

Grade 12  
Essential Mathematics  
Achievement Test

# **Marking Guide**

June 2016

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# Marking Guidelines

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

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

**The recommended procedure for scoring student responses is as follows:**

1. Read the *Marking Guide*.
2. Study the student samples provided and the rationales for the allotted 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.

## Irregularities in Provincial Tests

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

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

## Presentation of the Student Samples

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

Test Item  
Number

Maximum Number  
of Marks Allotted

**Question 4**

(4 Marks)

Yuri wants to purchase homeowner's insurance for his house valued at \$230 000 which is located in Area 4. He wants a standard policy with a \$500 deductible. Calculate the total cost of the homeowner's insurance.

**Answer:**

<i>First \$200 000:</i>	<i>\$966</i>	<i>← 1 mark</i>
<i>Table value:</i>	<i>4.72</i>	<i>← 1 mark</i>
<i>Next \$30 000:</i>	$\frac{\$30\,000}{1000} \times 4.72$	
	<i>= \$141.60</i>	<i>← 1 mark</i>
<i>Total cost of insurance: \$966 + \$141.60</i>		
	<i>= \$1107.60</i>	<i>← 1 mark</i>

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

This section presents the test item as it appears in the student booklet, including how marks should be allotted.

**Exemplar 2**

(4 Marks)

$996 + 4.72 \times 30$

$996 + 141.6 = 1137.6 + 500 = \$1637.6$

the total cost is \$1637.6

**Mark: 3 out of 4**

**Rationale:**

- Correct table value (1 mark)
- Correct amount on first \$200 000 (1 mark)
- Correct amount on next \$30 000 (1 mark)

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

# Home Finance

## Question 1

(1 Mark)

Jin is purchasing his first house. State 1 additional (one-time) cost to consider when purchasing his house.

*Sample answers:*

<b>Additional Cost</b>
<i>utility hook-up charges</i>
<i>interest adjustment</i>
<i>property tax adjustment</i>
<i>homeowner insurance adjustment</i>
<i>land transfer tax</i>
<i>moving</i>
<i>decor/renovation</i>
<i>appliances</i>
<i>immediate repairs</i>
<i>furniture</i>
<i>property survey</i>
<i>home inspection fee</i>
<i>lawyer/legal fees</i>
<i>appraisal fee</i>
<i>mortgage insurance</i>

**Test Item and Marking Guide**

**Exemplar 1**

(1 Mark)

Heating

**Mark: 0 out of 1**

**Rationale:** - Incorrect response (ongoing cost)

**Exemplar 2**

(1 Mark)

*Jim will need to remember that in order to live in his house comfortably, he will need a bed. So, one additional (one-time) cost to consider when purchasing his house would be a bed frame.*

**Mark: 1 out of 1**

**Rationale:** - Correct response

**Exemplar 3**

(1 Mark)

*A one time cost that could be applicable to buying a house, assuming it had a previous owner, could be a house inspector.*

**Mark: 1 out of 1**

**Rationale:** - Correct response

## Question 2

(2 Marks)

### Test Item and Marking Guide

Identify the 2 advantages of renting a house compared to buying a house from the list below:

- building equity
- lower initial (up front) costs
- ability to renovate
- move/leave whenever you want without penalty
- insurance is cheaper
- not responsible for any damages

Note: Place one response per line.

Advantage 1: \_\_\_\_\_

Advantage 2: \_\_\_\_\_

*Answer:*

Advantage 1: lower initial (up front) costs

Advantage 2: insurance is cheaper

*(2 × 1 mark)*

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

**Exemplar 1**

(2 Marks)

Advantage 1: cheaper to pay forAdvantage 2: can move out anytime**Mark: 0 out of 2****Rationale:** - Two incorrect responses**Exemplar 2**

(2 Marks)

Advantage 1: Insurance is cheaperAdvantage 2: move/leave whenever you want without penalty**Mark: 1 out of 2****Rationale:** - One correct response (insurance) (1 mark)**Exemplar 3**

(2 Marks)

Advantage 1: not responsible for any damagesAdvantage 2: lower initial costs**Mark: 1 out of 2****Rationale:** - One correct response (lower initial costs) (1 mark)

**Question 3**

(4 Marks)

David took out a mortgage of \$259 000 for a new house. He has arranged financing for 4% over 20 years.

