

Grade 12
Essential Mathematics
Achievement Test

Marking Guide

January 2015

Manitoba Education and Advanced Learning Cataloguing in Publication Data

Grade 12 essential mathematics achievement test.
Marking Guide. January 2015 [electronic resource]

ISBN: 978-0-7711-5877-3

1. Educational tests and measurements—Manitoba.
 2. Mathematical ability—Testing.
 3. Mathematics—Examinations, questions, etc.
 4. Mathematics—Study and teaching (Secondary)—Manitoba.
- I. Manitoba. Manitoba Education and Advanced Learning.
510.76

Manitoba Education and Advanced Learning
School Programs Division
Winnipeg, Manitoba, Canada

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Websites are subject to change without notice.

Disponible en français.

Available in alternate formats upon request.

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Marking Guidelines

The *Grade 12 Essential Mathematics Achievement Test: Marking Guide (January 2015)* is based on *Grades 9 to 12 Mathematics: Manitoba Curriculum Framework of Outcomes (2009)*.

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

The recommended procedure for scoring student responses is as follows:

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

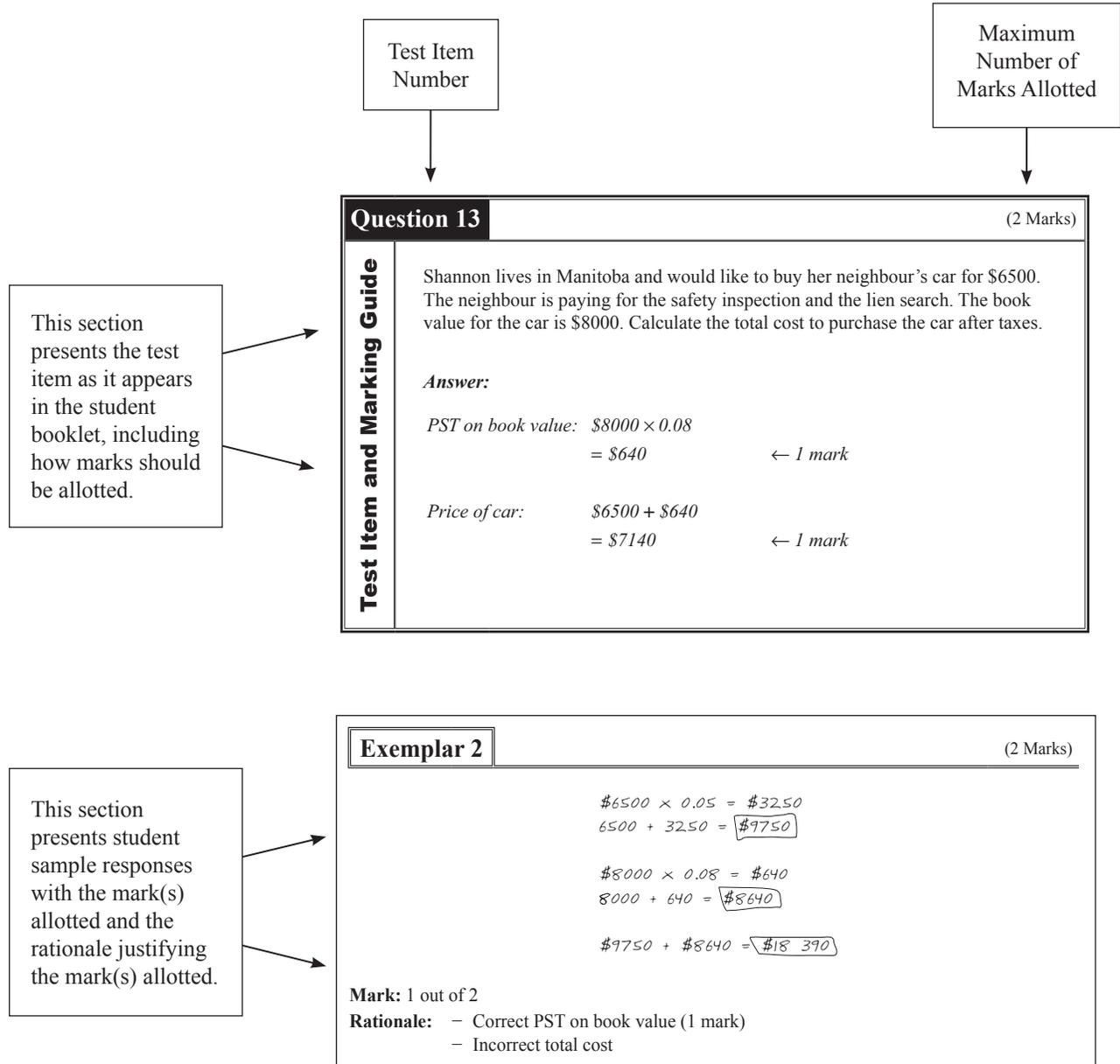
Irregularities in Provincial Tests

During the administration of provincial tests, supervising teachers may encounter irregularities. Markers may also encounter irregularities during local marking sessions. The appendix provides examples of such irregularities as well as procedures to follow to report irregularities.

If a *Scoring Sheet* is marked with "0" and/or "NR" only (e.g., student was present but did not attempt any questions) please document this on the *Irregular Test Booklet Report*.

Presentation of the Student Samples

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



Home Finance

Question 1

(4 Marks)

Chris buys a house in Carman for \$225 000. The bank offers him a mortgage interest rate of 4.75% amortized over 25 years.

- A) Chris makes a 10% down payment. Calculate the amount that Chris needs to borrow from the bank for his mortgage. (2 marks)

Answer:

$$\begin{aligned} \text{Down payment: } & \$225\,000 \times 0.10 \\ & \$22\,500 \quad \leftarrow 1 \text{ mark} \end{aligned}$$

$$\begin{aligned} \text{Mortgage amount: } & \$225\,000 - \$22\,500 \\ & = \$202\,500 \quad \leftarrow 1 \text{ mark} \end{aligned}$$

Note to marker: Accept the use of 90% as an alternate solution.

$$\begin{aligned} \$225\,000 \times \underbrace{0.90}_{1 \text{ mark}} & = \underbrace{\$202\,500}_{1 \text{ mark}} \end{aligned}$$

- B) Calculate the monthly mortgage payment. (2 marks)

Answer:

$$\begin{aligned} \text{Monthly mortgage payment: } & \frac{\$202\,500}{1000} \times \underbrace{5.67}_{1 \text{ mark}} \\ & = \$1148.18 \quad \leftarrow 1 \text{ mark} \end{aligned}$$

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

Exemplar 1

(4 Marks)

A) $table: 5.67$

B)

Mark: 1 out of 4

- Rationale:**
- Incorrect solution in Part A
 - Correct table value indicated in Part B (1 mark)

Exemplar 2

(4 Marks)

A)
$$\begin{aligned} \$225\,000 \div 4.75 &= \$47\,368.42 \\ \$272\,368.42 \div 10 & \quad \$27\,236.84 \\ \$245\,131.58 & \end{aligned}$$

B)
$$\frac{245\,131.58 \times 5.67}{1000} = \$1389.90$$

Mark: 2 out of 4

- Rationale:**
- Incorrect solution in Part A
 - Correct solution in Part B (follow-through error) (2×1 mark)

Exemplar 3

(4 Marks)

A) $225\,000 \times 0.90 = \underline{\underline{\$202\,500}}$

B)
$$\begin{aligned} 225\,000 &= \frac{5.67}{1000} \\ &= \$1275.75/\text{month} \end{aligned}$$

Mark: 3 out of 4

- Rationale:**
- Correct solution in Part A (2×1 mark)
 - Correct table value indicated in Part B (1 mark)
 - Incorrect solution in Part B

Question 2

(2 Marks)

State two factors that may increase or decrease a homeowner's insurance premium.

Sample answers:

- *amount of deductible*
- *options such as sewer backup, valuables, home business, riders, etc.*
- *value of home*
- *proximity to fire hall/fire hydrant*
- *discounts such as burglar alarm, 5 years claim free, senior's discount, etc.*
- *type of insurance (standard or comprehensive)*
- *change insurance provider*
- *past claims*
- *location*

(2 × 1 mark)

Exemplar 1

(2 Marks)

- 1) Something being stolen
- 2) Something being damaged

Mark: 0 out of 2**Rationale:** – Incorrect responses**Exemplar 2**

(2 Marks)

Area can affect the premiums if the area is known for floods or theft or any other problems. The size of the house and land owned.

