown in the chart, he has found that for the first $150 000, the land transfer tax will total $900. The land transfer tax is calculated as follows:

Land Transfer Tax Table		
Value of Property	**Rate (%)**	**Tax Amount ($)**
On the first $30 000	0%	$0
On the next $60 000 (i.e., $30 001 to $90 000)	0.5%	$300
On the next $60 000 (i.e., $90 001 to $150 000)	1.0%	$600
On the next $50 000 (i.e., $150 001 to $200 000)	1.5%	
On amounts in excess of $200 000	2.0%	

A) Calculate the land transfer tax due on the next $50 000. (1 mark)

Answer:

$150 001 to $200 000: $50 000 × 0.015

$$= \$750 \qquad \leftarrow 1 \text{ mark}$$

B) Calculate the land transfer tax due on the amounts in excess of $200 000. (1 mark)

Answer:

$200 001 to $230 000: $30 000 × 0.02

$$= \$600 \qquad \leftarrow 1 \text{ mark}$$

Exemplar 1

(2 marks)

A)	On the next $50 000 (i.e., $150 001 to $200 000)	1.5%	$750 000
B)	On amounts in excess of $200 000	2.0%	$4000

Mark: 0 out of 2
Rationale: Incorrect tax amounts

Exemplar 2

(2 marks)

A)	On the next $50 000 (i.e., $150 001 to $200 000)	1.5%	$750
B)	On amounts in excess of $200 000	2.0%	$4,000

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

Exemplar 3

(2 marks)

A)	On the next $50 000 (i.e., $150 001 to $200 000)	1.5%	$750
B)	On amounts in excess of $200 000	2.0%	$ 30000

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

Sven owns a home. Sven did not move, but in 2017 his house insurance premiums were $100 less than his 2016 premiums.

Describe one possible reason why Sven's premiums were lower in 2017.

Sample Answers:

– changed insurance providers
– updated wiring
– received a rebate for no claims made
– reduced the content coverage
– reduced the third party liability coverage
– changed from comprehensive coverage to basic coverage
– installed alarm system

Exemplar 1 (1 mark)

payed off some insurance

Mark: 0 out of 1
Rationale: Incorrect response

Exemplar 2 (1 mark)

He had a good record

Mark: 0 out of 1
Rationale: Insufficient response

Exemplar 3 (1 mark)

get rid of a fire place less likley to start a fire

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

Probability

A ring is tossed into one of six boxes. With each toss, there is an equal chance for the ring to land in any one of the boxes.

A ring is tossed 100 times with the following results:

Box	Number of times
White	22
Not White	78

A) State the theoretical probability of tossing a ring into the white box. (1 mark)

Answer:

$\dfrac{1}{6}$ or   0.17   or   16.67%   or   one out of six   or   1 : 6

Note to marker: Accept equivalent representations.

B) State the experimental probability of the ring **not** landing in the white box. (1 mark)

Answer:

$\dfrac{78}{100}$ or   0.78   or   78%   or   seventy-eight out of one hundred   or   78 : 100

Note to marker: Accept equivalent representations.

Exemplar 1

(2 marks)

A) $\dfrac{1}{6}$

B) $\dfrac{5}{6}$

Mark: 1 out of 2

Rationale: Correct answer in Part A (1 mark)

Incorrect answer in Part B

Exemplar 2

(2 marks)

A) 1/6 [E1] 1.5

B) 78/100 [E1] 78.22

Mark: 2 out of 2

Rationale: Correct answer in Part A (1 mark)

Correct answer in Part B (1 mark)

E1 (final answer not clearly indicated in parts A and B)

Question 9   E6.P.1 1 mark

The probability of being born with one extra finger or toe is approximately 1 out of 500.

Calculate the probability as a percent.

Answer:

0.2%

Note to marker: Do not award a mark for 0.2 because 0.2 equals 20%.

Exemplar 1

(1 mark)

$1 \div 500 \times 100 = 2\%$

Mark: 0 out of 1
Rationale: Incorrect answer

Exemplar 2

(1 mark)

0.002%

Mark: 0 out of 1
Rationale: Incorrect answer

Exemplar 3

(1 mark)

$\div \dfrac{1}{500} = 0.002$ [E2]

Mark: 1 out of 1
Rationale: Correct answer (1 mark)
E2 (answer expressed in an alternative form than requested)

Stephanie offers horse drawn carriage tours. It costs her $30 per day for feed and care of the horses. Each day she will operate either a premium tour, a standard tour, or no tour at all.

The table below shows the fee for each tour and the probability it will occur each day.

Tour	Fee for the Tour	Probability
Premium	$100	10%
Standard	$50	50%
No tour	$0	40%

Calculate Stephanie's daily expected value.

Answer:

Premium, gain: $100 − $30

$\qquad\qquad = \$70$

Standard, gain: $50 − $30

$\qquad\qquad = \$20$

No tour, loss: $30

$EV = 0.10(\$70) + 0.50(\$20) - 0.40(\$30)$ $\left\{ \begin{array}{l} \text{No mark for 1 or 2 correct substitutions} \\ \textbf{or} \\ \text{1 mark for 3, 4, or 5 correct substitutions} \\ \textbf{or} \\ \text{2 marks for all correct substitutions} \end{array} \right.$

$\quad = \$7 + \$10 - \$12$

$\quad = \$5$ $\leftarrow$ 1 mark

OR

Average winnings: $(0.10 \times \$100) + (0.50 \times \$50) + (0.40)(\$0)$ $\leftarrow$ 1 mark for process

$\qquad\qquad = \$10 + \$25 + \$0$

$\qquad\qquad = \$35$ $\leftarrow$ 1 mark

Expected value: $35 − $30

$\qquad\qquad = \$5$ $\leftarrow$ 1 mark

Note to marker: Award a follow-through mark only if a minimum of three values are substituted correctly.

Exemplar 1

$$E = P(.10) \times 100 - P(.50) \times 50 - P(40) \times 0$$

$$10 \quad - \quad 25$$

$$EV = 15 \quad lose$$

Mark: 1 out of 3

Rationale: Incorrect process

         Correct average winnings (follow-through error) (1 mark)

         Incorrect expected value

Exemplar 2

(3 marks)

$$100 \times 0.1 = \$10$$
$$50 \times 0.5 = \$25$$
$$0 \times 0.4 = 0$$
$$= \$35.00$$

her expected daily value is $35.00.

Mark: 2 out of 3

Rationale: Correct process (1 mark)

         Correct average winnings (1 mark)

         Incorrect expected value

Exemplar 3

(3 marks)

$$25 + 10 + 0 = \$35$$

$$35 \cdot 30 = \$5 \quad \boxed{E1}$$

Mark: 3 out of 3

Rationale: Correct process (1 mark)

         Correct average winnings (1 mark)

         Correct expected value (1 mark)

         E1 (final answer not clearly indicated)

Question 11   E6.P.1   1 mark

In many soccer leagues, the odds in favour of scoring on a penalty kick are 7 to 3.

