Grade 12
Essential Mathematics
Achievement Test

Marking Guide

January 2024

Manitoba

Grade 12 essential mathematics achievement test.
Marking guide. January 2024

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

Websites are subject to change without notice.

Disponible en français.

Contents

General Marking Instructions

The *Grade 12 Essential Mathematics Achievement Test: Marking Guide (January 2024)* 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 Early Childhood Learning 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 the *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). Consulter le *Guide de Correction* pour plus de details.

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 :	**56**	-	**1**	=	**55** / **76**
	Preliminary Mark Note préliminaire		Communication Errors (maximum 3 marks) Erreurs de communication (maximum 3 points)		

Marking Guidelines

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 simply the 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" 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 Early Childhood Learning 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.

Provincial Assessment Program Unit
Telephone: 204-945-5011
Toll-Free: 1-800-282-8069, ext. 5011 (8:30 a.m. to 4:30 p.m.)
Email: assesseval@gov.mb.ca

Home Finance

Question 1 E6.H.1 4 marks

Gary wants to purchase a house. The annual property taxes will be $3405, the monthly heating costs will be $175, and the monthly mortgage payment will be $1160. His gross pay is $4620 per month.

A) Calculate Gary's Gross Debt Service Ratio. (3 marks)

Show your work.

Answer:

$$\text{Monthly property taxes} = \frac{3405}{12}$$
$$= \$283.75$$

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

$$= \frac{(1160 + 283.75 + 175)}{4620}$$

No mark for 1 correct substitution
or
1 mark for 2 or 3 correct substitutions
or
2 marks for all correct substitutions

$$= \frac{1618.75}{4620}$$
$$= 0.350\,38...$$
$$= 0.35 \quad \text{or} \quad 35.04\% \qquad \leftarrow 1 \text{ mark}$$

B) Justify whether Gary's bank will approve his mortgage. (1 mark)

Sample Answer:

No. His GDSR is greater than 0.32 (32%) and he may have trouble budgeting for other expenses.

Exemplar 1

(4 marks)

A) $\frac{1160 + 3405 + 175}{4620} = 1.026$

B) yes, Gary's bank will approve his mortgage because it's less than 32% of his income.

Mark: 2 out of 4

Rationale: 3 correct substitutions in Part A (1 mark)
Correct final answer in Part A (follow-through error) (1 mark)
Incorrect response in Part B

Exemplar 2

(4 marks)

A)

Annual ↙ monthly ↙

$3405 \div 12 = \$283.75$ or $\$284$

E6

$\frac{1160 + 284 + 175}{4620} = \$1444$ ← GDSR

$1160 - monthly mortage
$175 - monthly heating
$284 - monthly property tax
$4620 - monthly gross pay

B) Yes because he's above 40%.

Mark: 2 out of 4

Rationale: All correct substitutions in Part A (2 marks)
Incorrect final answer in Part A
Incorrect response in Part B
E6 (rounds too soon)

Exemplar 3 (4 marks)

A) $\frac{3405}{12} = 283.75$

$$GDSR = \frac{\text{monthly mortgage payment} + \text{monthly property tax} + \text{monthly heating costs}}{\text{gross monthly income}}$$

$$= \frac{1160 + 283.75 + 175}{4620}$$

$$= 0.31$$

B) yes they will approve because its less than 0.32

Mark: 3 out of 4

Rationale: All correct substitutions in Part A (2 marks)
Incorrect final answer in Part A
Correct response in Part B (follow-through error) (1 mark)

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Question 2 E6.H.1 1 mark

Benoît takes possession of his new house on October 1st. The previous owner paid $2610 in property tax for the entire year.

Calculate Benoît's property tax adjustment for his 3-month portion of the year.

Answer:

$2610 \times \frac{3}{12}$

$= \$652.50$ ← 1 mark

Exemplar 1

(1 mark)

$\frac{2610}{3} = \$870.00$

Mark: 0 out of 1
Rationale: Incorrect answer

Exemplar 2

(1 mark)

$\frac{2610}{12} = \$218.00/month$ E6

$218.00 \times 3 = \$654.00$

Benoit's will have to pay $654.00 for his property tax that year.

Mark: 1 out of 1
Rationale: Correct answer (1 mark)
E6 (rounds too soon)

Question 3 E6.H.1 1 mark

Mary's annual home insurance premium is $823. She adds sewer backup coverage to the policy at a cost of $6.50 per month.

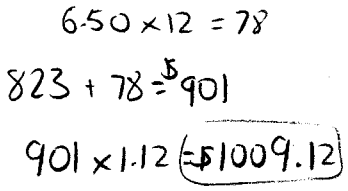
Calculate her total annual insurance cost.

Answer:

$$\begin{aligned}\text{Total cost} &= (6.50 \times 12) + 823 \\ &= 78 + 823 \\ &= \$901 \qquad \leftarrow 1 \text{ mark}\end{aligned}$$

Exemplar 1

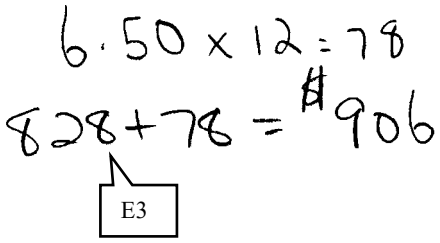
(1 mark)



Mark: 0 out of 1
Rationale: Incorrect answer

Exemplar 2

(1 mark)



Mark: 1 out of 1
Rationale: Correct answer (1 mark)
E3 (makes a transcription error)

Question 4 E6.H.1 3 marks

Sheila has been approved for a $200 000 mortgage. The bank offers her a 4% loan for 20 years with a monthly rate of $6.04 per $1000 borrowed.

A) Calculate Sheila's monthly mortgage payment if she accepts this offer. (1 mark)

Answer:

$$\text{Monthly mortgage payment} = \frac{6.04}{1000} \times 200\ 000$$
$$= \$1208 \qquad \leftarrow 1 \text{ mark}$$

B) Describe two ways that Sheila could reduce her monthly mortgage payment. (2 marks)

Sample Answers:

- She could find a less expensive house.
- She could find a lower interest rate at a different financial institution.
- She could borrow less money by increasing her down payment.
- She could extend the amortization period (a longer amortization period means a lower monthly payment).

(2 × 1 mark)

Exemplar 1

(3 marks)

A) 200 000 X 6.04 = 1,208,000

B) 1. Change the monthly rate

2. Don't borrowed lot of money from the bank

Mark: 1 out of 3

Rationale: Incorrect answer in Part A
Correct responses in Part B (2 marks)

Lack of clarity in both responses in Part B (How should the rate change?) (How can less money be borrowed?) (0.5 mark deduction × 2)

Exemplar 2

(3 marks)

A) $\frac{\$\ 200000}{1000} = 200$

$\$6.04 \times 200 = \$1208$

B) 1. Double the payment if have an ~~extra~~ money

2. pay more than the monthly payment

Mark: 1 out of 3

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

Question 5 E6.H.1 1 mark

Describe one benefit of owning a house rather than renting a similar house.

Sample Answers:

- renovation/customization
- no sharing services (storage space, laundry, etc.)
- build equity
- fewer restrictions (pets, smoke-free environment, etc.)

Exemplar 1	(1 mark)

The house will go up in Value.

Mark: 0 out of 1
Rationale: Incorrect response

Exemplar 2	(1 mark)

owning is cheaper in the long run after paying it out

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

Question 6 E6.H.1 2 marks

A) Lars spends $30 per month to light his warehouse with incandescent bulbs. He will save 75% on his electricity bill if he switches to LED bulbs.

Calculate his monthly savings. (1 mark)

Answer:

$$\text{Savings per month} = 30 \times 0.75$$
$$= \$22.50 \quad \leftarrow 1 \text{ mark}$$

B) The new LED bulbs will cost him $562.50, after taxes.