Mark: 2 out of 2**Rationale:** – Two correct responses (2 × 1 mark)**Exemplar 3**

(2 Marks)

- (1) Area that they live in
- (2) Past claims

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

Question 3

(2 Marks)

Describe 2 energy-efficient upgrades that are available to homeowners.

Sample answers:

Upgrade	Description
<i>high efficiency furnace</i>	– <i>lower monthly gas bill</i>
<i>improve attic insulation</i>	– <i>reduce heat loss</i> – <i>lower heating bill</i>
<i>replace windows</i>	– <i>reduce heat loss</i> – <i>lower heating bill</i>
<i>replace appliances with higher efficiency units</i>	– <i>lower operation costs</i>
<i>use CFL, LED bulbs, etc.</i>	– <i>last longer</i> – <i>use less energy</i>

1 mark for each description that matches the upgrade

(2 × 1 mark)

Exemplar 1

(2 Marks)

Upgrade	Description
Solar panels	Saves your cost on power by using the sun
Geothermal energy	

Mark: 1 out of 2**Rationale:** – One correct response (solar panels) (1 mark)**Exemplar 2**

(2 Marks)

Upgrade	Description
Lightbulbs	- buying a certain kind of light bulb that will last longer ↳ not throwing away so many light bulbs
Heater	- get a good one to heat house/room ↳ only using one heater will save energy

Mark: 2 out of 2**Rationale:** – Two correct responses (2 × 1 mark)**Exemplar 3**

(2 Marks)

Upgrade	Description
Washer/Dryer	Washer and Dryer are huge energy users
Oven	Cooking requires a great deal of energy

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

Question 4

(3 Marks)

A home has a portioned assessment of \$160 000 and a frontage of 50 feet. The municipal tax rate is 23.01 mills. The education taxes are \$1171.20. Local sewer improvements are assessed at \$6 per foot. Calculate the total taxes due if the provincial property tax credit is \$750.

Answer:

$$\begin{aligned} \text{Municipal tax:} & \quad \$160\,000 \times \frac{23.01}{1000} \\ & = \$3681.60 \qquad \leftarrow 1 \text{ mark} \end{aligned}$$

$$\begin{aligned} \text{Local improvements:} & \quad 50 \times \$6 \\ & = \$300.00 \qquad \leftarrow 1 \text{ mark} \end{aligned}$$

$$\text{Education tax:} \quad \$1171.20$$

$$\begin{aligned} \text{Total tax:} & \quad \$3681.60 + \$300 + \$1171.20 - \$750 \\ & = \$4402.80 \qquad \leftarrow 1 \text{ mark} \end{aligned}$$

Exemplar 1

(3 Marks)

Portioned Assessment:

$$\$160\,000 \times 45\% = \$72\,000$$

$$\text{Municipal: } \$72\,000 \times \frac{23.01}{1000} = \$1656.72$$

$$+ \text{Education: } \$1171.20$$

$$\begin{array}{r} \$2827.92 \\ - \quad 750 \\ \hline \$2077.92 \end{array}$$

Mark: 1 out of 3

- Rationale:**
- Incorrect calculation (municipal tax)
 - Incorrect calculation (local improvements not calculated)
 - Correct solution (follow-through error) (1 mark)

Exemplar 2

(3 Marks)

$$160\,000 \div 23.01 = \$6953.50$$

$$\begin{array}{r} \$6953.50 \quad \$8124.70 \\ + \$1171.20 \quad - \quad 750 \\ \hline \$8124.70 \quad \$7374.70 \end{array}$$

$$\text{TOTAL TAXES DUE IS } \$7374.70$$

Mark: 1 out of 3

- Rationale:**
- Incorrect calculation (municipal tax)
 - Incorrect calculation (local improvements not calculated)
 - Correct solution (follow-through error) (1 mark)

Exemplar 3

(3 Marks)

$$6 \times 50 = \$300$$

$$\begin{array}{r} 160\,000 (0.2301) = 36\,816 \\ + \quad 300 \\ \hline 1171.20 \\ \$38\,287.20 \end{array}$$

$$38\,287.20 - 750 = \$37\,537.20 \text{ tax}$$

$$\text{The total tax is } \$37\,537.20 \text{ tax}$$

Mark: 2 out of 3

- Rationale:**
- Incorrect calculation (municipal tax)
 - Correct calculation (local improvements) (1 mark)
 - Correct solution (follow-through error) (1 mark)

Question 5

(1 Mark)

Explain why the insurance premium would be lower for tenant's insurance rather than homeowner's insurance for the same property.

Sample answers:

- *You only need to insure the contents of the house when renting so insurance would be less expensive.*
- *You are not responsible for insuring the land or building when you rent.*

Exemplar 1

(1 Mark)

renting a house would cost less so insurance would be less

less liabilities when renting because the house is not owned by the resident

Mark: 0 out of 1

Rationale: – Incorrect response

Exemplar 2

(1 Mark)

They would lower because you don't own the house the other owner would pay to fix it.

You don't own the home yourself, the landlord does so they pay for repair and other things.

Mark: 0 out of 1

Rationale: – Incorrect response

Exemplar 3

(1 Mark)

For renting a house the only things needing to be insured are your material possessions since you don't personally own the house. When you buy the house it becomes your possession you own it and your possessions that are inside it. The things you are insuring when your renting are your possessions when you're buying you insure the house and possessions since you own both. Hence why renting would cost less, insurance wise.

Mark: 1 out of 1

Rationale: – Correct response (1 mark)

Question 6

(3 Marks)

Explain three types of additional (one-time) costs to consider when initially purchasing a home. Do not include the down payment or mortgage payment.

Sample answers:

Additional Cost	Explanation
<i>utility service charges</i>	<i>cost of hooking up utilities (gas, telephone, cable, etc.)</i>
<i>interest adjustment</i>	<i>difference between date of purchase and date the mortgage is available</i>
<i>property tax adjustment</i>	<i>amount paid to owner for prepaid property taxes</i>
<i>homeowner insurance adjustment</i>	<i>prorated cost of insurance on home of greater value</i>
<i>land transfer tax</i>	<i>fee paid to transfer ownership</i>
<i>moving</i>	<i>cost of moving: moving company or just gas</i>
<i>decorating/renovation</i>	<i>optional cost for purchaser—to personalize or upgrade the house</i>
<i>appliances</i>	<i>optional cost for purchaser—may not be previously owned</i>
<i>immediate repairs</i>	<i>optional cost for purchaser—to upgrade or may be essential</i>
<i>furniture</i>	<i>optional cost for purchaser—may not be previously owned</i>
<i>property survey</i>	<i>may be needed for mortgage (legal document)</i>
<i>home inspection fee</i>	<i>optional cost for purchaser—some purchasers wish to know if the house is mechanically and structurally sound before spending large amounts of money</i>
<i>lawyer/legal fees</i>	<i>necessary for transfer of ownership</i>
<i>appraisal fee</i>	<i>charged by the bank for mortgage</i>
<i>mortgage insurance</i>	<i>high ratio mortgage—a fee from the bank if down payment is minimal</i>

1 mark for each explanation that matches the additional cost (3 × 1 mark)

Exemplar 1

(3 Marks)

Additional Cost	Explanation
Home Insurance	It's what you can choose to have and pay to protect your home from damage or theft
Sales Taxes	you may have bought your house for less than what it's really worth so there is an additional sales tax
Realtor Fees	payment to the realtor for their assistance

Mark: 0 out of 3**Rationale:** – Incorrect responses**Exemplar 2**

(3 Marks)

Additional Cost	Explanation
Painting	• only have to do it once when you move in
Reno	• to make it how you want when you first move in
Decorating	• make it yours when you move in

Mark: 1 out of 3**Rationale:** – One correct response (decorating/renovating) (1 mark)**Exemplar 3**

(3 Marks)

Additional Cost	Explanation
Land Purchasing	When you are building a home there is a certain payment that you have to buy a home
Alarm System	Alarm system in your home, whether you are just building a brand new home or are buying a home with no alarm system
Extended Warranty	You can choose extra warranty on a new house

Mark: 2 out of 3**Rationale:** – Two correct responses (alarm and warranty) (2 × 1 mark)

Probability

Question 7

(2 Marks)

The probability of Billy scoring a basket is 6 out of 8. State Billy's success rate as a fraction and as a percent.