State the probability, in fraction form, of **not** scoring on a penalty kick.

Answer:

$$\frac{3}{10}$$

Exemplar 1 (1 mark)

E2

30% Probability of not scoring

Mark: 1 out of 1
Rationale: Correct answer (1 mark)
E2 (answer expressed in an alternative form than requested)

Jose cuts down 60 trees per month. Each time he cuts down a tree, there is a 1% probability that he will need to repair his chainsaw.

Calculate how many times Jose should expect to repair his chainsaw in one year.

Answer:

Number of trees in one year = 60 trees × 12 months
                                          = 720 trees per year $\left.\right\}$ ← 1 mark

Number of repairs in one year = 720 × 0.01
                                          = 7.2 repairs
                                          = 7 repairs or 8 repairs   ← 1 mark

Exemplar 1

(2 marks)

$$0.1 \times 60 = 6 \quad \times 12 = 72$$

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

Exemplar 2

(2 marks)

60 trees × 12 months = 720 trees cut

0.01 × 720 = 7.2% of the time

Mark: 1 out of 2
Rationale: Correct number of trees (1 mark)
Incorrect answer

Exemplar 3

(2 marks)

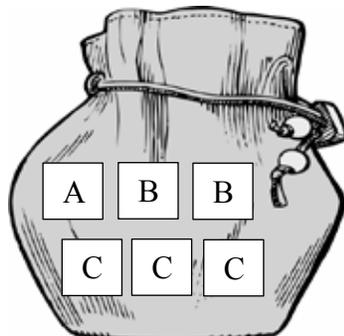$$60 \times 0.01 = 0.6 \times 12 = \text{about } 7 \text{ times}$$

Mark: 2 out of 2
Rationale: Correct answer (2 marks)

Question 13   E6.P.1   1 mark

A bag contains the following tiles:

David removes one ⬛ B tile from the bag and does not return it. He then randomly removes a second tile.

State the odds in favour of this second tile being ⬛ C .

Answer:

$3 : 2$ or   three to two   or   3 to 2

Exemplar 1

(1 mark)

3/5

3:2

E1

Mark: 1 out of 1
Rationale: Correct answer (1 mark)
E1 (final answer not clearly indicated)

Exemplar 2

(1 mark)

3/2

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

Vehicle Finance

Question 14   E5.V.1   1 mark

Choose the letter that best completes the statement below.

One cost Akaps would pay when purchasing a new car that he would **not** have to pay when purchasing a used car privately is:

A)   book value

B)   GST

C)   PST

D)   insurance

Answer: _____B)_____

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Question 15   E5.V.1   4 marks

Melanie purchased a van for $8000, after taxes. She made a down payment of $1500 and is financing the remaining balance.

A) Calculate the total amount Melanie will finance. (1 mark)

Answer:

$8000 – $1500

= $6500   ← 1 mark

B) The bank offers Melanie an annual interest rate of 7% over 5 years to finance the van.

Calculate the amount of interest Melanie will pay on her first month's payment. (2 marks)

Answer:

$I = Prt$

$= \$6500 \times 0.07 \times \dfrac{1}{12}$ ← 1 mark for all correct substitutions

$= \$37.92$ ← 1 mark

Note to marker: Award a mark for a follow-through error only if two of three correct substitutions are made and if all three variables (Prt) are represented.

C) State one way Melanie could reduce the monthly payment for her van. (1 mark)

Sample Answers:

– negotiate a lower interest rate
– get a longer amortization period
– make a larger down payment

Note to marker: Do not accept "buy a cheaper vehicle".

Exemplar 1   (4 marks)

A) $8000 - \$1500 = \$6500$

B)

$$I = Prt$$

$$I = (6500)(0.07)(5)$$

$$I = 2275$$

$$\overline{}$$

$$12 \text{ months}$$

$$= \$189.58$$

5 years = 60 months

C)

Mark: 2 out of 4

Rationale: Correct answer in Part A (1 mark)

Incorrect substitution in Part B
Correct final answer in Part B (follow-through error) (1 mark)
No response in Part C

Exemplar 2   (4 marks)

A) $8000 - 1500 = \$6500$

B) $(0.7/12) \times 6500$

$$= \$379.16$$

C)   She could finance the vehicle over more years

Mark: 3 out of 4

Rationale: Correct answer in Part A (1 mark)

Incorrect substitution in Part B
Correct final answer in Part B (follow-through error) (1 mark)
Correct response in Part C (1 mark)

Exemplar 3 (4 marks)

A) $8000 - 1500 = \$6500$

B) $6500 \times .07 \times 5 = \$2275$

C) Melanie could increase the years in which she wants to finance the van.

Mark: 3 out of 4

Rationale: Correct answer in Part A (1 mark)

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

Correct response in Part C (1 mark)

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Question 16 E5.V.1   2 marks

Maya is purchasing a used car from a dealership for $3500, before taxes. The trade-in value of her old vehicle is $500.

Calculate the total amount Maya will pay for the car, after taxes.

Answer:

Pre-tax amount: $3500 − $500

$\qquad$ = $3000 $\qquad$ ← 1 mark for subtracting trade-in value before taxes

Cost of car after taxes: $3000 × 1.13

$\qquad$ = $3390 $\qquad$ ← 1 mark

Exemplar 1

Car-$3500 × 1.13 = 3,955

Tradein-$500

3955 - 500 = $3455

Mark: 1 out of 2

Rationale: Incorrect pre-tax amount

Correct final answer (follow-through error) (1 mark)

Exemplar 2

$3000 × 0.13 = $390

3000 - 390 = $2910

Mark: 1 out of 2

Rationale: Correct pre-tax value (1 mark)

Incorrect final answer

Question 17 E5.V.1   1 mark

Henry is a long-distance delivery driver in Manitoba who needs a new vehicle. He often drives on gravel roads that damage his car.

Explain one reason why Henry should purchase a new vehicle instead of leasing one.

Sample Answers:

- A new vehicle has unlimited mileage so Henry doesn't have to pay for excess kilometers driven.
- All damage on a lease vehicle must be repaired.
- Henry can make modifications to the vehicle.
- Henry can sell the vehicle.

Exemplar 1
(1 mark)

If he leases he would get charged with fines for constantly damaging the vehicle

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

Exemplar 2
(1 mark)

he gets to keep the vehicle and can sell It if he wants

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

Exemplar 3
(1 mark)

A new vechile is Henry's, so he doesn't pay more to the company when its damaged.

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

Question 18   E5.V.1   2 marks

The distance from The Pas to Calgary is 1174 km. Lloyd's scooter has a fuel economy of 1.9 L/100 km.