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

*Answer:*

*Table value:*  $6.04$  ← 1 mark

$$\begin{aligned}\text{Monthly mortgage payment: } & \frac{\$259\,000}{1000} \times 6.04 \\ & = \$1564.36 \quad \leftarrow 1 \text{ mark}\end{aligned}$$

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

- B) Calculate the interest on the first month's payment. (2 marks)

*Answer:*

*Interest:*  $I = Prt$

$$= \$259\,000 \times 0.04 \times \frac{1}{12} \quad \leftarrow 1 \text{ mark for all correct substitutions}$$

$$= \$863.33 \quad \leftarrow 1 \text{ mark}$$

**Exemplar 1**

(4 Marks)

A)  $\frac{259000}{6.04} = 42880.7$

B)

**Mark: 1 out of 4****Rationale:** - Correct table value in Part A (1 mark)  
- Incorrect answer in Part B**Exemplar 2**

(4 Marks)

A)  $\frac{259,000 \times 5.26}{1000} = \$1,362.34$

B)  ~~$I = Prt \quad 259,000 \times 0.04 \times 20 = 5207,00$~~   
 ~~$2.04 \times 20 =$~~   
 $5.26 \times 20 = \$105.2$

**Mark: 1 out of 4****Rationale:** - Incorrect table value in Part A  
- Correct monthly mortgage payment in Part A (follow-through error) (1 mark)  
- Incorrect answer in Part B**Exemplar 3**

(4 Marks)

A)  $\frac{259000 \times 6.04}{1000} = \$1564.36 \text{ per month}$

B)  $1564.36 \times 0.04 = \$62.57 \text{ interest}$

**Mark: 2 out of 4****Rationale:** - Correct table value in Part A (1 mark)  
- Correct monthly mortgage payment in Part A (1 mark)  
- Incorrect answer in Part B

**Question 4**

(4 Marks)

Yuri wants to purchase homeowner's insurance for his house valued at \$230 000 which is located in Area 4. He wants a standard policy with a \$500 deductible. Calculate the total cost of the homeowner's insurance.

*Answer:*

*First \$200 000:*            \$966            ← 1 mark

*Table value:*            4.72            ← 1 mark

*Next \$30 000:*             $\frac{\$30\,000}{1000} \times 4.72$   
   = \$141.60            ← 1 mark

*Total cost of insurance:* \$966 + \$141.60  
   = \$1107.60            ← 1 mark

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

**Exemplar 1**

(4 Marks)

total cost for home owners insurance is \$1107.60 with a \$500 deductible

**Mark: 1 out of 4****Rationale:** - Correct total insurance cost (1 mark)**Exemplar 2**

(4 Marks)

$$996 + 4.72 \times 30$$

$$996 + 141.6 = 1137.6 + 500 = \$1637.6$$

the total cost is \$1637.6

**Mark: 2 out of 4****Rationale:** - Incorrect amount on first \$200 000  
- Correct table value (1 mark)  
- Correct amount on next \$30 000 (1 mark)**Exemplar 3**

(4 Marks)

$$\$200,000.00 \text{ at } \$966.00$$

$$\$30,000.00 \text{ at } \$141,600.00$$

$$\$4.72 \times \$30,000.00$$

$$= \$141,600.00$$

$$\$966.00 + \$141,600.00$$

$$= \$142,566.00$$

Yuri's homeowners' insurance will cost him \$142,566.00 for his \$230,000.00 house

**Mark: 3 out of 4****Rationale:** - Correct amount on first \$200 000 (1 mark)  
- Correct table value (1 mark)  
- Correct total insurance cost (follow-through error) (1 mark)

**Question 5**

(4 Marks)

Marcía earns \$52 500 annually and wants to buy a new house. Her monthly mortgage payments will be \$725, the monthly property taxes will be \$262.50, and the monthly heating costs will be \$215.