Fraction: _____

Percent: _____

Answer:

Fraction: $\frac{6}{8}$ ← 1 mark

Percent: $\frac{6}{8} \times 100$
 $= 75\%$ ← 1 mark

Note to marker: Accept equivalent fractions. Units are not required.

Test Item and Marking Guide

Exemplar 1

(2 Marks)

Fraction: $\frac{6}{8}$

Percent: 0.75%

Mark: 1 out of 2**Rationale:** – One correct response (fraction) (1 mark)**Exemplar 2**

(2 Marks)

Fraction: $\frac{3}{4}$

Percent: 0.75 75%

Mark: 1 out of 2**Rationale:** – One correct response (fraction) (1 mark)**Exemplar 3**

(2 Marks)

Fraction: $\frac{75}{100}$

Percent: 75

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

Question 8

(2 Marks)

Jonas is experimenting with pulling blocks out of a bag. There is an equal number of red blocks, yellow blocks, and blue blocks.

A) State the theoretical probability of pulling out a yellow block. (1 mark)

Answer:

$\frac{1}{3}$ or 0.33 or 33% or one out of three or 1:3

B) After repeating the experiment several times, Jonas pulled a red block 7 times, a yellow block 3 times, and a blue block 2 times. State the experimental probability of pulling a yellow block. (1 mark)

Answer:

$\frac{3}{12}$ or 0.25 or 25% or three out of twelve or 3:12

Note to marker: Accept equivalent representations.

Exemplar 1

(2 Marks)

A)
$$\frac{\text{yellow}}{\text{blue} + \text{red} + \text{yellow}}$$

B)
$$\text{experimental} = \frac{3}{11} = 0.25$$

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

(2 Marks)

A) THERE IS A 1 IN 3 CHANCE OF PULLING OUT A YELLOW BLOCK.

B) RED:YELLOW:BLUE
7:3:2

THERE IS A 3 TO 9 CHANCE OF PULLING OUT A YELLOW BLOCK

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

(2 Marks)

A) The probability of pulling a yellow block is every one of three will be yellow.

B) red = 58% 25% of the time
yellow = 25% Jonas pulled a yellow block.
blue = 17%

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

Question 9

(4 Marks)

It would cost \$1000 for a contractor to bid on a construction project. There is a one in four chance that she will win the contract. If she is awarded the contract she will be paid \$3000 for the work.

A) Calculate the expected value. (3 marks)

Answer:

$$\begin{aligned} \$gain &= \$3000 - \$1000 \\ &= \$2000 \end{aligned}$$

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

$$= \frac{1}{4} \times \$2000 - \frac{3}{4} \times \$1000$$

}

No mark for 1 or 2 correct substitution(s)

OR

1 mark for 3 correct substitutions

OR

2 marks for all correct substitutions

$$= \$500 - \$750$$

$$= -\$250 \quad \leftarrow 1 \text{ mark}$$

OR

$$\text{Average earnings: } \frac{1}{4} \times \$3000$$

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

$$\underbrace{\$750 - \$1000}_{1 \text{ mark}}$$

$$= -\$250 \quad \leftarrow 1 \text{ mark}$$

B) Justify whether she should bid on the contract based on the expected value calculated in Part A. (1 mark)

Answer:

No, the expected gain is negative, therefore, she should not bid on the project.

Exemplar 1

(4 Marks)

- A) $\frac{1}{4} = \text{chance of winning } \2000 $\frac{3}{4} = \text{chance of not getting the contract}$
 $25\% \text{ chance of getting } \2000 $75\% \text{ chance of losing } \1000
- B) *I wouldn't bid on the project because there is a higher chance that I won't earn \$3000. I will more likely lose \$1000.*

Mark: 1 out of 4

- Rationale:** – Incorrect solution in Part A
– Correct response in Part B (follow-through error) (1 mark)

Exemplar 2

(4 Marks)

- A) $EV = P(\text{win}) \times \$\text{gains} - P(\text{lose}) \times \loss
 $EV = 0.25 \times \$3000 - 0.75 \times \1000
 $EV = 0.00$

- B) *she should not bid on the contract.*

Mark: 2 out of 4

- Rationale:** – Three correct substitutions in Part A (1 mark)
– Correct solution in Part A (follow-through error) (1 mark)
– Incorrect response in Part B

Exemplar 3

(4 Marks)

- A) $EV = P(\text{win}) \times (\text{winnings}) - P(\text{lose}) \times (\$loss)$ B) *She should not bid on the contract because the expected value is zero so she should not earn or lose money over time.*
 $EV = \frac{1}{4} \times 3000 - \frac{3}{4} \times 1000$
 $EV = 750 - 750$
 $EV = \$0$

Mark: 3 out of 4

- Rationale:** – Three correct substitutions in Part A (1 mark)
– Correct solution in Part A (follow-through error) (1 mark)
– Correct response in Part B (follow-through error) (1 mark)

Question 10

(1 Mark)

The weather forecast states that there is a 30% probability of rain for tomorrow. State the odds **against** it raining tomorrow.

Answer:

70 : 30 or 70 to 30

Note to marker: Accept equivalent odds.

Test Item and Marking Guide

Exemplar 1

(1 Mark)

The fact that there is 70% chance of it not raining I would leave my umbrella at home

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

(1 Mark)

$\frac{70}{30}$ chance of rain tomorrow

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

(1 Mark)

there is a 70% to 30% odds against rain

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

Question 11

(2 Marks)

The manager of a clothing company collects the following sales data for the winter season.

T-shirt colours	Red	Yellow	Green	Blue
Number purchased	111	140	204	145

- A) State the probability that a customer purchased a green T-shirt based on the sales data presented above. (1 mark)

Answer:

$$\begin{aligned} \text{Probability: } & \frac{204}{111 + 140 + 204 + 145} \times 100 \\ & = \frac{204}{600} \quad \leftarrow 1 \text{ mark} \end{aligned}$$

Note to marker: Accept equivalent representations.

- B) The manager of the store needs to order 9000 T-shirts for next year. State how many green T-shirts the manager should order based on the above sales data. (1 mark)

Answer:

$$\begin{aligned} & \frac{204}{600} \times 9000 \\ & = 3060 \text{ green T-shirts} \quad \leftarrow 1 \text{ mark} \end{aligned}$$

Exemplar 1

(2 Marks)

A) $25\% = \frac{1}{4}$

B) $9000 \div 4 = 2250$

He should get 2250 green shirts.

Mark: 1 out of 2

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

Exemplar 2

(2 Marks)

A) $204 / 600$

B) $600 = 204$

$9000 \div 204 = 44.1 \times 600 = 26471$

Mark: 1 out of 2

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

Exemplar 3

(2 Marks)

A) $204 + 140 + 145 + 111 = 600$

B) $9000 / 150 = 60$

$60 \times 51 = 3060$

$\frac{204}{600} = \frac{51}{150}$

around 3060 shirts should be made

Mark: 2 out of 2

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

Vehicle Finance

Question 12

(2 Marks)

Tyson has a job that requires a vehicle for out-of-town travel. On average, he drives at least 3000 km per month. State one advantage and one disadvantage of leasing a vehicle.

Sample answers:

Advantage	Disadvantage
<i>enjoyment of driving new vehicle more often</i>	<i>penalty/premium for high mileage</i>
<i>can be written off as a business expense</i>	<i>no equity</i>
<i>reliability of a new vehicle</i>	<i>more expensive in the long run</i>
<i>lower monthly payment</i>	

(2 × 1 mark)

Exemplar 1

(2 Marks)

Advantage: You can end the lease whenever you want.

Disadvantage: You do not own the car so you cannot customize it.

Mark: 1 out of 2

Rationale: – One correct response (disadvantage) (1 mark)

Exemplar 2

(2 Marks)

<i>ADVANTAGES</i>	<i>DISADVANTAGES</i>
<i>cheaper</i>	<i>limited distance allowed to drive</i>

Mark: 1 out of 2

Rationale: – One correct response (disadvantage) (1 mark)

Exemplar 3

(2 Marks)

advantage - If the car breaks down or needs repairs the dealership pays for them.

disadvantage - If Tyson drives over the amount of km that is stated in the contract he has to pay additional costs.