Calculate the amount of fuel used if Lloyd drives his scooter from The Pas to Calgary.

Answer:

$$\frac{1.9\ \text{L}}{100\ \text{km}} = \frac{\text{fuel used in litres}}{1174\ \text{km}}$$ ← 1 mark for process

Fuel used in litres = 22.31 L   ← 1 mark

Exemplar 1

(2 marks)

$$22.30 \leftarrow \boxed{E5} \\ \leftarrow \boxed{E6}$$

Mark: 1 out of 2

Rationale: Process not shown

Correct final answer (1 mark)

E5 (does not include units in final answer)

E6 (rounds incorrectly)

Exemplar 2

(2 marks)

$$1.9 L / 100 \, km \times 1174 \, km$$

Mark: 1 out of 2

Rationale: Correct process (1 mark)

Exemplar 3

(2 marks)

$$= \left(\frac{1.9}{100} = \frac{?}{1174} \right) \times \quad \leftarrow 22.306 \quad \boxed{E5}$$

Mark: 2 out of 2

Rationale: Correct process (1 mark)

Correct final answer (1 mark)

E5 (does not include units in final answer)

Note: More than two decimal places are acceptable if rounded correctly.

Question 19 E5.V.1   2 marks

Shawna is at an insurance agency to renew her car insurance policy.

Describe two changes she could make to lower the total cost of her insurance.

Place one response per line.

1. _____

2. _____

Sample Answers:

- decrease 3rd party liability amount
- remove loss of use coverage
- increase her deductible
- change all purpose to pleasure
- pay upfront rather than multiple payments

(2 x 1 mark)

Note to marker: Do not accept "deductible", "third party liability", etc., without a description of the change.

Exemplar 1 (2 marks)

1) Change one of the extra things she's
   Paying towards in her insurance

2)

Mark: 0 out of 2
Rationale: Incorrect responses

Exemplar 2 (2 marks)

1) She will pay less if she gets into
   an accident, and her insurance will
   be cheaper

2) She can get a new vehicle and
   make sure everything is paid on
   time

Mark: 0 out of 2
Rationale: Incorrect responses

Exemplar 3 (2 marks)

1) move

2) install an alarm system

Mark: 0 out of 2
Rationale: Incorrect responses

Serge needs to pay for the following repairs on his vehicle:

Item	Cost of Parts	Labour Time Required
Muffler	$207	0.5 hour
Transmission	$600	2.5 hours

A) Calculate the total labour cost, before taxes, if the service centre charges $110/hour.
     (1 mark)

Answer:

Labour time: 0.5 h + 2.5 h

$\qquad$ = 3 h

Total cost: $110/h × 3 h $\left.\begin{array}{c} \\ \\ \end{array}\right\}$ ← 1 mark

$\qquad$ = $330

B) Calculate the total amount Serge will pay to the service centre, after taxes. (2 marks)

Answer:

Labour and parts costs (pre-tax value): $207 + $600 + $330

$\qquad$ = $1137 $\qquad$ ← 1 mark

Total amout: $1137 × 1.13

$\qquad$ = $1284.81 $\qquad$ ← 1 mark

Exemplar 1

(3 marks)

A) $207 + 600 + 275.5 = 1082.5$

B) $1082.5 \times 1.13 = 1223.225$

Mark: 2 out of 3

Rationale: Incorrect answer in Part A

Correct labour and parts cost in Part B (follow-through error) (1 mark)
Correct total cost in Part B (follow-through error) (1 mark)
E5 (does not include units in final answer)
E6 (does not express the answer to the appropriate number of decimal places)

Exemplar 2

(3 marks)

A) $110 \times 0.5 = \$55$

$110 \times 2.5 = \$275$

B) $55 + 207 = 262$

$600 + 275 = 875$

$1137 \times 1.13 = \$1284.81$

Mark: 3 out of 3

Rationale: Correct answer in Part A (1 mark)

Correct answer in Part B (2 marks)

Exemplar 3 (3 marks)

A) $207 + 600$
    $= 807$ 3×110
                $= 330$ — E5

    $807 + 330$
    1137 — E1

B) 1137×1.13
    $= 1284.81$ — E5

Mark: 3 out of 3

Rationale: Correct answer in Part A (1 mark)
E1 (too much information is presented in the answer and the information is numerically and conceptually correct)
E5 (does not include units in final answer)

Correct answer in Part B (2 marks)
E5 (does not include units in final answer)

Question 21   E5.V.1   2 marks

Chris purchases a snowmobile for $11 500. The snowmobile depreciates at a rate of 15% per year.

A) Calculate the amount of depreciation in the first year. (1 mark)

Answer:

$11 500 × 0.15

= $1725   ← 1 mark

B) Calculate the value of the snowmobile at the end of the first year. (1 mark)

Answer:

$11 500 − $1725

= $9775   ← 1 mark

Exemplar 1 (2 marks)

A)

$$11500$$
$$-\ 1725 \quad \text{E1}$$
$$\$\ 9775$$

B)

$\$\ 8050$

Mark: 1 out of 2

Rationale: Correct answer in Part A (1 mark)

E1 (too much information is presented in the answer and the information is numerically and conceptually correct)

Incorrect answer in Part B

Exemplar 2 (2 marks)

A)

$11500 \times .15 = \$1725$

$11500 - 1725 = \$9775 \quad \text{E1}$

B)

$\$9775$

Mark: 2 out of 2

Rationale: Correct answer in Part A (1 mark)

E1 (too much information is presented in the answer and the information is numerically and conceptually correct)

Correct answer in Part B (1 mark)

Question 22   E5.V.1   2 marks

Odette is purchasing a used vehicle privately. She has some additional costs to pay: $40 for a safety inspection and $15 for a lien search.

Calculate the total for these additional costs, after taxes.

Answer:

Safety inspection, after taxes: $40 × 1.05
                              = $42   ← 1 mark

Total cost: $42 + $15
          = $57   ← 1 mark

OR

Total cost: $(40 × 1.05) + 15$ ← 1 mark
          = $57   ← 1 mark

Note to marker: The total cost mark can only be awarded if the lien search is not taxed.