Calculate how many months it will take for the savings to pay for the bulbs. (1 mark)

Answer:

$$\frac{562.50}{22.50}$$
$$= 25 \text{ months} \quad \leftarrow 1 \text{ mark}$$

Exemplar 1

(2 marks)

A) $30 x 0.75 = $22.5
$30 - 22.5 = 7.5

B) $562.50 / 7.5 = 75 It will take cars 75 months for the savings to pay for the bills

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) $30 x 12 = $360
$360 x 0.75 = $270
$270 / 12 = 22.5 months

E5

B) $562.50 ÷ $30 per month = 18.75
= 19 months

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

Question 7 E6.H.1 3 marks

Kari's property has a market value assessment of $250 000.

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

Answer:

$$\text{Portioned assessment} = 250\,000 \times 0.45$$
$$= \$112\,500 \quad \leftarrow 1 \text{ mark}$$

B) Kari's municipal mill rate is 12.7 mills on the portioned assessment. The education taxes are $1850 and there is a provincial property tax credit of $700.

Calculate the total amount of property tax Kari must pay. (2 marks)

Show your work.

Answer:

$$\text{Municipal tax} = 112\,500 \times \frac{12.7}{1000}$$
$$= \$1428.75 \quad \leftarrow 1 \text{ mark}$$

$$\text{Total tax} = 1428.75 + 1850 - 700$$
$$= \$2578.75 \quad \leftarrow 1 \text{ mark}$$

Exemplar 1

(3 marks)

A) $ 250,000 × .45

= $ 112,500

B) Property tax = $\frac{112,500}{700} \times 1000$ Property tax $\frac{n}{n}$ x100

= $ 160,714.29

Mark: 1 out of 3
Rationale: Correct answer in Part A (1 mark)
Incorrect municipal tax in Part B
Incorrect final answer in Part B

Exemplar 2

(3 marks)

A) 250,000 ×45%

E5 112500 = PA

B) $\frac{1856}{1000} \times 12.7$

23,495
- 700
-$676.505

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

Exemplar 3

(3 marks)

A) $\$250\,000 \times 0.45 = \$112\,500$

B) municipal taxes $= \frac{\$112500}{1000} \times 12.7 = \$1428.75$

Total : $\$1428.75 + \$1850 + \$700$

$= \$3978.75$

Mark: 2 out of 3

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

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Probability

Question 8

E6.P.1 1 mark

Students in a homeroom class must choose one optional course. The following table shows how many students chose each course.

Optional Course	Number of Students
Art	18
Drama	4
Drafting	6

The principal randomly selects one student from the class.

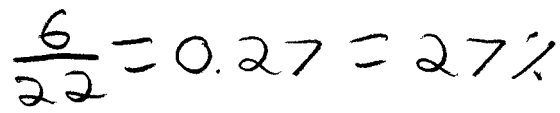
Calculate the experimental probability, as a percent, that this student chose drafting.

Answer:

$\frac{6}{28}$

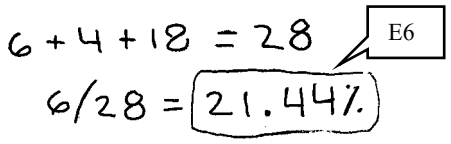
$= 21.43\%$ ←1 mark

Exemplar 1 (1 mark)



Mark: 0 out of 1
Rationale: Incorrect answer

Exemplar 2 (1 mark)



Mark: 1 out of 1
Rationale: Correct answer (1 mark)
E6 (rounds incorrectly)

Question 9 E6.P.1 3 marks

A community centre regularly hosts basketball tournaments. The probability that a team wins the tournament is 20%. The tournament entry fee is \$150. There is a prize valued at \$1200 for the winning team.

Calculate the expected value of participating in the tournament.

Show your work.

Answer:

\$gain: $1200 - 150 = \$1050$

\$loss: \$150

$$
\begin{aligned}
EV &= P(\text{win}) \times \$\text{gain} - P(\text{lose}) \times \$\text{loss} \\
&= \underbrace{(0.20)(1050)}_{1 \text{ mark}} - \underbrace{(0.80)(150)}_{1 \text{ mark}} \\
&= 210 - 120 \\
&= \$90 \qquad \leftarrow 1 \text{ mark}
\end{aligned}
$$

Note to marker: Award one mark for a follow-through error only if two correct values have been used to calculate EV.

OR

Answer:

$$
\begin{aligned}
\text{Average earning} &= (0.20)(1200) \qquad \leftarrow 1 \text{ mark for process} \\
&= \$240 \qquad \leftarrow 1 \text{ mark}
\end{aligned}
$$

$$
\begin{aligned}
EV &= 240 - 150 \\
&= \$90 \qquad \leftarrow 1 \text{ mark}
\end{aligned}
$$

Note to marker: Award one mark for a follow-through error only if "0.20" or "\$1200" has been used to calculate the average earning.

Exemplar 1

(3 marks)

EV = P(win)(gain) − P(lose)(loss)

EV = (20)(1200) − (80)(150)

24000 − 12000

EV = $12000

Mark: 1 out of 3

Rationale: Incorrect *P*(win) × $gain
Incorrect *P*(lose) × $loss
Correct final answer (follow-through error; incorrect representation of probability counts as one incorrect value) (1 mark)

Exemplar 2

(3 marks)

0.20 × 1200 − 0.8 × 150 = 120

∴ $120

Mark: 2 out of 3

Rationale: Incorrect *P*(win) × $gain
Correct *P*(lose) × $loss (1 mark)
Correct final answer (follow-through error) (1 mark)

Exemplar 3

(3 marks)

0.20	×	$1050	−	0.80	×	$150	=	0.90

The participation in the tournament is 90%

Mark: 2 out of 3

Rationale: Correct *P*(win) × $gain (1 mark)
Correct *P*(lose) × $loss (1 mark)
Incorrect final answer

Question 10 E6.P.1 1 mark

The odds **against** purchasing a dress with a defective zipper are 49 : 1.

State the odds in favour of purchasing a dress with a defective zipper.

Answer:

1 : 49

Note to marker: Even though students are encouraged to express odds in the form "for : against", award one mark for odds expressed in the form "$\frac{\text{for}}{\text{against}}$".

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Question 11 E6.P.1 2 marks

Randy plays a game using two regular six-sided dice each numbered 1 to 6. The two dice must be rolled at the same time. To win the game, Randy must roll doubles.
(Example: 1 and 1, 2 and 2, ...)

A) State the theoretical probability, as a fraction, of rolling doubles. (1 mark)

Answer:

$\frac{6}{36}$ or $\frac{1}{6}$

B) Randy rolls the two dice 5 times. The results are shown below:

	Dice A	Dice B
Roll 1	5	3
Roll 2	6	4
Roll 3	4	4
Roll 4	3	1
Roll 5	2	6

State the experimental probability, as a decimal, of rolling doubles. (1 mark)

Answer:

0.2

Exemplar 1

(2 marks)

A) Theoretical probability : $\frac{7}{12}$

B) Experimental probability $= \frac{2}{5} = 0.4$

Mark: 1 out of 2

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

Question 12 E6.P.1 1 mark

Odds represents a comparison between the number of favourable outcomes and the number of unfavourable outcomes.

Explain what probability represents.

Sample Answers:

- Probability is a part–whole relationship.
- $\text{Probability} \rightarrow \dfrac{\text{favourable outcome}}{\text{total possible outcomes}}$
- Probability represents a comparison between the number of favorable outcomes and the total number of outcomes.

Exemplar 1

(1 mark)

Probability of something occuring & not occuring will always equal 1.

Mark: 0 out of 1
Rationale: Incorrect response

Exemplar 2

(1 mark)

probability shows an amount out of the total

Mark: 0.5 out of 1
Rationale: Correct response (1 mark)

Lack of clarity (unclear what "amount" means) (0.5 mark deduction)

Exemplar 3

(1 mark)

Probability is the number of things you want out of the total number of things

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

Exemplar 4

(1 mark)

Probability is comparing the chance of an event occuring and the total number of outcomes.