Mark: 2 out of 2

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

Question 13

(2 Marks)

Shannon lives in Manitoba and is going to buy her neighbour's car for \$6500. The neighbour is paying for the safety inspection and the lien search. The book value for the car is \$8000. Calculate the total cost to purchase the car after taxes.

Answer:

$$\begin{aligned} \text{PST on book value: } & \$8000 \times 0.08 \\ & = \$640 && \leftarrow 1 \text{ mark} \end{aligned}$$

$$\begin{aligned} \text{Price of car: } & \$6500 + \$640 \\ & = \$7140 && \leftarrow 1 \text{ mark} \end{aligned}$$

Exemplar 1

(2 Marks)

$$8000 \times 0.05 = 400$$

$$6500 + 400 = \boxed{\$6900}$$

Mark: 1 out of 2

- Rationale:**
- Incorrect use of tax
 - Correct total cost (follow-through error) (1 mark)

Exemplar 2

(2 Marks)

$$\$6500 \times 0.05 = \$3250$$

$$6500 + 3250 = \boxed{\$9750}$$

$$\$8000 \times 0.08 = \$640$$

$$8000 + 640 = \boxed{\$8640}$$

$$\$9750 + \$8640 = \boxed{\$18\,390}$$

Mark: 1 out of 2

- Rationale:**
- Correct PST on book value (1 mark)
 - Incorrect total cost

Exemplar 3

(2 Marks)

$$8000 \times \overset{\text{(PST)}}{0.08} = 640$$

$$8000 + 640$$

$$= 8640$$

Mark: 1 out of 2

- Rationale:**
- Correct PST on book value (1 mark)
 - Incorrect total cost

Question 14

(4 Marks)

Bonnie wishes to buy a new vehicle from a Manitoba dealership for \$16 200 before taxes. She has \$5000 saved for a down payment.

- A) Calculate the amount Bonnie needs to borrow to purchase the vehicle. (2 marks)

Answer:

$$\begin{aligned} \text{Purchase price:} & \quad \$16\,200 \times 1.13 \\ & = \$18\,306 \quad \leftarrow 1 \text{ mark} \end{aligned}$$

$$\begin{aligned} \text{Principal:} & \quad \$18\,306 - \$5000 \\ & = \$13\,306 \quad \leftarrow 1 \text{ mark} \end{aligned}$$

- B) Bonnie can get a loan for 4 years at 5.5%. Calculate the amount of interest in the first month's payment. (2 marks)

Answer:

$$\begin{aligned} I & = Prt \\ & = \$13\,306 \times 0.055 \times \frac{1}{12} \quad \leftarrow 1 \text{ mark} \end{aligned}$$

$$= \$60.99 \quad \leftarrow 1 \text{ mark}$$

Exemplar 1

(4 Marks)

$$\begin{array}{r}
 \text{A) } 16\ 200 \\
 - 5000 \\
 \hline
 11\ 200 \\
 \times 1.13 \\
 \hline
 \text{\$}12\ 656
 \end{array}$$

$$\begin{array}{l}
 \text{B) } 12\ 656 \times 0.055 \times 4 \\
 \\
 = \$2784.32
 \end{array}$$

Mark: 2 out of 4

- Rationale:**
- Incorrect use of tax in Part A
 - Correct principal in Part A (follow-through error) (1 mark)
 - Incorrect substitution in Part B
 - Correct solution in Part B (follow-through error) (1 mark)

Exemplar 2

(4 Marks)

$$\begin{array}{l}
 \text{A) } 16\ 200 \times 0.13 = 2106 \\
 16\ 200 + 2106 = 18\ 306 \\
 18\ 306 - 5000 = \$13\ 306
 \end{array}$$

$$\text{B) } 13\ 306 \times 0.055 = \boxed{731.83}$$

Mark: 2 out of 4

- Rationale:**
- Correct solution in Part A (2 × 1 mark)
 - Incorrect solution in Part B

Exemplar 3

(4 Marks)

$$\begin{array}{l}
 \text{A) } 16\ 200 + 810 \text{ (GST)} + 1296 \text{ (PST)} \\
 = 18\ 306 - 5000 = \$13\ 306
 \end{array}$$

She needs to borrow \$13 306.00

$$\begin{array}{l}
 \text{B) } I = Prt \\
 I = (13\ 306) \times (5.5\%) \times (4) \\
 = \$2927.32 \text{ for 4 years} \\
 2927.32 \div 48 = \$60.99
 \end{array}$$

The amount of interest for the first month is \$60.99

Mark: 4 out of 4

- Rationale:**
- Correct solution in Part A (2 × 1 mark)
 - Correct solution in Part B (2 × 1 mark)

Question 15

(2 Marks)

A car travels 2400 km and consumes 200 L of fuel. Calculate the fuel economy in L/100 km for the car.

Answer:

$$FE = \frac{\text{Fuel used in litres}}{\text{Distance in km}} \times 100$$

$$= \frac{200 \text{ L}}{2400 \text{ km}} \times 100 \quad \leftarrow 1 \text{ mark}$$

$$= 8.3 \text{ L/100 km} \quad \leftarrow 1 \text{ mark}$$

OR

$$\frac{200 \text{ L}}{2400 \text{ km}} = \frac{x \text{ L}}{100 \text{ km}} \quad \leftarrow 1 \text{ mark}$$

$$x \text{ L} = \frac{200 \times 100}{2400}$$

$$= 8.3 \text{ L/100 km} \quad \leftarrow 1 \text{ mark}$$

Note to marker: Units are not required.

Exemplar 1

(2 Marks)

$$\frac{200}{2400} \quad \frac{20}{240} \quad \frac{1}{12}$$
$$\frac{1 \text{ L}}{12 \text{ km}}$$

Mark: 1 out of 2**Rationale:** – Correct substitution (1 mark)
– Incorrect solution**Exemplar 2**

(2 Marks)

$$\frac{200 \text{ L fuel}}{2400 \text{ km}} = \$8.33 \text{ per } 100 \text{ km}$$

Mark: 1 out of 2**Rationale:** – Correct substitution (1 mark)
– Incorrect solution**Exemplar 3**

(2 Marks)

$$\begin{aligned} 2400 \div 200 &= 12 \\ 1200 \div 100 &= 12 \\ 600 \div 50 &= 12 \\ 300 \div 25 &= 12 \\ 150 \div 12.5 &= 12 \\ 100 \div 8.3 &= 12.04 \end{aligned}$$

it takes about 8.3/8.4 L for 100 km

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

Question 16

(2 Marks)

Frank has been leasing his pickup truck for the last 3 years. He has made a total of \$16 028 in payments; which included a down payment of \$3500.

Calculate Frank's monthly lease payments.

Answer:

$$\begin{array}{l} \text{Total lease payments:} \quad \$16\,028 - \$3500 \\ \quad \quad \quad \quad \quad \quad = \$12\,528 \quad \quad \quad \leftarrow 1 \text{ mark} \end{array}$$

$$\begin{array}{l} \text{Monthly payment:} \quad \frac{\$12\,528}{36} \\ \quad \quad \quad \quad \quad \quad = \$348 \quad \quad \quad \leftarrow 1 \text{ mark} \end{array}$$

Exemplar 1

(2 Marks)

$$16\ 028 + 3500 = 19\ 528$$

$$(19\ 528 \div 3) \div 12 = 542.44$$

Mark: 1 out of 2

- Rationale:**
- Incorrect total lease payment
 - Correct monthly payment (follow-through error) (1 mark)

Exemplar 2

(2 Marks)

3 years or 36 months

$$16\ 028 + 3500 = 19\ 528 \div 36 = \$542.44/\text{month}$$

Mark: 1 out of 2

- Rationale:**
- Incorrect total lease payment
 - Correct monthly payment (follow-through error) (1 mark)

Exemplar 3

(2 Marks)

$$16\ 028 - 3500 = 12\ 528$$

$$12\ 528 \div 3 = 4176$$

$$4176 \div 12 = \$348.00$$

Mark: 2 out of 2

- Rationale:**
- Correct solution (2 × 1 mark)

Question 17

(1 Mark)

Sam has been involved in a car accident. Explain if this will affect the cost of his Manitoba vehicle insurance.