- A) Calculate Marcía's Gross Debt Service Ratio (GDSR). (3 marks)

**Answer:**

*Gross monthly income:*  $\$52\,500 \div 12 = \$4375$

*Monthly mortgage + property + heating*

$$GDSR = \frac{\text{payment} \quad \text{taxes} \quad \text{costs}}{\text{Gross monthly income}} \times 100$$

$$= \left( \frac{\$725 + \$262.50 + \$215}{\$4375} \right) \times 100 \left\{ \begin{array}{l} \text{No mark for 1 correct substitution} \\ \text{OR} \\ \text{1 mark for 2 or 3 correct substitutions} \\ \text{OR} \\ \text{2 marks for all correct substitutions} \end{array} \right.$$

$$= 27.5\% \quad \leftarrow 1 \text{ mark}$$

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

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

**Answer:**

*Yes, Marcía will be approved because her GDSR is below 32%.*

**Note to marker:** Students must refer to 32%.

**Exemplar 1**

(4 Marks)

A)  $\frac{\$725 + 262.50 + 215}{52,500} \times 100 = 987.90$

B) No because its over 42%

**Mark: 1 out of 4**

**Rationale:** - Three correct substitutions in Part A (1 mark)  
- Incorrect response in Part B

**Exemplar 2**

(4 Marks)

A)  $\frac{725 + 262 + 215}{52,500} \times 100 = 2.289$

B) Yes because the GDSR is low

**Mark: 2 out of 4**

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

**Exemplar 3**

(4 Marks)

A)  $\frac{52500}{12} \quad \frac{\$725 + \$262.50 + \$215}{\$4375} \times 100$   
 $= 4375\$ \quad = 27.5\%$

B) No, GDSR HAS TO BE 23% OR LOWER

**Mark: 3 out of 4**

**Rationale:** - All correct substitutions in Part A (2 marks)  
- Correct GDSR in Part A (1 mark)  
- Incorrect response in Part B

**Question 6**

(1 Mark)

State 1 energy-efficient improvement available to homeowners.

*Sample answers:*

- *high efficiency furnace*
- *energy efficient windows*
- *energy efficient washer and dryer*
- *high efficiency hot water tank*

**Exemplar 1**

(1 Mark)

*Windows*

**Mark: 0 out of 1**

**Rationale:** - Insufficient response

**Exemplar 2**

(1 Mark)

*instead of electric heat you can burn wood to heat your home*

**Mark: 0 out of 1**

**Rationale:** - Incorrect response

**Exemplar 3**

(1 Mark)

*Energy efficient appliances*

**Mark: 1 out of 1**

**Rationale:** - Correct response

**Exemplar 4**

(1 Mark)

*replace an old wood stove with a new high efficiency stove*

**Mark: 1 out of 1**

**Rationale:** - Correct response

# Probability

## Question 7

(2 Marks)

Josephine has placed 3 white, 5 blue, and 6 purple marbles in a bag.

- A) State the probability of randomly selecting a purple marble from the bag. (1 mark)

*Answer:*

$\frac{6}{14}$  or  $\frac{3}{7}$  or 0.43 or 43% or 3:7 or 3 out of 7

- B) A purple marble is pulled out of the bag and not replaced. State the probability of randomly selecting another purple marble from the bag. (1 mark)

*Answer:*

$\frac{5}{13}$  or 0.38 or 38% or 5:13 or 5 out of 13

*Note to marker: Accept equivalent representations.*

**Exemplar 1**

(2 Marks)

A)  $P(\text{select purple}) = \frac{6}{8} = 6 : 8$

B)  $P\left(\begin{array}{c} \text{selecting another} \\ \text{purple} \end{array}\right) = \frac{5}{8} = 5 : 8$

**Mark: 0 out of 2**

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

**Exemplar 2**

(2 Marks)

A)  $P(\text{purple marble}) = \frac{\text{can}}{\text{total}} = \frac{6}{14} * 100 = 42.8557$   
 $= 43\% \text{ chance of}$   
 $\text{selecting a purple marble}$

B)  $P(\text{purple marble}) = \frac{5}{14}$

**Mark: 1 out of 2**

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

**Exemplar 3**

(2 Marks)

A)  $6 + 5 + 3 = 14 \text{ marbles}$

$$\frac{6}{14} = 0.428571428 \times 100 =$$

$= 43\% \text{ probability of pulling out a purple marble}$

B)  $13 \text{ marbles}$

$$\frac{5}{13} \times 100 = 38\% \text{ probability of pulling another purple marble}$$

**Mark: 2 out of 2**

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

**Question 8**

(1 Mark)

State the odds in favour of a tidal wave occurring given that the probability for this event is 3 out of 147.

*Answer:*

*3 : 144 or 3 to 144*

**Exemplar 1**

(1 Mark)

$$\frac{3}{147} \times 100 = 2\%$$

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

(1 Mark)

$$P(\text{tidal wave}) = \frac{3}{147} \quad 3:147$$

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

(1 Mark)

3:144
-------

The odds are 3 to 144 of a Tidal wave happening.