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

Question 13 E6.P.1 1 mark

A survey of 400 high school students showed that 200 of them have a cell phone.

Identify which of the following answers represents the odds **against** a student having a cell phone.

A) 1 : 1

B) 4 : 2

C) 1 : 2

D) 50%

Answer: A

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Question 14 E6.P.1 2 marks

In a package of 500 beads, Crystal found 5 broken ones.

A) State the probability of randomly picking a broken bead from this package. (1 mark)

Answer:

$\frac{5}{500}$ or 0.01 or 1% or five out of five hundred

Note to marker: Accept equivalent representations.

B) Calculate how many broken beads Crystal would expect to find in a package of 780 beads based on your answer in Part A. (1 mark)

Answer:

$$\frac{5}{500} = \frac{x}{780}$$
$$x = \frac{3900}{500}$$
$$x = 7.8$$
$$= 7 \text{ or } 8 \text{ beads} \quad \leftarrow 1 \text{ mark}$$

Note to marker: "beads" is not required.

Exemplar 1

(2 marks)

A) 500:5

B) 780:7.8

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

Exemplar 2

(2 marks)

A) $5/500$

B) $\frac{5}{500} \times 780$

7.8 beads

E4

Mark: 2 out of 2
Rationale: Correct answer in Part A (1 mark)
Correct answer in Part B (1 mark)
E4 (does not use whole units in contextual questions involving discrete data)

Vehicle Finance

Question 15 E5.V.1 1 mark

Explain why the fuel economy of a vehicle is usually better driving on the highway compared to driving in the city.

Sample Answers:

- frequent starting and stopping in the city requires more fuel
- frequent acceleration in the city requires more fuel
- idling in the city uses fuel while not moving

Exemplar 1

(1 mark)

You drive longer distances but less times than you would in the city, and not to mention how full of traffic the city is.

Mark: 0 out of 1
Rationale: Incorrect response

Exemplar 2

(1 mark)

less stoping and starting.

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

Exemplar 3

(1 mark)

because in the city you stop and go all the time and on the highway its in overdrive and all it has to do is keep the speed not slow down and try pulling the car to get moving again and that works the motor with cost more fuel

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

Question 16 E5.V.1 3 marks

Martina leases a car. The conditions of the lease are shown below.

Conditions of Lease	
Monthly lease payment (after taxes)	\$325
Term	3 years
Sticker price	\$20 000
Residual value	60%

A) Calculate the total cost to lease the car for the 3-year term. (1 mark)

Answer:

$$\text{Total cost} = 325 \times 3 \times 12$$
$$= \$11\,700 \quad \leftarrow 1 \text{ mark}$$

B) At the end of the term, Martina decides to buy out the car.

Calculate the cost to buy out the car, after taxes. (2 marks)

Show your work.

Answer:

$$\text{Residual value} = 20\,000 \times 0.60$$
$$= \$12\,000 \quad \leftarrow 1 \text{ mark}$$

$$\text{Cost to buy out} = 12\,000 \times 1.12$$
$$= \$13\,440 \quad \leftarrow 1 \text{ mark}$$

Exemplar 1

(3 marks)

A) $12 \times 3 = 36 \times 325 = 11700$ E5

B) $8300.00

Mark: 1 out of 3

Rationale: Correct answer in Part A (1 mark)
Incorrect residual value in Part B
Incorrect final answer in Part B
E5 (does not include units in final answer)

Exemplar 2

(3 marks)

A) $325 \times 36 = \$11700$

B) $20000 - 40\% = 12000$

She will need $12000 to buy the car

Mark: 2 out of 3

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

Exemplar 3

(3 marks)

A) $325 \times 36 = \$11700$

B) Residual value $= 20000(0.6)$
$= \$12000$
$12000 \times 1.12 = \$13440$
$+ \quad 11700$
$\$25140$

Mark: 2 out of 3

Rationale: Correct answer in Part A (1 mark)
Correct residual value in Part B (1 mark)
Incorrect final answer in Part B (calculated total cost of lease and buyout)

Question 17 E5.V.1 2 marks

Inara has just purchased a new car worth $24 500. She is told the value of the car will depreciate at a rate of 20% after the first year.

Calculate the value of her car after the first year.

Show your work.

Answer:

Depreciation amount $= 24\ 500 \times 0.20$
$= \$4900$ ←1 mark

Value of car $= 24\ 500 - 4900$
$= \$19\ 600$ ←1 mark

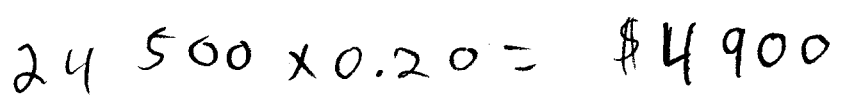
OR

Answer:

Value of car $= 24\ 500 \times 0.80$ ←1 mark for process
$= \$19\ 600$ ←1 mark

Exemplar 1

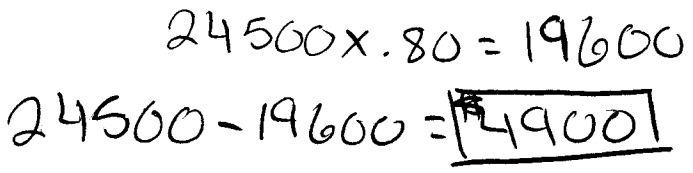
(2 marks)



Mark: 1 out of 2
Rationale: Correct depreciation amount (1 mark)
No value of car calculated

Exemplar 2

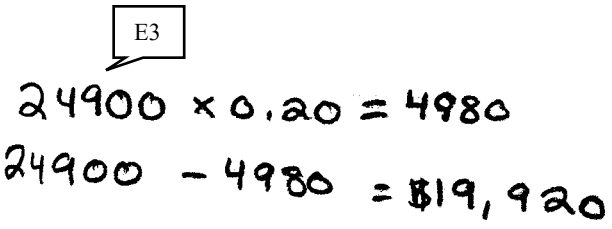
(2 marks)



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

Exemplar 3

(2 marks)



Mark: 2 out of 2
Rationale: Correct depreciation amount (1 mark)
Correct final answer (1 mark)
E3 (makes transcription error)

Question 18 E5.V.1 1 mark

Many dealerships require a security deposit when leasing a new car or truck.

Describe one reason why the entire security deposit may not be refunded when returning the leased vehicle.

Sample Answers:

- not repairing small dents and scratches (damages)
- abnormally dirty interior (excessive cleaning required)

Exemplar 1

(1 mark)

because the vehicle has already
been driven and depricated and
now may not be worth
what it was

Mark: 0 out of 1
Rationale: Incorrect response

Exemplar 2

(1 mark)

Money from the security deposit will be used to repair the car and the entire security deposit may not be refunded.

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

Exemplar 3

(1 mark)

if the car was damaged, for example, a cracked windshield

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

Question 19 E5.V.1 3 marks

René goes to a garage to get the brake pads of his car replaced. The brake pads will cost a total of $70, before taxes. The garage charges $135 per hour for labour and it will take 1.5 hours to complete.

Calculate the total amount René will pay, after taxes.

Show your work.