Exemplar 1

(2 marks)

$$40 + 15 = \$55$$

$$55 \times 1.13 = \$62.15$$

Mark: 0 out of 2

Rationale: Incorrect tax on safety inspection
Incorrect final answer (taxed lien search)

Exemplar 2

(2 marks)

$$\left(\begin{array}{c} 40 \\ \times 0.05 \end{array}\right)$$
$$+ \quad 15$$
$$\overline{\quad \$170 \quad}$$

Mark: 0 out of 2

Rationale: Incorrect safety inspection cost after taxes
Incorrect final answer

Exemplar 3

(2 marks)

$$40 \times 0.05 =$$

$$15 \times 0.$$

$$15 + 40 + tox =$$

$$\$57.^{00}$$

Mark: 2 out of 2
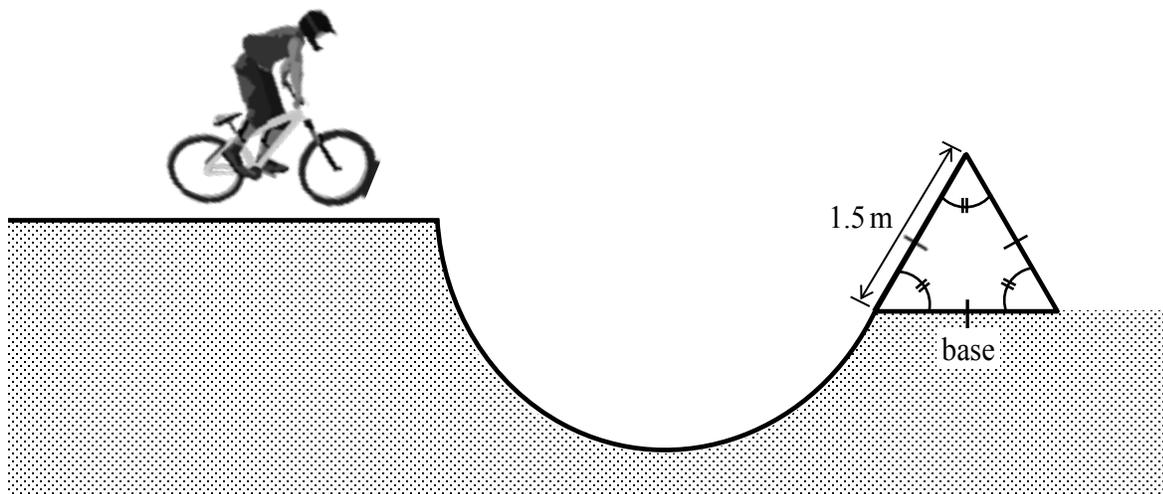
Rationale: Correct tax on safety (1 mark)
Correct final answer (1 mark)

Geometry and Trigonometry

Question 23   E6.G.2   2 marks

An extreme bike rider has constructed a ramp with a 1.5 m long take off as shown below.

A)   State the type of triangle used for the ramp. (1 mark)

Sample Answers:

- acute
- equilateral
- equiangular

B)   State the measure of one of the ramp's base angles. (1 mark)

Answer:

60°

Exemplar 1

A) Isoceles triangle

B) 60° ∠

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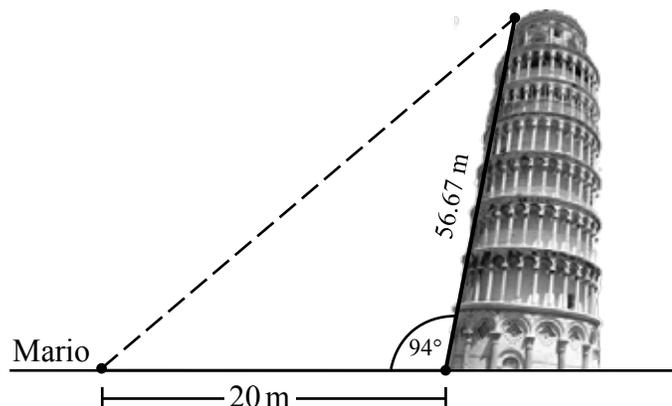
Exemplar 2

(2 marks)

A) right triangle

B) 60% — [E5]

Mark: 1 out of 2
Rationale: Incorrect answer in Part A
         Correct answer in Part B (1 mark)
         E5 (uses incorrect units of measure)

Mario is taking a photo of the Leaning Tower of Pisa from 20 m away. The Leaning Tower of Pisa is on an angle of $4°$ from vertical. The tower is 56.67 m tall.

Calculate the distance from Mario to the top of the tower.

Answer:

$a^2 = b^2 + c^2 - (2bc \cos A)$ ← 1 mark for cosine law

$a^2 = 20^2 + 56.67^2 - \left[(2)(20)(56.67) \cos 94° \right]$

$a^2 = 400 + 3211.4889 - (2266.8) \cos 94°$

$a^2 = 3611.4889 - (-158.123...)$ ← 1 mark for process/substitution

$a = \sqrt{3769.61...}$

$a = 61.40$ m   ← 1 mark

Exemplar 1

<div style="float:right">(3 marks)</div>

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

$$a^2 = 20^2 + 56.67^2 - (2 \times 20 \times 56.67 \times \cos 4°)$$

$$a^2 = 400 + 3211 - (2261$$

$$a^2 = 3611 - 2261$$

$$a^2 = 1350$$

$$a = 36.7°$$

       E5

       E6

Mark: 2 out of 3

Rationale: Correct identification of cosine law (1 mark)

        Incorrect substitutions

        Correct final answer (follow-through error) (1 mark)

        E5 (uses incorrect units of measure)

        E6 (does not express the answer to the appropriate number of decimal places)

Exemplar 2

<div style="float:right">(3 marks)</div>

$$b = 20^2 + 56.67^2 - (2ac\cos B)$$

$$b^2 = 20^2 + 56.67^2 - 2(20)(56.67)\cos 94°$$

$$b^2 = 400 + 3211.49 - 158.12$$

$$b^2 = 3611.49 - 158.12$$

$$\sqrt{b^2} = \sqrt{3453.37}$$

$$b = 58.8m$$

       E6

Mark: 2 out of 3

Rationale: Correct identification of cosine law (1 mark)

        Incorrect process

        Correct final answer (follow-through error) (1 mark)

        E6 (does not express the answer to the appropriate number of decimal places)

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

$$20^2 + 56.67^2 - (2(20)(56.67) \cos 94)$$

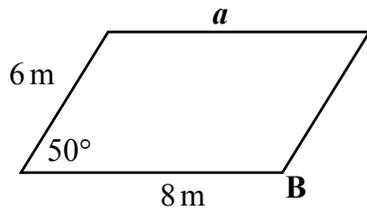$$3769.61$$

$$\simeq 61.4 \, m \quad \boxed{E6}$$

Mark: 3 out of 3

Rationale: Correct answer (3 marks)

E6 (does not express the answer to the appropriate number of decimal places)

Question 25 E6.G.2   2 marks

State the length of side *a* and the measure of angle **B** for the parallelogram below.