Sample answers:

Yes, his insurance will increase if he was at fault.

OR

No, his insurance will not increase if he was not at fault.

Exemplar 1

(1 mark)

The accident will effect the cost of his insurance because your driving skills are reflected in the amount of insurance you pay.

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

(1 mark)

It depends whether the accident was his fault or not, if so his demerits will rise increasing the cost to drive and be insured. Also depends if he uses insurance to cover his damages.

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

(1 mark)

it all depends on who caused the accident if he was just sitting there and someone hits his car then no but if he caused the accident then yes it will effect it

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

Question 18

(2 Marks)

A brand new car costs \$26 800 after taxes*. It will depreciate 15% in the first year. Calculate the value of the car after the first year.

Answer:

$$\begin{aligned} \text{Amount of depreciation:} & \quad \$26\,800 \times 0.15 \\ & = \$4020 \quad \leftarrow 1 \text{ mark} \end{aligned}$$

$$\begin{aligned} \text{Value of car after first year:} & \quad \$26\,800 - \$4020 \\ & = \$22\,780 \quad \leftarrow 1 \text{ mark} \end{aligned}$$

OR

$$\text{Value of car after first year: } \$26\,800 \times \underbrace{0.85}_{1 \text{ mark}} = \underbrace{\$22\,780}_{1 \text{ mark}}$$

Test Item and Marking Guide

* Depreciation is to be calculated on the value of the car. The notion of taxes is irrelevant here. In the future, the phrase “after taxes” will not be included in this type of question.

Exemplar 1

(2 Marks)

$$26\,800 \times 0.15 = \$4020$$

Mark: 1 out of 2**Rationale:** – Correct depreciation amount (1 mark)
– Incorrect solution**Exemplar 2**

(2 Marks)

$$26\,800 \times 0.015 = \$402$$
$$26\,800 - 402 = \$26\,398$$

Mark: 1 out of 2**Rationale:** – Incorrect depreciation amount
– Correct solution (follow-through error) (1 mark)**Exemplar 3**

(2 Marks)

$$\$26\,800 \times 0.85 = \$22\,780$$
$$\text{VALUE OF CAR: } \$26\,800 - \$22\,780 = \$4020$$

Mark: 1 out of 2**Rationale:** – Correct depreciation amount (1 mark)
– Incorrect solution

Question 19

(2 Marks)

Sylvie takes her car in for a seasonal maintenance checkup at a Manitoba dealership. In addition to the basic \$60 fee, Sylvie gets an oil change for \$50, and a new set of brake pads for \$80. The mechanic spends 1.5 hours working on the vehicle at a rate of \$90 per hour.

Calculate Sylvie's total bill, after taxes.

Answer:

<i>Check-up/Basic fee:</i>	\$60	
<i>Oil change:</i>	\$50	
<i>Brake pads:</i>	\$80	
<i>Labour (1.5 × \$90):</i>	<u>+ \$135</u>	
	\$325	← 1 mark
<i>Total bill:</i>	$\$325 \times 1.13$	
	$= \$367.25$	← 1 mark

Exemplar 1

(2 Marks)

$$\begin{aligned}
 90 \times 1.5 &= 135 \\
 60 \times 1.13 &= 67.80 \\
 50 \times 1.13 &= 56.50 \\
 80 \times 1.13 &= + 81.13 \\
 \hline
 &= \boxed{\$340.43}
 \end{aligned}$$

Mark: 1 out of 2

Rationale: – Incorrect use of tax
 – Correct solution (follow-through error) (1 mark)

Exemplar 2

(2 Marks)

$$\begin{array}{l}
 \$60 \\
 \$50 \\
 \$80
 \end{array}
 \left. \vphantom{\begin{array}{l} \$60 \\ \$50 \\ \$80 \end{array}} \right\} \$190 \quad \text{Sylvie's bill}$$

1.5 hours
 90 per hour

$$= \boxed{\$325}$$

Mark: 1 out of 2

Rationale: – Correct subtotal (1 mark)
 – Incorrect total bill

Exemplar 3

(2 Marks)

ITEM	UNIT	COST
FEE	1	\$60
OIL CHANGE	1	\$50
BRAKE PADS	1	\$80
LABOUR	1	1.5

Total bill

$$190 + 135 = 225$$

$$\$225 \times 1.13 = \boxed{\$254.25}$$

Mark: 1 out of 2

Rationale: – Incorrect subtotal
 – Correct solution (follow-through error) (1 mark)

Geometry and Trigonometry

Question 20

(2 Marks)

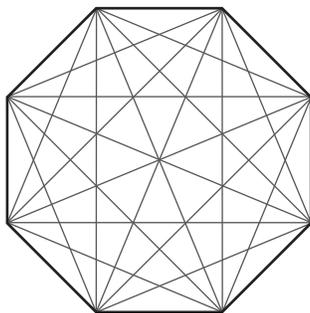
Determine the number of diagonals in a regular octagon.

Number of diagonals: _____

Answer:

$$\begin{aligned} \text{Number of diagonals: } D &= \frac{n(n-3)}{2} \\ &= \frac{8(8-3)}{2} \quad \leftarrow 1 \text{ mark} \\ &= \frac{40}{2} \\ &= 20 \quad \leftarrow 1 \text{ mark} \end{aligned}$$

OR



$\leftarrow 1 \text{ mark}$

There are 20 diagonals. $\leftarrow 1 \text{ mark}$

Note to marker: *Diagonals do not need to be drawn within the octagon.*

Test Item and Marking Guide

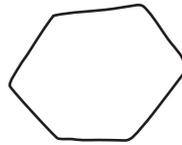
Exemplar 1

(2 Marks)

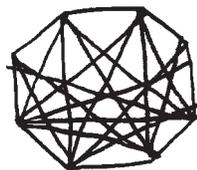
$$D = \frac{6(3)}{2}$$
$$= 9$$

Mark: 1 out of 2**Rationale:** – Incorrect substitution
– Correct response (follow-through error) (1 mark)**Exemplar 2**

(2 Marks)

*9 diagonals***Mark:** 1 out of 2**Rationale:** – Incorrect polygon
– Correct response (follow-through error) (1 mark)**Exemplar 3**

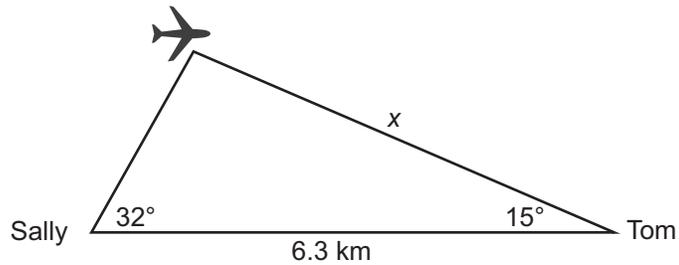
(2 Marks)

*17 diagonals***Mark:** 1 out of 2**Rationale:** – Correct polygon (1 mark)
– Incorrect response

Question 21

(3 Marks)

Sally spots an airplane in the sky flying away from her at an angle of elevation of 32° . At the same time, Tom who is 6.3 km away from Sally sees the same airplane flying towards him at an angle of elevation of 15° .



Calculate how far the plane is from Tom.