Answer:

$$\left.\begin{aligned}\text{Labour cost before taxes} &= 1.5 \times 135 \\ &= \$202.50\end{aligned}\right\} \leftarrow 1 \text{ mark}$$

$$\left.\begin{aligned}\text{Subtotal} &= 202.50 + 70 \\ &= \$272.50\end{aligned}\right\} \leftarrow 1 \text{ mark}$$

$$\left.\begin{aligned}\text{Total amount} &= 272.50 \times 1.12 \\ &= \$305.20\end{aligned}\right\} \leftarrow 1 \text{ mark}$$

OR

Answer:

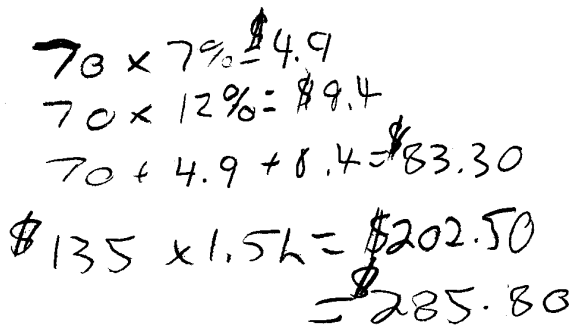
$$\text{Subtotal} = \underbrace{(1.5 \times 135 \times 1.12)}_{\substack{1 \text{ mark for} \\ \text{total labour} \\ \text{cost}}} + \underbrace{(70 \times 1.12)}_{\substack{1 \text{ mark for} \\ \text{total parts} \\ \text{cost}}}$$

$$\begin{aligned}\text{Total amount} &= 226.80 + 78.40 \\ &= \$305.20 \quad \leftarrow 1 \text{ mark}\end{aligned}$$

Note to marker: A final answer of $305.21 is correct; student calculated PST and GST separately.

Exemplar 1

(3 marks)

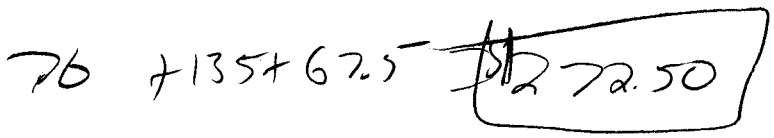


Mark: 2 out of 3

Rationale: Correct labour cost before taxes (1 mark)
Incorrect application of taxes
Correct final answer (follow-through error) (1 mark)

Exemplar 2

(3 marks)

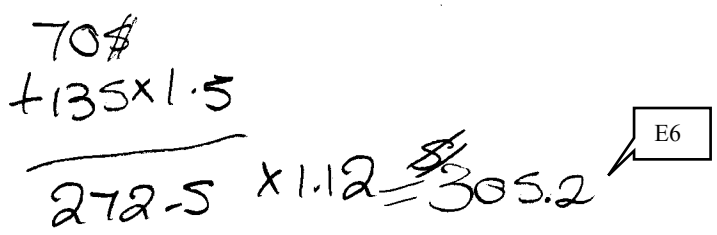


Mark: 2 out of 3

Rationale: Correct labour cost before taxes (1 mark)
Correct subtotal (1 mark)
Incorrect final answer

Exemplar 3

(3 marks)



Mark: 3 out of 3

Rationale: Correct labour cost before taxes (1 mark)
Correct subtotal (1 mark)
Correct final answer (1 mark)
E6 (does not express the answer to the appropriate number of decimal places)

Question 20 E5.V.1 3 marks

Marshall is driving from Winnipeg to Saskatoon, a distance of 780 km. His vehicle uses 70 L of fuel for the trip.

A) Calculate the fuel economy of Marshall's vehicle in L/100 km. (1 mark)

Answer:

$$\frac{\text{L}}{100\text{ km}} = \frac{\text{Fuel used in litres}}{\text{Distance travelled in km}}$$

$$\frac{x}{100} = \frac{70}{780}$$

$$x = \frac{70\,(100)}{780}$$

$$= 8.97 \text{ L/100 km} \quad \leftarrow 1 \text{ mark}$$

B) Marshall continues on to Edmonton, a distance of 530 km from Saskatoon. The fuel economy of his vehicle remains the same.

Calculate how many litres of fuel his vehicle uses from Saskatoon to Edmonton. (2 marks)

Show your work.

Answer:

$$\frac{\text{L}}{100\text{ km}} = \frac{\text{Fuel used in litres}}{\text{Distance travelled in km}}$$

$$\left.\begin{array}{l} \dfrac{8.97}{100} = \dfrac{x}{530} \\ x = \dfrac{8.97\,(530)}{100} \end{array}\right\} \leftarrow 1 \text{ mark for process}$$

$$= 47.54 \text{ L} \quad \leftarrow 1 \text{ mark}$$

Note to marker: A final answer of 47.56 L is also acceptable; student did not use a rounded fuel economy value.

Exemplar 1

(3 marks)

A) $\frac{70L}{780K} \times 100 = 8.97\,L/100Km$

B) $\frac{70L}{534K} \times 100 = 13.20\,L/100km$

Mark: 1 out of 3
Rationale: Correct answer in Part A (1 mark)
Incorrect process in Part B
Incorrect final answer in Part B

Exemplar 2

(3 marks)

A) $\frac{70}{780} \times 100 = 8.97\,L$ E5

B) $8.97 \times 530 = 4754.10\,L$

Mark: 2 out of 3
Rationale: Correct answer in Part A (1 mark)
Incorrect process in Part B
Correct final answer in Part B (follow-through error) (1 mark)
E5 (used incorrect units of measure)

Exemplar 3

(3 marks)

A) $\frac{70}{780} \times 100 =$ E6 $9L/100km$

B) $\frac{9}{100} \times 530 = 47.7L$

Mark: 3 out of 3
Rationale: Correct answer in Part A (1 mark)
Correct process in Part B (1 mark)
Correct final answer in Part B (follow-through error) (1 mark)
E6 (does not express the answer to the appropriate number of decimal places)

Question 21 E5.V.1 1 mark

Darius works full time. He uses his vehicle for driving to work, shopping, and going on vacation.

State the type of car insurance he must buy.

Answer:

All-purpose insurance

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Question 22 E5.V.1 2 marks

Maria buys a used vehicle privately for $14 000, before taxes. The book value of the vehicle is $12 300.

Calculate the total amount Maria will pay for this vehicle, after taxes.

Show your work.

Answer:

$$\text{PST on purchase price} = 14\,000 \times 0.07$$
$$= \$980 \quad \leftarrow 1 \text{ mark}$$

$$\text{Total amount} = 14\,000 + 980$$
$$= \$14\,980 \quad \leftarrow 1 \text{ mark}$$

Note to marker: Award one mark for a follow-through error only if the PST is added to $14 000.

Exemplar 1

(2 marks)

Vehicle cost = $14000

PST on Book value = 12300 x .07 = $861

= $14,000 + $861

= $14,861

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

Exemplar 2

(2 marks)

$14000 x 5% x 7%

$14000 + $760 $9980

= $15680

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

Exemplar 3

(2 marks)

14000 x 1.07 = 14980

E5

Mark: 2 out of 2
Rationale: Correct application of taxes (1 mark)
Correct final answer (1 mark)
E5 (does not include units in final answer)

Question 23 E5.V.1 2 marks

Liane finances the purchase of a new car for $34 500, after taxes. Her monthly payment for the next 4 years will be $779.01.

Calculate the amount of interest Liane will have paid at the end of the 4 years.

Show your work.

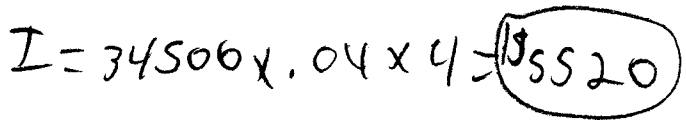
Answer:

$$\text{Total paid} = 779.01 \times 12 \times 4$$
$$= \$37\ 392.48 \quad \leftarrow 1 \text{ mark}$$

$$\text{Total interest paid} = 37\ 392.48 - 34\ 500$$
$$= \$2892.48 \quad \leftarrow 1 \text{ mark}$$

Exemplar 1

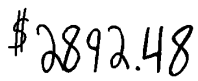
(2 marks)



Mark: 0 out of 2
Rationale: Incorrect total paid
Incorrect final answer

Exemplar 2

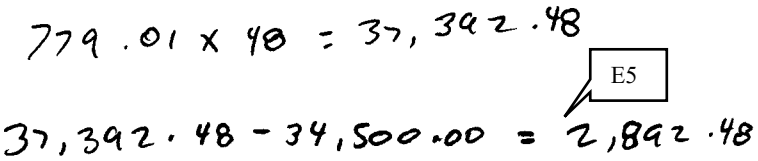
(2 marks)



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

Exemplar 3

(2 marks)



Mark: 2 out of 2
Rationale: Correct total paid (1 mark)
Correct final answer (1 mark)
E5 (does not include units in final answer)

Exemplar 4

(2 marks)

Mark: 2 out of 2
Rationale: Correct total paid (1 mark)
Correct final answer (1 mark)

Geometry and Trigonometry

Question 24 E6.G.2 1 mark

The angle measures of a triangle are 30°, 40°, and 110°.