Place one response per line.

length of side *a*: _____

measure of ∠B: _____

Answer:
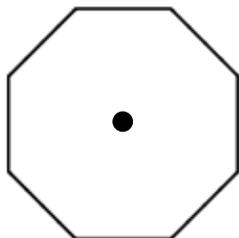
length of side *a*: _____8 m_____ ← 1 mark

measure of ∠B: _____130°_____ ← 1 mark

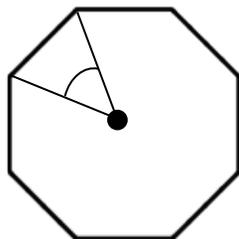## Question 26 E6.G.2   3 marks

Juanita is building a table in the shape of a regular octagon.

A) Sketch and label one of the central angles. (1 mark)

Answer:

B) Calculate the measure of one of the central angles. (1 mark)

Answer:

$$C = \frac{360°}{8}$$

$$= 45° \qquad \leftarrow 1 \text{ mark}$$

C) Calculate the measure of one of the interior angles. (1 mark)

Answer:

$$S = 180°(n - 2)$$
$$= 180°(8 - 2)$$
$$= 180°(6)$$
$$= 1080°$$

$$\frac{1080°}{8}$$
$$= 135° \qquad \leftarrow 1 \text{ mark}$$

OR

$$180° - 45°$$
$$= 135° \qquad \leftarrow 1 \text{ mark}$$

Exemplar 1 $\qquad$ (3 marks)

A) $360 \div 8 = 45°$ Acute

B) $360 \div 8 = 45°$ Acute

C)

Mark: 1 out of 3

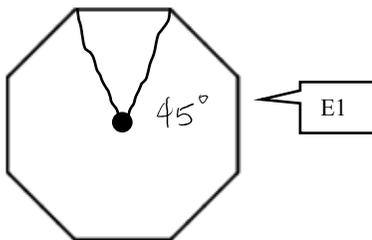**Rationale:** Incorrect answer in Part A (not sketched)

Correct answer in Part B (1 mark)

No answer in Part C

Exemplar 2 $\qquad$ (3 marks)

A)

B) $C = \dfrac{360}{8} = 45°$

C) $180(8-2)$

$= 1080$

Mark: 2 out of 3

Rationale: Correct answer in Part A (1 mark)

E1 (final answer not clearly indicated)
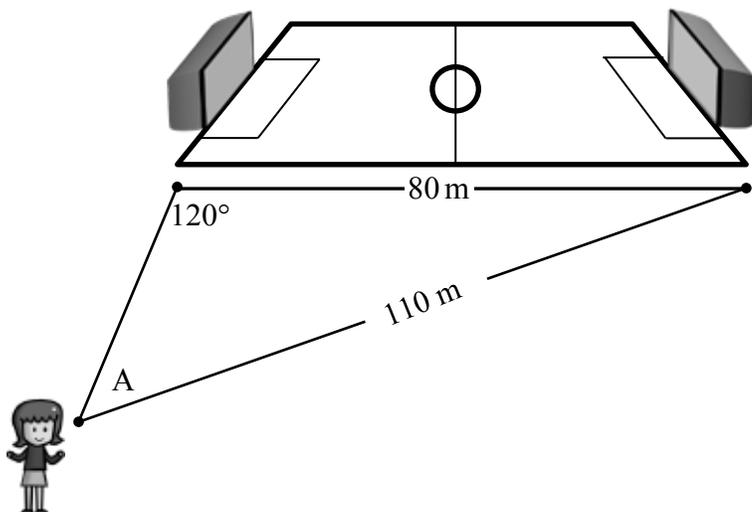
Correct answer in Part B (1 mark)

Incorrect answer in Part C

Maria is watching a soccer match. The following sketch is the view from her seat.

Calculate the measure of angle A.

Answer:

$$\frac{\sin A}{a} = \frac{\sin B}{b}$$ ← 1 mark for sine law

$$\frac{\sin A}{80 \text{ m}} = \frac{\sin 120°}{110 \text{ m}}$$

$$\sin A = \frac{\left(\sin 120°\right)\left(80 \text{ m}\right)}{110 \text{ m}}$$ ← 1 mark for process/substitution

$$\angle A = \sin^{-1}\left(\frac{\left(\sin 120°\right)\left(80 \text{ m}\right)}{110 \text{ m}}\right)$$

$$\angle A = 39.04°$$ ← 1 mark

Exemplar 1 (3 marks)

$$\frac{\sin A}{50} = \frac{\sin 110}{120}$$

$$\sin A \cancel{80} = 0.0072 \times 80$$

$$\sin A = 0.58 \sin$$

$$\sin$$

$$A = 35.26°$$

Mark: 1 out of 3

Rationale: Correct identification of sine law (1 mark)

         Incorrect substitution

         Incorrect final answer

Exemplar 2 (3 marks)

$$\frac{110}{\sin 20} \qquad \frac{80}{\sin A}$$

$$\frac{\sin A}{80} = \frac{\sin 120°}{110}) =$$

$$\sin A = 0.62$$

Mark: 2 out of 3

Rationale: Correct identification of sine law (1 mark)

         Correct substitution (1 mark)

         Incorrect final answer

$$\frac{\sin a}{a} = \frac{\sin B}{b}$$

$$80m \cdot \frac{\sin a}{80m} = \frac{\sin 120°}{110m} \cdot 80m$$

$$\frac{\sin 120° \times 80m}{110m}$$

$$\angle a = 0,6298\ldots$$
$$\angle a = \sin^{-1}(0,6298\ldots)$$
$$\angle a = 39°. \boxed{E6}$$

Mark: 3 out of 3
Rationale: Correct answer (3 marks)
E6 (does not express the answer to the appropriate number of decimal places)

Question 28 E6.G.2   1 mark

Choose which one of the following equations could be used to find the number of diagonals in a pentagon.
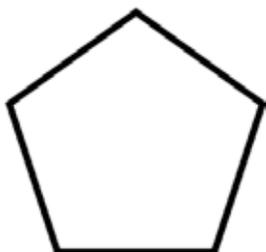
A) $D = \dfrac{5(3-5)}{2}$

B) $D = \dfrac{6(6-3)}{2}$

C) $D = \dfrac{5(3)}{2}$

D) $D = \dfrac{5(2)}{2}$

Answer: ___D)___

Precision Measurement

Given the following measurement:

$$2.5 \text{ mL} \begin{smallmatrix} +0.3 \text{ mL} \\ -0 \end{smallmatrix}$$

State the minimum value.

Do not round the final answer.