Answer:

$$\begin{aligned} \text{Third angle: } & 180 - 32 - 15 \\ & = 133^\circ \qquad \leftarrow 1 \text{ mark} \end{aligned}$$

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

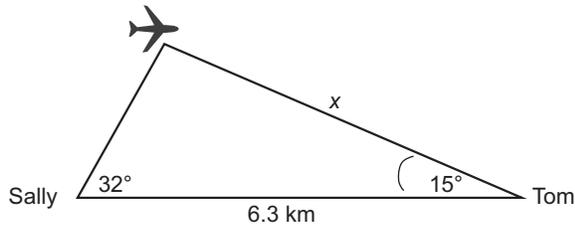
$$\frac{\sin 133^\circ}{6.3} = \frac{\sin 32^\circ}{x} \quad \leftarrow 1 \text{ mark}$$

$$x = 4.6 \text{ km} \quad \leftarrow 1 \text{ mark}$$

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

Exemplar 1

(3 Marks)



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

$$\frac{\sin 32}{x} = \frac{\sin 15}{6.3}$$

$$\frac{\sin 32 (6.3)}{\sin 15}$$

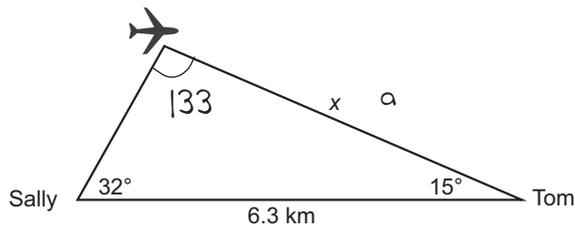
$$= 12.9 \text{ km}$$

Mark: 1 out of 3

- Rationale:**
- Incorrect third angle
 - Incorrect substitutions
 - Correct solution (follow-through error) (1 mark)

Exemplar 2

(3 Marks)



$$180 - 32 - 15 = 133$$

$$\frac{\sin a}{\sin A} = \frac{\sin b}{\sin B} = \frac{\sin c}{\sin C}$$

$$\frac{\sin a}{\sin 32} = \frac{\sin 6.3}{\sin 133}$$

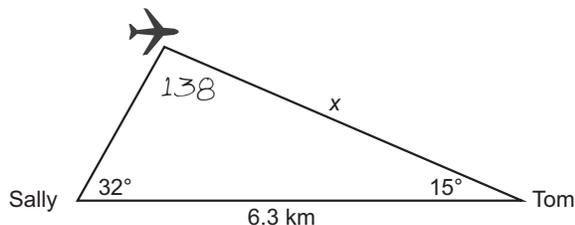
$$\sin a = \frac{(\sin 32 \times \sin 6.3)}{(\sin 133 \times \sin a)} = 0.079$$

Mark: 1 out of 3

- Rationale:**
- Correct third angle (1 mark)
 - Incorrect substitutions
 - Incorrect solution

Exemplar 3

(3 Marks)



$$\frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{6.3}{\sin 138} = \frac{c}{\sin 32}$$

$$\sin 32 \times \frac{6.3}{\sin 138} = 4.99 \text{ km}$$

Mark: 2 out of 3

- Rationale:**
- Incorrect third angle
 - Correct substitutions (1 mark)
 - Correct solution (follow-through error) (1 mark)

Question 22

(2 Marks)

The Cosine Law is often used in construction, commercial, industrial, or artistic applications.

- A) Sketch a labelled picture or diagram (not necessarily to scale) that demonstrates where the Cosine Law can be used in the real world. (1 mark)

Answer:

1 mark for sketch

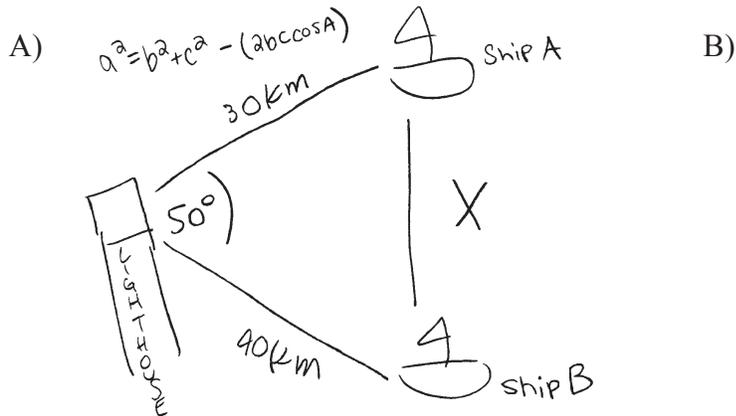
- B) Support your diagram with an explanation of how the Cosine Law was used. (1 mark)

Answer:

1 mark for explanation

Exemplar 1

(2 Marks)

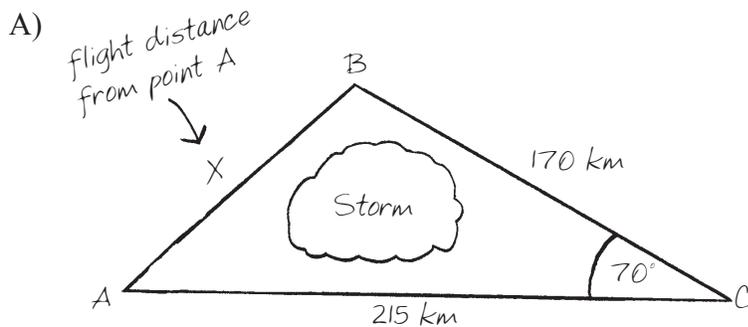


Mark: 1 out of 2

Rationale: - Correct sketch in Part A (1 mark)

Exemplar 2

(2 Marks)



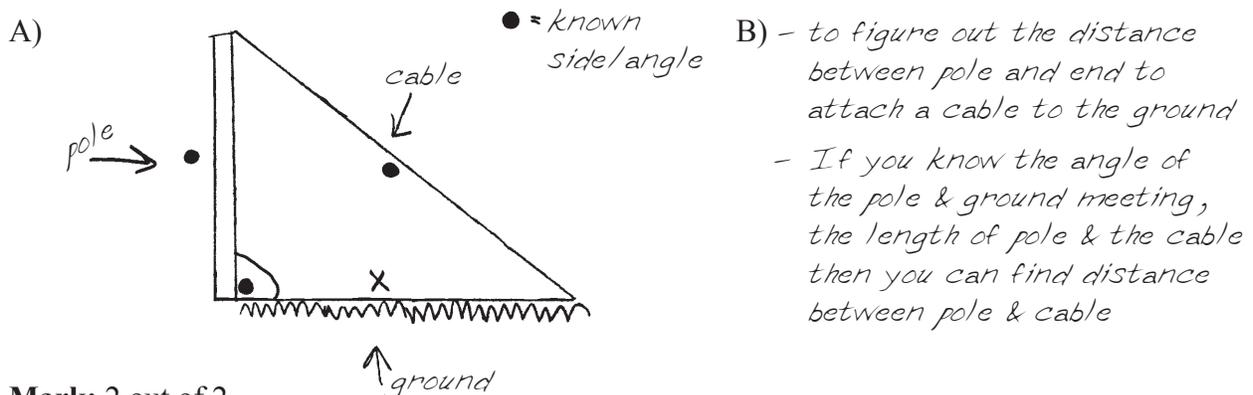
Cosine Law can be used to graph a flight path around a set of storms in the airline industry. If the storm was depicted in the center, then the aircraft could sketch their angle of diversion and determine how much further their detour was.

Mark: 2 out of 2

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

Exemplar 3

(2 Marks)



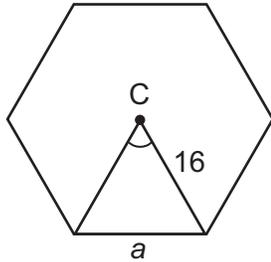
Mark: 2 out of 2

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

Question 23

(3 Marks)

Given a regular hexagon with centre C:



A) Determine the measure of the central angle of the hexagon. (1 mark)

Answer:

$$\begin{aligned} \text{central angle: } & 360 \div 6 \\ & = 60^\circ \quad \leftarrow 1 \text{ mark} \end{aligned}$$

B) Determine the length of side a . Justify your response. (2 marks)

Answer:

The length of side a is 16. ← 1 mark

It is an equilateral triangle. All angles are 60° and all sides are equal. ← 1 mark

Exemplar 1

(3 Marks)

A) $360 \div 5 = 72^\circ$

B)  $\frac{16}{\sin 54} = \frac{a}{\sin 72}$ $180 - 72 = 108$
 $\div 2 = 54^\circ$
 ~~$\frac{(\sin 54)(a)}{\sin 54} = \frac{(16)(\sin 72)}{\sin 54}$~~
 $a = 18.81$

A would be 18.81 because the triangle is isosceles because its a regular hexagon when it's isosceles you know the two base angles are the same and you know them because you know LC and then you can use the sine law to find side A

Mark: 2 out of 3

Rationale: – Incorrect response in Part A
 – Correct response and justification in Part B (follow-through error) (2 × 1 mark)

Exemplar 2

(3 Marks)

A) $\frac{360}{n} = \frac{360}{6} = 60^\circ$

B) The length is 16 it is an Isosceles Triangle.