Identify which option best describes this triangle.

A) isosceles and obtuse

B) equilateral

C) scalene and acute

D) scalene and obtuse

Answer: D

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Question 25 E6.G.2 1 mark

Margo stands a loonie (an 11-sided $1 coin) vertically on a table.

Calculate the measure of the angle, x, that the coin makes with the table.

Answer:

$$\text{Measure of exterior angle} = \frac{360°}{n}$$
$$= \frac{360°}{11}$$
$$= 32.73° \quad \leftarrow 1 \text{ mark}$$

OR

Answer:

$$\text{Measure of one interior angle} = \frac{180°(n-2)}{n}$$
$$= \frac{180°(11-2)}{11}$$
$$= \frac{1620°}{11}$$
$$= 147.27°$$

$$\text{Measure of exterior angle} = 180 - 147.27$$
$$= 32.73° \quad \leftarrow 1 \text{ mark}$$

Exemplar 1 (1 mark)

$$\frac{180(11-2)}{11} = 147.27^\circ$$

Mark: 0 out of 1
Rationale: Incorrect answer (calculated interior angle)

Exemplar 2 (1 mark)

$$\frac{360}{n} = \frac{360}{11} = 32.72$$

E5

E6

Mark: 1 out of 1
Rationale: Correct answer (1 mark)
E5 (does not include units in final answer)
E6 (rounds incorrectly)

Exemplar 3 (1 mark)

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

32.7° E6

Mark: 1 out of 1
Rationale: Correct answer (1 mark)
E6 (does not express the answer to the appropriate number of decimal places)

Question 26 E6.G.2 2 marks

Pedro is designing a logo for his company. The logo will feature all diagonals of a regular decagon (10-sided polygon).

Calculate or illustrate the total number of diagonals that can be drawn.
If illustrating, clearly state the total number of diagonals.

Show your work.

Answer:

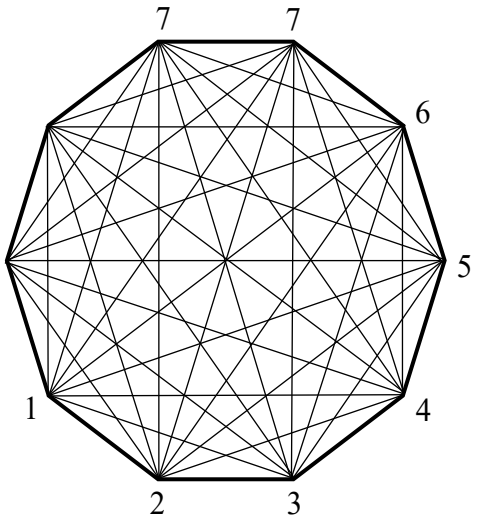
$$D = \frac{n(n-3)}{2}$$
$$= \frac{10(10-3)}{2}$$
$$= \frac{70}{2}$$

← 1 mark for substitution

= 35 diagonals ← 1 mark

OR

Answer:



← 1 mark for process

35 diagonals ← 1 mark

Note to marker: Student does not need to draw all the diagonals to be awarded full marks.

Note to marker: Award one mark if a student correctly identifies that 7 diagonals can be drawn from any one vertex.

Exemplar 1 (2 marks)

$\frac{8(8-3)}{2} = 20$ diagonals

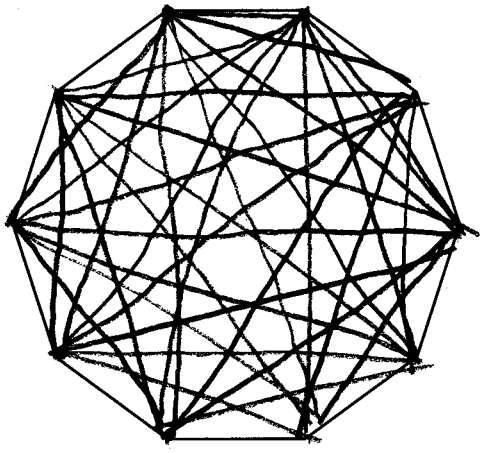
Mark: 1 out of 2
Rationale: Incorrect substitution
Correct final answer (follow-through error) (1 mark)

Exemplar 2 (2 marks)

$\frac{10(10-3)}{2} =$ 32 diagonals

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

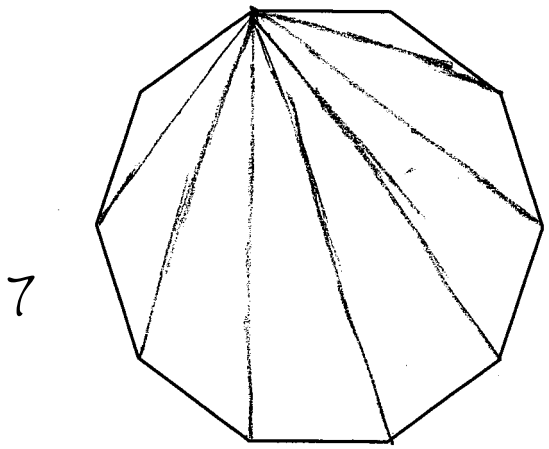
Exemplar 3 (2 marks)



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

Exemplar 4

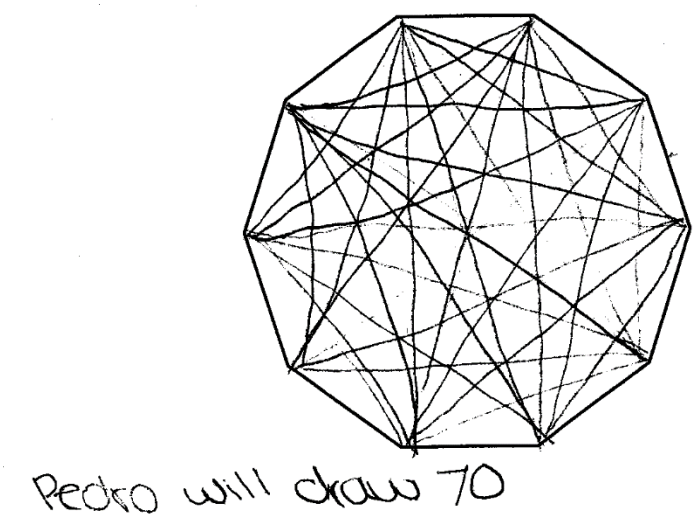
(2 marks)



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

Exemplar 5

(2 marks)



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

Question 27 E6.G.2 1 mark

Identify which of the following quadrilaterals is **not** also a parallelogram.

A) square

B) trapezoid

C) rhombus

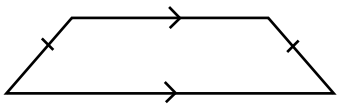
D) rectangle

Answer: B

Question 28 E6.G.2 2 marks

Describe, using words or a labelled diagram, two properties of an isosceles trapezoid.