Answer:

2.5 mL

Exemplar 1

(1 mark)

$2.5 + 0.3 = \boxed{2.8 \text{ML}}$

Mark: 0 out of 1
Rationale: Incorrect answer

Exemplar 2

(1 mark)

2.2

$2.5 \overset{\text{to}}{\underset{0.3\text{mL}}{}}$

Mark: 0 out of 1
Rationale: Incorrect answer

Exemplar 3

(1 mark)

2.5 ◁ E5

Mark: 1 out of 1
Rationale: Correct answer (1 mark)
      E5 (does not include units in final answer)

Given the following enlarged diagram of a ruler:
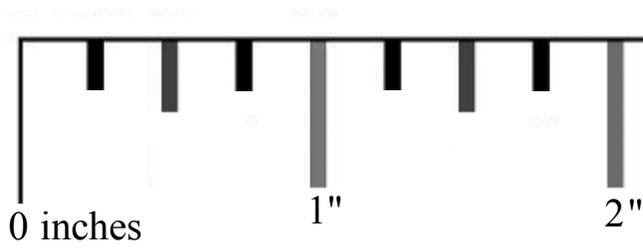
State the precision of the ruler.

Do not round the final answer.

Answer:

$\frac{1}{4}$"

Exemplar 1

(1 mark)

1/8"

Mark: 0 out of 1
Rationale: Incorrect answer

Exemplar 2

(1 mark)

1/4 of an Inch

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

Exemplar 3

(1 mark)

P = 0.25"

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

A door manufacturer states that the measurement of a door is:

$$32" \, {}^{+0}_{-\frac{1}{2}}"$$

State the nominal value of the door.

Do not round the final answer.

Answer:

32"

Exemplar 1

(1 mark)

$$32 - 0.5 = \boxed{31.5}$$

Mark: 0 out of 1
Rationale: Incorrect answer

Exemplar 2

(1 mark)

$$32'' + 0 = 32''$$
$$32 - \tfrac{1}{2}'' = 31.5''$$

Mark: 0 out of 1
Rationale: Incorrect answer

Exemplar 3

(1 mark)

$$32 \pm 0.5$$

$$32 + 0.5 = 32.5$$
$$32 - 0.5 = 31.5$$

Mark: 0 out of 1
Rationale: Incorrect answer

A baker fills a 250 mL measuring cup with sugar.

The true amount of sugar in the measuring cup is 225 mL.

Explain what could have affected the accuracy of the measuring cup.

Sample Answers:

− There are residual ingredients in the cup.
− The measuring cup is dented or damaged.
− The measuring cup was not manufactured accurately.
− The tolerance in manufacturing was 25 mL or more.

Exemplar 1

(1 mark)

Didn't fill it to the top.

Mark: 0 out of 1
Rationale: Incorrect response

Exemplar 2

(1 mark)

not enough sugar added

Mark: 0 out of 1
Rationale: Incorrect response

Exemplar 3

(1 mark)

If the measuring cup is plastic it could have deformed in a way that reduces the total amount of sugar in the cup

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

Joel is cutting a new pair of insoles for his shoes. The true length of the shoes is 25 cm.

Choose which measurement Joel should use so the insoles will fit the shoes the best (not too large or too small).

A) 23.5 ± 1.5 cm

B) 24.0 ± 1.0 cm

C) 24.5 ± 0.5 cm

D) 25.0 ± 1.2 cm

Answer: _____C)_____

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Question 34   E5.P.1   1 mark

A spark plug in a car needs a gap precise to $\frac{1}{100}$ of an inch.

Explain why you should not use the ruler below to measure the gap. (Diagram is enlarged.)

Sample Answers:

- The ruler is not precise enough to measure a $\frac{1}{100}$" hole.
- The uncertainty of the ruler is too large.

Exemplar 1

(1 mark)

The ruler would not give you an accurate reading, it's not flexable either.

Mark: 0 out of 1
Rationale: Incorrect response

Exemplar 2

(1 mark)

you should not use the ruler above because the most precision you can get with the ruler is $\frac{1}{15}$

Mark: 0 out of 1
Rationale: Incorrect response

Exemplar 3

(1 mark)

Markings dont indicate where $\frac{1}{100}(0.01)$ is on ruler

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

Question 35   E5.P.1   2 marks

A welder is joining three pieces of pipe end to end. She measures them using a measuring tape precise to 0.1 cm. The three pieces of pipe are shown below.

5.4 cm   60.3 cm   30.1 cm

Calculate the combined length of the three pipes in the form measurement ± uncertainty.

Do not round the final answer.

Answer:

5.4 ± 0.05 cm

60.3 ± 0.05 cm

$+ \ 30.1 \pm 0.05$ cm

$\underbrace{95.8}_{\text{1 mark}} \ \pm \ \underbrace{0.15}_{\text{1 mark}}$ cm

Exemplar 1

(2 marks)

95.8 ± 0.1 —[E5]

Mark: 1 out of 2

Rationale: Correct measurement (1 mark)

Incorrect uncertainty

E5 (does not include units in final answer)

Exemplar 2

(2 marks)

$5.4 + 60.3 + 30.1 = 95.8 \begin{smallmatrix} +.3 \\ -.3 \end{smallmatrix}$ —[E5]

Mark: 1 out of 2

Rationale: Correct measurement (1 mark)

Incorrect uncertainty

E5 (does not include units in final answer)

Exemplar 3

(2 marks)

5.4 ± 0.1
$\oplus \, 60.3 \pm 0.1 \, \oplus$
30.1 ± 0.1

$\boxed{95.8cm \pm 0.3cm}$

Mark: 1 out of 2

Rationale: Correct measurement (1 mark)

Incorrect uncertainty

Question 36   E5.P.1   1 mark

An employee doing quality control at a screw factory uses the following measurements to check the diameter of the screws.

$$7.85 \text{ mm} \begin{smallmatrix} +0.12 \text{ mm} \\ -0.06 \text{ mm} \end{smallmatrix}$$

State the tolerance of the measurement.

Do not round the final answer.

Answer:

0.18 mm

Exemplar 1

(1 mark)

$$0.18 \div 2 = \boxed{0.0a}$$

Mark: 0 out of 1
Rationale: Incorrect answer

Exemplar 2

(1 mark)

$$7.85 \, {}^{+.12}_{-.00} \, mm = 7.97m$$

$$7.85 \, {}^{+0}_{-.06} = 7.79mm$$

Mark: 0 out of 1
Rationale: Incorrect answer

Exemplar 3

(1 mark)

$$\pm 0.18mm$$

Mark: 0 out of 1
Rationale: Incorrect answer

Statistics

Question 37 E5.S.2   2 marks

A school group went on a weekend ice fishing trip. The following table shows how many fish each student caught and released:

Name	Number of Fish Caught and Released
Jin	45
Sue	16
Dave	13
Tyson	40
Bob	39
Alexa	13

Calculate Sue's percentile rank.

Answer:

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

$$= \frac{2}{6} \times 100 \qquad \qquad \leftarrow 1 \text{ mark for all correct substitutions}$$

$$= 33.3\bar{3}$$

$$\therefore 33 \quad \text{or} \quad 33\text{rd} \quad \text{or} \quad PR_{33} \qquad \leftarrow 1 \text{ mark}$$

or

$$34 \quad \text{or} \quad 34\text{th} \quad \text{or} \quad PR_{34}$$

Note to marker: Award a follow-through mark only if "*b*" or "*n*" is substituted correctly.