Mark: 2 out of 3

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

Exemplar 3

(3 Marks)

A) $360/6 = 60$

central angle is a 60°

B) $a^2 = 16^2 + 16^2 - 2(16)(16)\cos(60)$
 $a^2 = 512 - 256$
 $a^2 = 256$
 $\sqrt{a} = \sqrt{256}$
 $a = 16$

Mark: 3 out of 3

Rationale: – Correct response in Part A (1 mark)
 – Correct response and justification in Part B (2 × 1 mark)

Question 24

(2 Marks)

Polygons are often used in construction, commercial, industrial, or artistic applications.

- Sketch a picture or diagram that demonstrates how properties of polygons are used in the real world. (1 mark)
- Support your diagram with an explanation of how the properties were used. (1 mark)

Answer:

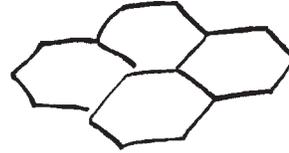
1 mark for sketch

1 mark for explanation

Exemplar 1

(2 Marks)

In nature, honey bees use polygons to construct the combs in the hive used to store honey for their hive.

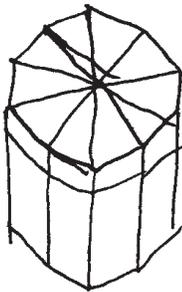


Mark: 1 out of 2

Rationale: – Correct sketch (1 mark)
– Incorrect explanation

Exemplar 2

(2 Marks)



polygons are used in art to create sturdy stands

let's say that an artist had a brand new sculpture and needed a stand that wouldn't fall but had to be easily movable putting together multiple triangles to form a polygon could be the best option

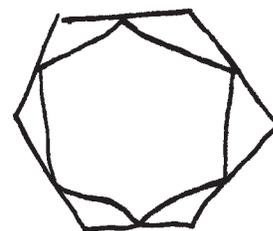
Mark: 2 out of 2

Rationale: – Correct sketch (1 mark)
– Correct explanation (1 mark)

Exemplar 3

(2 Marks)

For artistic, when drawing or painting something they may want to make a similar shape inside of an already existing one. This can be accomplished by using polygons because; when you join the midpoints of the sides of a regular polygon, you get a smaller, similar polygon.



Mark: 2 out of 2

Rationale: – Correct sketch (1 mark)
– Correct explanation (1 mark)

Question 25

(2 Marks)

Looking at his chocolate bar from a top view, Brian states that it looks like a rectangle. State two properties of Brian's chocolate bar that make it a rectangle.

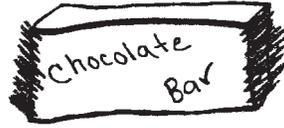
Sample answers:

- *opposite sides of the same length*
- *four right angles*
- *opposite sides are parallel*
- *diagonals are congruent*

(2 × 1 mark)

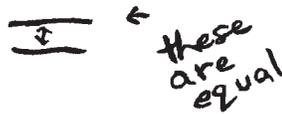
Exemplar 1

(2 Marks)



- it's 3D

- 2 sides are equal



Mark: 1 out of 2

Rationale: - One correct response (sides) (1 mark)

Exemplar 2

(2 Marks)

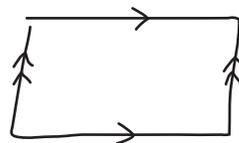
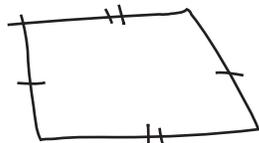
2 pairs of equal sides
all interior angles
are equal

Mark: 2 out of 2

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

Exemplar 3

(2 Marks)



Mark: 2 out of 2

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

Precision Measurement

Question 26

(2 Marks)

State an example from the construction, commercial, industrial, or artistic industries where a certain degree of tolerance is required. Support your example with an explanation of how tolerance was required.

Answer:

1 mark for example

1 mark for explanation

Test Item and Marking Guide

Exemplar 1

(2 Marks)

A PLUG OUTLET IN A WALL BECAUSE YOU HAVE TO MAKE IT THE EXACT SIZE FOR IT TO FIT

Mark: 1 out of 2

Rationale: – Correct example (1 mark)
– Incorrect explanation

Exemplar 2

(2 Marks)

Carpenter. If a door needed to be made for a classroom, he needs to use tolerance and exact measurement or the door will

- a.) be too small and cold air will come into the room
or
b.) Door will be too big and won't be able to close

Mark: 2 out of 2

Rationale: – Correct example (1 mark)
– Correct explanation (1 mark)

Exemplar 3

(2 Marks)

- Any kind of manufacturing or carpentry.
- Manufacturing cabinets to be a certain size. Incorrect measurements outside the tolerance can result in gaps or the cabinets might be too close, causing them not to fit.

Mark: 2 out of 2

Rationale: – Correct example (1 mark)
– Correct explanation (1 mark)

Question 27

(2 Marks)

An odometer is used to measure the distance a car travels. The trip odometer reads 947.2 km. State the precision and uncertainty of the odometer.

Precision: _____

Uncertainty: _____

Answer:

Precision: 0.1 km ← 1 mark

Uncertainty: 0.05 km ← 1 mark

Note to marker: Units are not required. Accept ± 0.05 .

Test Item and Marking Guide

Exemplar 1

(2 Marks)

Precision: km Uncertainty: km **Mark:** 0 out of 2**Rationale:** – Incorrect responses**Exemplar 2**

(2 Marks)

Precision: 947.2 Uncertainty: 473.6 **Mark:** 1 out of 2**Rationale:** – Incorrect precision
– Correct uncertainty (follow-through error) (1 mark)**Exemplar 3**

(2 Marks)

Precision: 0.1 Uncertainty: 0.5 **Mark:** 1 out of 2**Rationale:** – Correct precision (1 mark)
– Incorrect uncertainty

Question 28

(2 Marks)

A metre stick is left outside in the sun and it expands. Explain how this will affect the stick's accuracy and precision.

Accuracy:

Precision:

Answer:

Accuracy:

changes (better or worse) ← 1 mark

Precision:

does not change ← 1 mark

Exemplar 1

(2 Marks)

Accuracy:

The lines may be a little off of 1 cm apart now, making for a longer reading than the actual measurement.

Precision:

The precision would be off because you would read a longer measurement than what it really is.

Mark: 1 out of 2

Rationale: – One correct response (accuracy) (1 mark)

Exemplar 2

(2 Marks)

Accuracy:

It will affect the accuracy because once it expands it will be off scale of what you're measuring.

Precision:

It will affect the precision because if it expands it will no longer be precise like it was before it expanded.

Mark: 1 out of 2

Rationale: – One correct response (accuracy) (1 mark)

Exemplar 3

(2 Marks)

Accuracy:

The accuracy may become out of wack because it might become too big.

Precision:

The precision will still be the smallest unit on the metre stick

Mark: 2 out of 2

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

Question 29

(2 Marks)

The width of a door frame has a nominal value of 36 inches (which is halfway between the minimum and maximum value). The tolerance is 0.5 inches. State the minimum and maximum values of the width of the door frame.

Maximum: _____

Minimum: _____

Answer:

Maximum: 36.25 inches ← 1 mark

Minimum: 35.75 inches ← 1 mark

Note to marker: Units are not required.

Test Item and Marking Guide

Exemplar 1

(2 Marks)

Maximum: 36 inMinimum: 0.5 in**Mark:** 0 out of 2**Rationale:** – Two incorrect responses**Exemplar 2**

(2 Marks)

Maximum: 36 ^{+0.25}₋₀Minimum: 36 ⁺⁰_{-0.25}**Mark:** 0 out of 2**Rationale:** – Two incorrect responses**Exemplar 3**

(2 Marks)

Maximum: 36.5 inchMinimum: 35.5 inch**Mark:** 1 out of 2**Rationale:** – Incorrect response (maximum)
– Correct response (minimum) (follow-through error) (1 mark)

Question 30

(2 Marks)

A welding company has determined that the desired length of a steel arm is $12 \text{ cm} \pm 2.5 \text{ cm}$. The tolerance is given in the form $\textit{nominal value} \begin{matrix} +\textit{tolerance} \\ -0 \end{matrix}$. State the nominal value and tolerance.

nominal value: _____

tolerance: _____

Answer:

nominal value: 9.5 cm ← 1 mark

tolerance: 5 cm ← 1 mark

Note to marker: Units are not required.