Sample Answers:

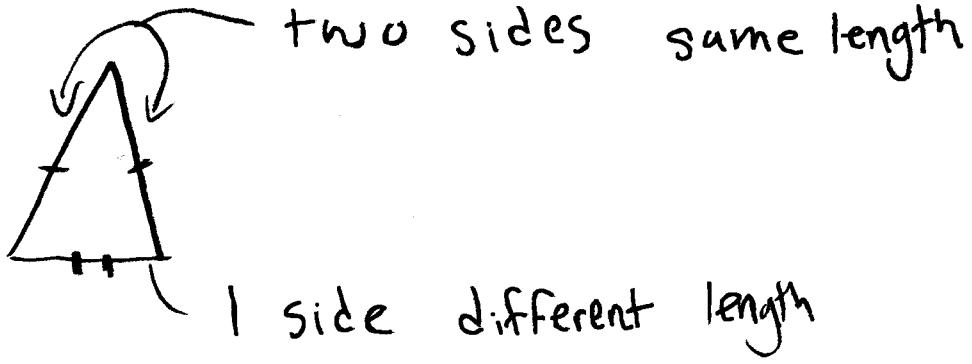
- 
- 

- one pair of opposite sides are parallel
- one pair of opposite sides are congruent
- the base angles are congruent
- the top angles are congruent
- the diagonals are congruent

(2 × 1 mark)

Exemplar 1

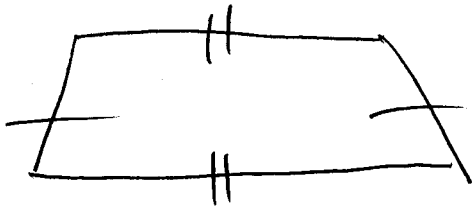
(2 marks)



Mark: 0 out of 2
Rationale: Incorrect responses

Exemplar 2

(2 marks)



Mark: 1 out of 2
Rationale: One property correctly labelled (1 mark)

Exemplar 3

(2 marks)

- 2 sides are equal

- 2 angles are equal

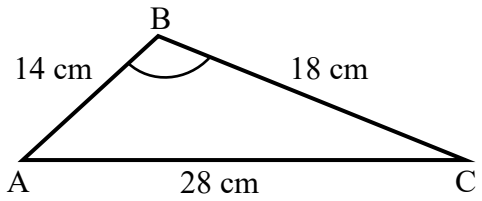
Mark: 1 out of 2
Rationale: Correct first response (1 mark)
Correct second response (1 mark)

Lack of clarity in both responses (Which sides?) (Which angles?)
(0.5 mark deduction × 2)

Question 29 E6.G.1 3 marks

Jacynth bends a wire into a triangular frame. The triangle has sides that measure 14 cm, 18 cm, and 28 cm.

Calculate the measure of $\angle \mathrm{B}$.



Show your work.

Answer:

$$\cos \mathrm{B} = \frac{a^2 + c^2 - b^2}{2ac} \quad \leftarrow 1 \text{ mark for identification of cosine law}$$

$$= \frac{18^2 + 14^2 - 28^2}{2(18)(14)}$$

$$= \frac{-264}{504}$$

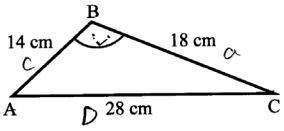
$$\angle \mathrm{B} = \cos^{-1}(-0.523\,809\ldots) \quad \leftarrow 1 \text{ mark for process/substitution}$$

$$= 121.588\,135\,5$$

$$= 121.59° \quad \leftarrow 1 \text{ mark}$$

Exemplar 1

(3 marks)



$\cos A = \frac{28^2 + 14^2 - 18^2}{2(28)(14)} = 0.57 \quad \cos^{-1} = 55^\circ$

Mark: 1 out of 3

Rationale: Correct identification of cosine law (1 mark)
Incorrect substitution
Incorrect final answer

Exemplar 2

(3 marks)

$\cos B = \frac{a^2 + c^2 - b^2}{2bc}$

$= \frac{18^2 + 14^2 - 28^2}{2(18)(14)}$

$\cos B = \frac{264}{504}$

$\cos B = 52.380952380^\circ$

Mark: 2 out of 3

Rationale: Correct identification of cosine law (1 mark)
Correct substitution (1 mark)
Incorrect final answer

Exemplar 3

(3 marks)

Cosine law

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

$b^2 = a^2 + c^2 + 2ac\cos B$

$28^2 = 18^2 + 14^2 - 2(18)(14)\cos$

$\frac{(28^2 - 18^2 - 14^2)}{(-2(18)(14))} = \cos B$

0.523809523

$\cos^{-1}(\text{ans}) = 58$

$\angle\theta = 58$

Mark: 2 out of 3

Rationale: Correct identification of cosine law (1 mark)
Correct substitution (1 mark)
Incorrect final answer

Exemplar 4

(3 marks)

$\cos B = \frac{28^2 + 14^2 - 18^2}{2(18 \times 14)}$

$\frac{784 + 126 - 324}{784}$

$\frac{656}{784}$

$\cos B = 0.8367$

$B = 33.2°$ E6

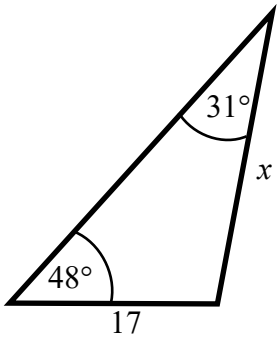
Mark: 2 out of 3

Rationale: Correct identification of cosine law (1 mark)
Incorrect substitution
Correct final answer (follow-through error) (1 mark)
E6 (does not express the answer to the appropriate number of decimals places)

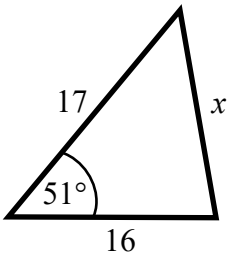
Question 30 E6.G.1 1 mark

Identify which of the following triangles will require the cosine law to solve for x.

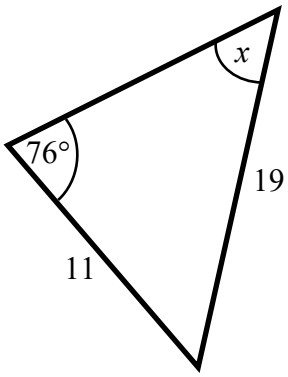
A)



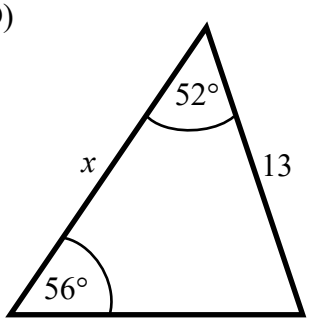
B)



C)



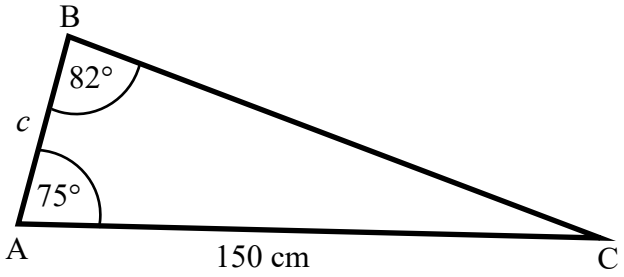
D)



Answer: B

Question 31 E6.G.1 4 marks

Calculate the length of side c.



Show your work.