Exemplar 1

(2 marks)

$$\frac{4}{6} \times 100 = 66.7\text{th percentile}$$

E4

Mark: 1 out of 2

Rationale: Incorrect substitutions

Correct answer (follow-through error) (1 mark)

E4 (does not use whole units in contextual questions involving discrete data)

Exemplar 2

(2 marks)

$$\frac{2}{3} \times 100 = 66.\bar{6}\%$$

E2

E4

Mark: 1 out of 2

Rationale: Incorrect substitutions

Correct answer (follow-through error) (1 mark)

E2 (incorrect application of percent symbol)

E4 (does not use whole units in contextual questions involving discrete data)

Exemplar 3

(2 marks)

$$2/6 = 33\text{rd percentile}$$

33% are lower scores

Mark: 2 out of 2

Rationale: Correct substitutions (1 mark)

Correct answer (1 mark)

Question 38   E5.S.1   2 marks

A group of 20 students fundraised a total of $3000 for a local charity.

A) Calculate the mean amount of money fundraised by each student. (1 mark)

Answer:

Mean = $3000 ÷ 20

       = $150   ← 1 mark

B) The median amount raised by the group is $120.

Explain why eliminating the highest and the lowest amounts fundraised will not affect the median amount. (1 mark)

Answer:

The omitted amounts will not affect the median because an equal number of values from each side was omitted.

Exemplar 1

(2 marks)

A)

$$\frac{\$3000}{20} = \$150$$

B) Because they all fundraised the same amount.

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

Exemplar 2

(2 marks)

A)

$$3000 \div 20 = \$150 \text{ average / student}$$

B)

because median = arrange all values
from least to greatest and simply
pick center number.

The sides don't affect the
middle #

ex →   30, 35 (38) 39, 46

38 is unaffected
by outside numbers
wether you omit them or not

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

Exemplar 3 (2 marks)

A) $3000 \div 20 = 150$ [E5]

B) u will ~~ot~~ still get the same middle numbers

Mark: 2 out of 2

Rationale: Correct answer in Part A (1 mark)

E5 (does not include units in final answer)

Correct response in Part B (1 mark)

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Question 39 E5.S.1 2 marks

A golf course located near a shopping center may be expanded. A survey is conducted at two locations to determine the percentage of people in favour of the expansion. The table below shows the results of the survey.

Survey Location	Percentage in Favour	Weight
Golf Course	95%	20%
Shopping Centre	35%	80%

Calculate the weighted mean of the percentage in favour of the expansion of the golf course.

Answer:

Golf course: $0.20 \times 95 = 19$
Shopping centre: $0.80 \times 35 = \underline{28}$ } ←1 mark for process

Percentage in favour: 47% ←1 mark

Exemplar 1 (2 marks)

$$\left(95\right)\left(\frac{20}{100}\right) + \left(35\right)\left(\frac{80}{100}\right)$$

$$19 + 20$$

$$= \boxed{39 \text{ people}}$$

Mark: 1 out of 2
Rationale: Correct process (1 mark)
Incorrect answer

Exemplar 2 (2 marks)

$$\frac{(95 \times 20) + (35 \times 80)}{100} = 47\%$$

Mark: 2 out of 2
Rationale: Correct process (1 mark)
Correct answer (1 mark)

Exemplar 3 (2 marks)

$$\frac{95 \times 20 + 35 \times 30}{100} = 47\%$$

Mark: 2 out of 2
Rationale: Correct process (1 mark)
Correct answer (1 mark)

The following table shows the amount of bushels per ton of various crops grown in Manitoba.

Crop	Bushels per Ton
Barley	45.93
Corn	39.37
Oats	68.89
Soya beans	36.74
Wheat	36.74
Sunflower	73.49
Canola	44.09

Calculate the trimmed mean (bushels per ton) of the various crops by eliminating the two highest and the two lowest values.

Answer:

Trimmed mean: $\dfrac{44.09 + 39.37 + 45.93}{3}$

$= \dfrac{129.39}{3}$ ← 1 mark for process

$= 43.13$ bushels per ton   ← 1 mark

Note to marker: Student must have at least one correct value (numerator or denominator) in process to earn a follow-through mark. If the student trims the highest and lowest values and divides by 5, award 1 mark for follow-through error.

$\dfrac{235.02}{5} = 47.00$ bushels per ton

Exemplar 1

(2 marks)

129.39

36.74 , 36.74 , 39.37, 44.09, 45.93, 68.89, 73.49

39.37 + 44.09 + 45.93
= 129.39

Mark: 0 out of 2
Rationale: Incorrect process
Incorrect answer

Exemplar 2

(2 marks)

48.32   bushels per ton

$$\frac{39.37 + 44.09 + 45.93 + 63.89}{4}$$

Mark: 0 out of 2
Rationale: Incorrect process
Incorrect answer

Exemplar 3

(2 marks)

43.13 ◁ E5

Mark: 1 out of 2
Rationale: No process shown
Correct answer (1 mark)
E5 (does not include units on final answer)

In a math class, David received the median score on his math test. Phil's score was at the 75th percentile. No students received the same score.

State the approximate percentage of students who received a score between David's and Phil's.

Answer:

0   *PR* = 50   *PR* = 75   100
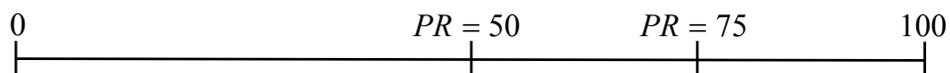
David   Phil