Exemplar 1

(2 Marks)

nominal value: 14.5tolerance: 9.5**Mark:** 0 out of 2**Rationale:** – Two incorrect responses**Exemplar 2**

(2 Marks)

nominal value: 9.5tolerance: 2.5**Mark:** 1 out of 2**Rationale:** – Correct response for “nominal value” (1 mark)**Exemplar 3**

(2 Marks)

nominal value: 12tolerance: 5**Mark:** 1 out of 2**Rationale:** – Correct response for “tolerance” (1 mark)

Statistics

Question 31

(2 Marks)

Given the following scores from a Grade 12 Biology class:

61	80	87	54
40	86	61	68
54	72	54	87

A) State the mean. (1 mark)

Answer:

$$\text{Mean: } \frac{804}{12}$$

$$= 67 \quad \leftarrow 1 \text{ mark}$$

B) State the mode. (1 mark)

Answer:

$$\text{Mode: } 54 \quad \leftarrow 1 \text{ mark}$$

Exemplar 1

(2 Marks)

A)
$$\frac{804}{12}$$

B) $87 - 40 = 47$

Mark: 0 out of 2**Rationale:** – Incorrect response in Part A
– Incorrect response in Part B**Exemplar 2**

(2 Marks)

A)
$$61 + 80 + 87 + 54 + 40 + 86 + 61 + 68 + 54 + 72 + 54 + 87 \div 12 = \underline{724.25}$$

B) 40 54 54 54 61 61 68 72 80 86 87 87

$$\frac{61 + 68}{2} = 64.5$$

Mark: 0 out of 2**Rationale:** – Incorrect response in Part A
– Incorrect response in Part B**Exemplar 3**

(2 Marks)

A) 67

B) 54 3 times
61 2 times
87 2 times

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

Question 32

(2 Marks)

Three hundred (300) students wrote a math exam. Craig scored 78% on his math exam. Calculate Craig's percentile ranking, if 204 students received a lower score than him.

Answer:

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

$$= \frac{204}{300} \times 100 \quad \leftarrow 1 \text{ mark}$$

$$= 68$$

$$\therefore 68 \text{ or } 68\text{th or } PR_{68} \quad \leftarrow 1 \text{ mark}$$

Exemplar 1

(2 Marks)

$$\frac{0.78 \times 204}{300} = 0.53$$

Mark: 0 out of 2**Rationale:** – Incorrect solution**Exemplar 2**

(2 Marks)

Craig was in the 68th percentile

Mark: 1 out of 2**Rationale:** – Correct solution (1 mark)**Exemplar 3**

(2 Marks)

$$204 \div 300 = 0.68$$

$$0.68 \times 100 = 68\%$$

68%

Mark: 1 out of 2**Rationale:** – Correct substitution (1 mark)
– Incorrect units (%)

Question 33

(1 Mark)

Jody and Carol play on two different basketball teams. They were both ranked for points scored on their teams.

- Jody ranks in the 90th percentile on her team.
- Carol ranks in the 75th percentile on her team.

Explain whether it can be determined which player scored more points.

Answer:

You cannot determine who scored more. Percentile rank tells you where you place in a group of people. It does not give you your score.

Exemplar 1

(1 Mark)

No you can't with the info given.
You can't because you don't know how many girls are on both teams.

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

(1 Mark)

No, maybe Jody's team doesn't get many points
and she has a little bit more than the rest

Carol maybe has a lot of points
but her teammates get lots of points also

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

(1 Mark)

Jody 90th
Carol 75th

No it can't determine which player scored more points because they
play on two different teams and their percentile rank was based on
the teams not the whole league

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

Question 34

(2 Marks)

Tatiana is enrolled in a law class. The following table shows the average marks she earned and the weight for each category.

Category	Average Mark	Weight
Assignments	90	10%
Tests	65	60%
Final Exam	60	30%

Using a weighted mean, calculate Tatiana's final mark in the course.

Answer:

$$\left. \begin{array}{l} 90 \times 0.1 = 9 \\ 65 \times 0.6 = 39 \\ 60 \times 0.3 = 18 \end{array} \right\} \leftarrow 1 \text{ mark for process}$$
$$\frac{66}{66\%} \quad \leftarrow 1 \text{ mark}$$

Note to marker: Units are not required.

Exemplar 1

(2 Marks)

$$90 + 65 + 60 = 215 \div 3 = 71.7\%$$

Mark: 0 out of 2**Rationale:** – Incorrect solution**Exemplar 2**

(2 Marks)

$$\begin{array}{r} 90 \times 10 = 900 \\ 65 \times 60 = 3900 \\ 60 \times 30 = 1800 \\ \hline 6600 \end{array}$$

$$\frac{6600}{100} = 66\%$$

Mark: 2 out of 2**Rationale:** – Correct solution (2 × 1 mark)**Exemplar 3**

(2 Marks)

Category	Average Mark	Weight	
Assignments	90	10%	= 9
Tests	65	60%	= 39
Final Exam	60	30%	= 18
			<hr/> 66%

Tatiana's final mark is 66%

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

Question 35

(2 Marks)

Calculate the trimmed mean by eliminating the highest and the lowest number for the following set of data.

29	61	87	64
53	90	82	46
70	78	76	73

Answer:

$$\begin{array}{l} \text{New trimmed total:} \\ = 690 \end{array} \left. \begin{array}{l} 809 - 29 - 90 \\ \end{array} \right\} \leftarrow 1 \text{ mark for process}$$

$$\text{Trimmed } n: \quad 10$$

$$\begin{array}{l} \text{Trimmed mean:} \\ = 69 \end{array} \quad \frac{690}{10} \quad \leftarrow 1 \text{ mark}$$

Exemplar 1

(2 Marks)

29 46 53 61 64 76 70 73 78 82 87 90

Take away 29 and 90

Mark: 0 out of 2

Rationale: – Incorrect solution

Exemplar 2

(2 Marks)

$$\frac{53 + 70 + 61 + 78 + 87 + 82 + 76 + 64 + 46 + 73}{12}$$

$$= \boxed{56.6}$$

Mark: 1 out of 2

Rationale: – Correct trimmed total (1 mark)
– Incorrect solution

Exemplar 3

(2 Marks)

29	61	87	64
53	90	82	46
70	78	76	73

69

Mark: 1 out of 2

Rationale: – Correct solution (1 mark)

Appendix:

Irregularities in Provincial Tests

A Guide for Local Marking

During the marking of provincial tests, irregularities are occasionally encountered in test booklets. The following list provides examples of irregularities for which an *Irregular Test Booklet Report* should be completed and sent to the department:

- completely different penmanship in the same test booklet
- incoherent work with correct answers
- notes from a teacher indicating how he or she has assisted a student during test administration
- student offering that he or she received assistance on a question from a teacher
- student submitting work on unauthorized paper
- evidence of cheating or plagiarism
- disturbing or offensive content
- no responses provided by the student (all “NR”) or only incorrect responses (“0”)

Student comments or responses indicating that the student may be at personal risk of being harmed or of harming others are personal safety issues. This type of student response requires an immediate and appropriate follow-up at the school level. In this case, please ensure the department is made aware that follow-up has taken place by completing an *Irregular Test Booklet Report*.

Except in the case of cheating or plagiarism where the result is a provincial test mark of 0%, it is the responsibility of the division or the school to determine how they will proceed with irregularities. Once an irregularity has been confirmed, the marker prepares an *Irregular Test Booklet Report* documenting the situation, the people contacted, and the follow up. The original copy of this report is to be retained by the local jurisdiction and a copy is to be sent to the department along with the test materials.

Irregular Test Booklet Report

Test: _____

Date marked: _____

Booklet No.: _____

Problem(s) noted: _____

Question(s) affected: _____

Action taken or rationale for assigning marks: _____

Follow-up: _____

Decision: _____

Marker's Signature: _____

Principal's Signature: _____

For Department Use Only—After Marking Complete

Consultant: _____

Date: _____