Answer:

$$\angle C = 180 - 82 - 75$$

$= 23°$ ← 1 mark for calculation of third angle

$$\frac{b}{\sin B} = \frac{c}{\sin C}$$ ← 1 mark for identification of sine law

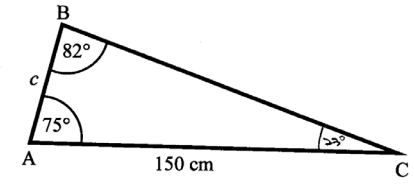
$$\frac{150}{\sin 82°} = \frac{c}{\sin 23°}$$ ← 1 mark for substitution

$$c = \frac{(\sin 23°)(150)}{\sin 82°}$$

$c = 59.19$ cm ← 1 mark

Exemplar 1

(4 marks)

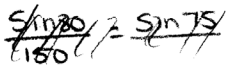


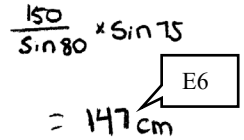
Mark: 1 out of 4

Rationale: Correct calculation of third angle (1 mark)
No identification of sine law
No substitution
No final answer calculated

Exemplar 2

(4 marks)



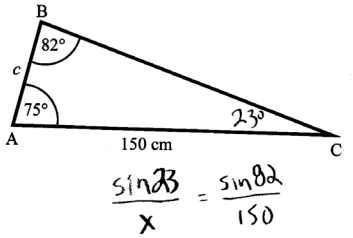


Mark: 2 out of 4

Rationale: No third angle calculated
Correct identification of sine law (1 mark)
Incorrect substitution
Correct final answer (follow-through error) (1 mark)
E6 (does not express the answer to the appropriate number of decimal places)

Exemplar 3

(4 marks)



Mark: 3 out of 4

Rationale: Correct calculation of third angle (1 mark)
Correct identification of sine law (1 mark)
Correct substitution (1 mark)
No final answer calculated

Precision Measurement

Note: Do not round answers in this unit.

Question 32 E5.P.1 1 mark

Archie wants to buy a piece of fabric 120 inches long. The store uses a measuring device with a precision of 0.5 inches to measure the piece of fabric.

State the maximum length of the measured piece of fabric.

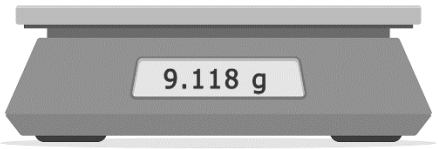
Answer:

$$\text{Uncertainty} = 0.5 \div 2$$
$$= 0.25"$$
$$\text{Maximum length} = 120 + 0.25$$
$$= 120.25" \quad \leftarrow 1 \text{ mark}$$

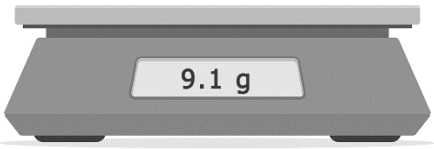
Question 33 E5.P.1 1 mark

Agnes works in a jewellery store. She must weigh each gold ring very carefully. She weighs a gold ring on two different scales. The weights are shown below.

Scale A



Scale B



Identify, from the list below, why she should use Scale A.

A) Scale A has a greater tolerance.

B) Scale A has a greater uncertainty.

C) Scale A is more precise.

D) Scale A is more accurate.

Answer: C

Question 34 E5.P.1 2 marks

Given the following measurements: $\begin{matrix}10.000\,\text{mm}\\9.964\,\text{mm}\end{matrix}$

A) Calculate the tolerance. (1 mark)

Answer:

$10.000 - 9.964$

$= 0.036$ mm ←1 mark

B) Calculate the nominal value, if it is the midpoint between the maximum and minimum. (1 mark)

Answer:

$$\frac{10 + 9.964}{2}$$

$$= \frac{19.964}{2}$$

$= 9.982$ mm ←1 mark

Exemplar 1

(2 marks)

A) $T = 10.000 - 9.964 = 0.036$ E5

B)

Mark: 1 out of 2
Rationale: Correct answer in Part A (1 mark)
No answer in Part B
E5 (does not include units in final answer)

Exemplar 2

(2 marks)

A) $\pm .036$

B) 9.982 E5

Mark: 1 out of 2
Rationale: Incorrect answer in Part A
Correct answer in Part B (1 mark)
E5 (does not include units in final answer)

Exemplar 3

(2 marks)

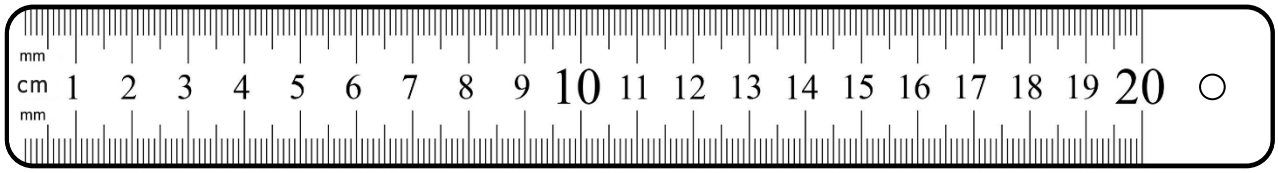
A) 0.018 mm

B) $\frac{10 + 9.964}{2} = 9.982$ mm

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

Question 35 E5.P.1 1 mark

Fannie is measuring floor tiles for her bathroom. She uses the ruler below:



State the precision of her ruler.

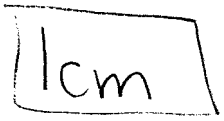
Answer:

1 mm or 0.1 cm

Exemplar 1 (1 mark)

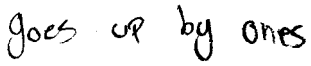
Mark: 0 out of 1
Rationale: Incorrect answer

Exemplar 2 (1 mark)



Mark: 0 out of 1
Rationale: Incorrect answer

Exemplar 3 (1 mark)



Mark: 0 out of 1
Rationale: Insufficient answer

Exemplar 4 (1 mark)

Mark: 0 out of 1
Rationale: Insufficient answer

Exemplar 5 (1 mark)

Mark: 0 out of 1
Rationale: Insufficient answer

Exemplar 6 (1 mark)

Mark: 0 out of 1
Rationale: Incorrect answer

Question 36 E5.P.1 1 mark

Identify from the list below the difference between accuracy and precision.

A) Accuracy is how close you are to the true value.
Precision is the range of acceptable measurements.

B) Accuracy is the range of acceptable measurements.
Precision is how close you are to the true value.

C) Accuracy is the smallest increment you can measure with a device.
Precision is how close you are to the true value.

D) Accuracy is how close you are to the true value.
Precision is the smallest increment you can measure with a device.

Answer: D

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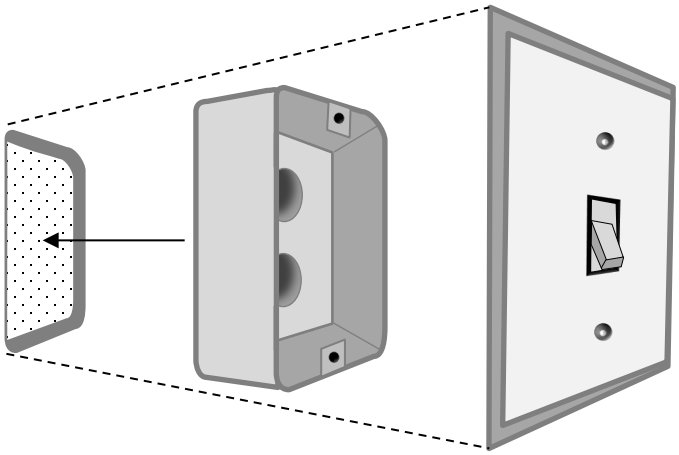
Question 37 E5.P.1 2 marks

Walter needs to cut a rectangular hole in the wall to install a switch box. The height of the hole must be at least 83 mm and cannot be more than 97 mm. A switch plate is used to cover the hole.



Rectangular Hole in Wall | Switch Box | Switch Plate

A) State the height of the rectangular hole in the form: minimum $^{+\text{tolerance}}_{-\ 0}$ (1 mark)

Answer:

83 mm $^{+14\text{ mm}}_{-\ 0}$

B) Explain one reason why it is important to stay within the tolerance range when cutting the hole. (1 mark)

Sample Answers:

- If the hole is too small, the switch box will not fit.
- If the hole is too large, the switch plate won't hide the hole.