25% of students scored
between David and Phil

or

25%   ←1 mark

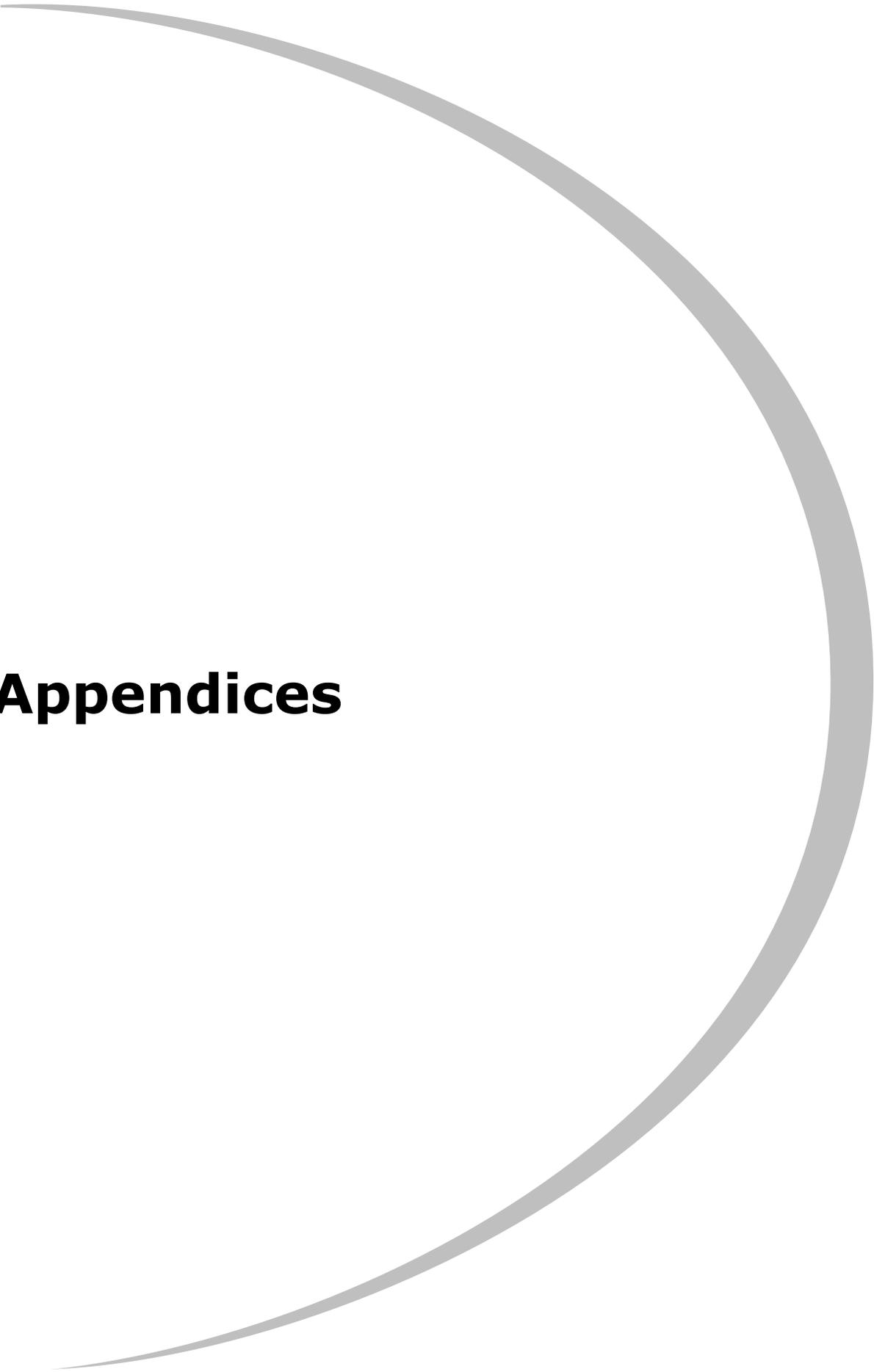## Question 42   E5.S.1   1 mark

Choose the letter that best completes the statement below.

Removing a low outlier:

A)   decreases the mean

B)   increases the mean

C)   has no effect on the mean

D)   decreases the median

Answer: ___B)___

Appendices

Appendix A:
Table of Questions by Unit and Learning Outcome

Home Finance		
Question	**Learning Outcome**	**Mark**
1 a)	E6.H.1	1
1 b)	E6.H.1	1
1 c)	E6.H.1	1
2	E6.H.1	3
3 a)	E6.H.1	1
3 b)	E6.H.1	1
4 a)	E6.H.1	1
4 b)	E6.H.1	1
4 c)	E6.H.1	2
5	E6.H.1	1
6 a)	E6.H.1	1
6 b)	E6.H.1	1
7	E6.H.1	1
		Total = 16
Probability		
Question	**Learning Outcome**	**Mark**
8 a)	E6.P.1	1
8 b)	E6.P.1	1
9	E6.P.1	1
10	E6.P.1	3
11	E6.P.1	1
12	E6.P.1	2
13	E6.P.1	1
		Total = 10
Vehicle Finance		
Question	**Learning Outcome**	**Mark**
14	E5.V.1	1
15 a)	E5.V.1	1
15 b)	E5.V.1	2
15 c)	E5.V.1	1
16	E5.V.1	2
17	E5.V.1	1
18	E5.V.1	2
19	E5.V.1	2
20 a)	E5.V.1	1
20 b)	E5.V.1	2
21 a)	E5.V.1	1
21 b)	E5.V.1	1
22	E5.V.1	2
		Total = 19

Geometry and Trigonometry

Question	Learning Outcome	Mark
23 a)	E6.G.2	1
23 b)	E6.G.2	1
24	E6.G.1	3
25	E6.G.2	2
26 a)	E6.G.2	1
26 b)	E6.G.2	1
26 c)	E6.G.2	1
27	E6.G.1	3
28	E6.G.2	1
		Total = 14

Precision Measurement

Question	Learning Outcome	Mark
29	E5.P.1	1
30	E5.P.1	1
31	E5.P.1	1
32	E5.P.1	1
33	E5.P.1	1
34	E5.P.1	1
35	E5.P.1	2
36	E5.P.1	1
		Total = 9

Statistics

Question	Learning Outcome	Mark
37	E5.S.2	2
38 a)	E5.S.1	1
38 b)	E5.S.1	1
39	E5.S.1	2
40	E5.S.1	2
41	E5.S.2	1
42	E5.S.1	1
		Total = 10

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: _____

_____

_____

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_____

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_____

Follow-up: _____

_____

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Decision: _____

_____

_____

_____

_____

_____

Marker's Signature: _____

Principal's Signature: _____

For Department Use Only—After Marking Complete

Consultant: _____

Date: _____

Appendix C:
Communication 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 (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
- too much information is presented in the answer and the information is numerically and conceptually correct (If contradictory information is provided, no mark is awarded.)

E2 (Notation)

- dimensions written in an alternative form than requested (e.g., write the tolerance in the form $\text{nominal value} \pm \frac{1}{2} \text{ tolerance}$ and student gives $\text{maximum} \, {}^{+\,0}_{-\,\text{tolerance}}$)
- answer expressed in an alternative form than requested (e.g., express probability as a percentage and student gives a decimal form)
- incorrect application of percent symbol

E3 (Transcription/Transposition)

- makes a transcription error (inaccurate transferring of information from one part of the page to another)
- makes a transposition error (changing order of digits)

E4 (Whole Units)

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

E5 (Units)

- uses incorrect units of measure
- does not include units in final answer (e.g., missing dollar sign for monetary values, missing degrees for angles)
- answer stated in gradians or radians instead of degrees

E6 (Rounding)

- rounds incorrectly
- rounds too soon
- does not express the answer to the appropriate number of decimal places (e.g., monetary values are not expressed to two decimal places)