Exemplar 1

(2 marks)

A)

B) Because if the hole is too small the switch box won't fit.

Mark: 1 out of 2
Rationale: No answer in Part A
Correct response in Part B (1 mark)

Exemplar 2

(2 marks)

A) $96.5 \begin{matrix} +0.5 \\ -0 \end{matrix}$

B) Because if you go over or under the piece would not fit correctly

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

Exemplar 3

(2 marks)

A) $97 - 83 = 14$

$83 \begin{matrix} +14 \\ -0 \end{matrix}$ E5

B) Its important so you don't have it too small or too big

Mark: 1 out of 2
Rationale: Correct answer in Part A (1 mark)
Insufficient response in Part B
E5 (does not include units in final answer)

Statistics

Question 38 E5.S.1 1 mark

Explain how a set of data could have no mode.

Sample Answers:

- There is no mode if none of the data points repeat (example: 1, 2, 3, 4, 5).
- There is no mode if each data point occurs the same number of times.

Exemplar 1 (1 mark)

all different answers

Mark: 0.5 out of 1
Rationale: Correct response (1 mark)

Lack of clarity ("answers") (0.5 mark deduction)

Exemplar 2 (1 mark)

Median = middle
mode = repeat
mean = all add up

If all the number doesn't repeat.

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

Exemplar 3 (1 mark)

1 2 3 4 5 6 = no mode

1 (22) 4 5 6 = has mode

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

Question 39 E5.S.2 2 marks

The table below shows the number of students in a math class and their marks on a quiz.

Marks	50–59%	60–69%	70–79%	80–89%	90–100%
Number of Students	2	6	1	8	4

Jen, the only student who received a mark between 70% and 79%, calculated her percentile rank as follows:

$$PR = \frac{9}{21} \times 100 = 42.86$$

Describe two mistakes she made in her solution.

Answers:

- The numerator b in the formula $\frac{b}{n} \times 100$ is 8 not 9.
- Percentile ranks are rounded to a whole number. Jen should round her answer to:

  42 or 42nd or PR_{42}

  or

  43 or 43rd or PR_{43}

(2 × 1 mark)

Exemplar 1

(2 marks)

she included her self

Mark: 0.5 out of 2
Rationale: Correct response (1 mark)

Lack of clarity (unclear where she included herself) (0.5 mark deduction)

Exemplar 2

(2 marks)

She miscalculated the number of students below her, and excluded 0/0

Mark: 1 out of 2
Rationale: Correct first response (1 mark)
Incorrect second response (%)

Exemplar 3

(2 marks)

for percentile, she made the mistake of using decimals and there 8 students below her mark, not 7as she indicated.

Mark: 2 out of 2
Rationale: Correct first response (1 mark)
Correct second response (1 mark)

Question 40 E5.S.1 4 marks

The table below shows the weight, in kilograms, of suitcases on a flight from Flin Flon to Winnipeg.

Weights of Suitcases (kg)					
13	11	15	16	16	18
20	16	50	19	20	17

A) Calculate the median weight. (1 mark)

Answer:

$\frac{16+17}{2}$

$= 16.5 \text{ kg}$ ← 1 mark

B) Identify the outlier in the data set. (1 mark)

Answer:

50 kg

C) Calculate the trimmed mean by removing the lightest and heaviest weights in the data set. (2 marks)

Show your work.

Answer:

$\frac{13+15+16+16+16+17+18+19+20+20}{10}$ ← 1 mark for process

$= \frac{170}{10}$

$= 17 \text{ kg}$ ← 1 mark

Note to marker: Award one mark for a follow-through error only if the numerator or denominator is correct.

Exemplar 1

(4 marks)

A)

Weights of Suitcases (kg)					
13	~~11~~	15	16	16	~~18~~
20	16	~~50~~	19	20	17

19

B) 50 E5

C) 17 E5

Mark: 2 out of 4

Rationale: Incorrect answer in Part A
Correct answer in Part B (1 mark)
No process shown in Part C
Correct final answer in Part C (1 mark)
E5 (does not include units in final answer)

Exemplar 2

(4 marks)

A)

Weights of Suitcases (kg)					
~~13~~	~~11~~	~~15~~	~~16~~	~~16~~	~~18~~
20	~~16~~	50	~~19~~	20	~~17~~

11, 13, 15, 16, 16, 16, 17, 18, 19, 20, 20, 50

$\frac{17+16}{2}$

$= 16.5$ kg

B) 50 kg

C) $\text{m} = \frac{231}{12} = 19.25$

$231 - 50 - 11 = \frac{200}{10} = 20$

Mark: 3 out of 4

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

Exemplar 3

(4 marks)

A)

Weights of Suitcases (kg)					
13 1	11 2	15 3	16 4	16 5	18 8
20 11	16 6	50	19 10	20 9	17 7

11 13 15 16 16 16 17 18 19 20 20 50

$\frac{33}{2} = 16.5$ % median

E5

B) 50% E5

C) 13 15 16 16 16 17 18 19 20 20

$\frac{170}{10} = 17$ % E5

Mark: 4 out of 4

Rationale: Correct answer in Part A (1 mark)
Correct answer in Part B (1 mark)
Correct process in Part C (1 mark)
Correct final answer in Part C (1 mark)
E5 (uses incorrect units of measure; student incorrectly applied the percent symbol as a unit of measure)

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Question 41 E5.S.1 2 marks

Ms. Lee took a university math course. Her results are shown in the table below.

Results		
Category	**Mark (out of 100)**	**Weight**
Test 1	80	40%
Test 2	30	10%
Exam	40	50%

Calculate her final mark using a weighted mean.

Show your work.

Answer:

$(80 \times 0.40) + (30 \times 0.10) + (40 \times 0.50)$
$= 32 + 3 + 20$ ← 1 mark for process

$= 55$ ← 1 mark

Exemplar 1

(2 marks)

Results		
Category	**Mark (out of 100)**	**Weight**
Test 1	80	40%
Test 2	30	10%
Exam	40	50%

$80 \times \frac{40}{100} = 32$

$(80 \times 40) + (30 \times 10) + (40 \times 50) = 5500$

3200 300 2000

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

Exemplar 2

(2 marks)

32
3
20

18,33

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

Exemplar 3

(2 marks)

Results		
Category	**Mark (out of 100)**	**Weight**
Test 1	80 ✗	40%
Test 2	30 ✗	10%
Exam	40 ✗	50%

32
3
20
55%

55%

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

Appendices

Appendix A:
Table of Questions by Unit and Learning Outcome

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

Geometry and Trigonometry		
Question	**Learning Outcome**	**Mark**
24	E6.G.2	1
25	E6.G.2	1
26	E6.G.2	2
27	E6.G.2	1
28	E6.G.2	2
29	E6.G.1	3
30	E6.G.1	1
31	E6.G.1	4
		Total = 15

Precision Measurement		
Question	**Learning Outcome**	**Mark**
32	E5.P.1	1
33	E5.P.1	1
34 a)	E5.P.1	1
34 b)	E5.P.1	1
35	E5.P.1	1
36	E5.P.1	1
37 a)	E5.P.1	1
37 b)	E5.P.1	1
		Total = 8

Statistics		
Question	**Learning Outcome**	**Mark**
38	E5.S.1	1
39	E5.S.2	2
40 a)	E5.S.1	1
40 b)	E5.S.1	1
40 c)	E5.S.1	2
41	E5.S.1	2
		Total = 9

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 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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_____

Follow-up: _____

_____

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Decision: _____

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Marker's Signature: _____

Principal's Signature: _____

For Department Use Only—After Marking Complete

Consultant: _____

Date: _____

Appendix C:
Marking Guidelines

A 0.5 mark deduction will apply each time there is a lack of clarity in written responses.

Communication Errors

The following errors, which are not conceptually related to the learning outcomes associated with the question, may 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 nominal value $\pm$ half tolerance and student gives 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)

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)