**Mark: 1 out of 1****Rationale:** - Correct answer

**Question 9**

(4 Marks)

A game at a summer carnival costs \$2 to play. The prize at this game is a stuffed animal valued at \$10. The probability of winning the game is 27%.

- A) Calculate the expected value (EV) for the game from the player's perspective. (3 marks)

**Answer:**

$$\begin{aligned} \$gain &= \$10 - \$2 \\ &= \$8 \\ \$loss &= \$2 \end{aligned}$$

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

$$\begin{aligned} &= (0.27)(\$8) - (0.73)(\$2) \\ &= \$0.70 \end{aligned} \quad \left\{ \begin{array}{l} \text{No mark for 1 correct substitution} \\ \text{OR} \\ \text{1 mark for 2 or 3 correct substitutions} \\ \text{OR} \\ \text{2 marks for all correct substitutions} \end{array} \right.$$

← 1 mark

**OR**

$$\begin{aligned} \text{Average winnings: } &(0.27)(\$10) \\ &= \$2.70 \quad \leftarrow 2 \text{ marks} \\ EV &= \$2.70 - \$2.00 \\ &= \$0.70 \quad \leftarrow 1 \text{ mark} \end{aligned}$$

- B) Justify whether the **owner** of the game should continue offering it at the carnival based on your answer in Part A. (1 mark)

**Sample answers:**

- No, it has a positive expected value for the player so the owner will lose money over time.
- No, it has a negative expected value for the owner.

**Note to marker:** Accept all reasonable justifications.

**Exemplar 1**

(4 Marks)

A)  $E = P_{win} \times gain - P(lose) \times \$loss$

$$\$2 \times \$10 - \frac{27}{100} \times 8 = 17.84$$

B) *yes the owner should because expected value is greater than \$10*

**Mark: 1 out of 4**

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

**Exemplar 2**

(4 Marks)

A)  $.27 \times \$10 - .73 \times \$2$   
 $.27 - 1.46$   
 $-1.24$

B) *Yes, higher positive outcome. If played multiple times, should go positive.*

**Mark: 2 out of 4**

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

**Exemplar 3**

(4 Marks)

A)  $\frac{27}{100}$  ~~reduced~~ =

win  $\frac{27}{100} \times 10 - 2 = 2.16$

game lose  $\frac{73}{100} \times 0 - 2 = -1.46$

$2.16 + -1.46 = \boxed{0.70}$

B) *The owner is making a profit of 70 cents per play so he should continue*

**Mark: 3 out of 4**

- Rationale:**
- All correct substitutions in Part A (2 marks)
  - Correct EV in Part A (1 mark)
  - Incorrect response in Part B

**Question 10**

(2 Marks)

State the probability of “13 out of 50” as a decimal and a percent.

Decimal: \_\_\_\_\_

Percent: \_\_\_\_\_

*Answers:*

Decimal: 0.26 ← 1 mark

Percent: 26% ← 1 mark

*(2 × 1 mark)*

**Test Item and Marking Guide**



**Question 11**

(1 Mark)

A group of 30 students were given 4 choices and asked to choose their favourite colour. The results were as follows:

Red	Blue	Yellow	Green
9	12	6	3

The teacher states “If I choose a student at random, there is a 25% probability that their favourite colour is green.”

The teacher’s claim is an example of theoretical probability. Justify the teacher’s claim.

*Sample answers:*

- *The students were given four choices and green is one choice.*
- *The theoretical probability does not depend on what other students have chosen.*

**Exemplar 1**

(1 Mark)

$$\frac{3}{30} = .1$$

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

(1 Mark)

$$P(\text{green}) = \frac{3}{27}$$

$$3 : 27$$

$$27 : 3$$

*There are only 3 green marbles while there are multiple other colours to choose from so if she picks a student she probably won't pick the student whose fav colour is green.*

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

(1 Mark)

*the student has 4 choices. so there is a 25% chance that he or she will pick green.*

*1 out of 4*

$$\frac{1}{4} = .25$$

**Mark: 1 out of 1****Rationale:** - Correct response

**Question 12**

(1 Mark)

Choose the letter that best completes the statement below.

Sharon would like to borrow a specific book from the local library. The odds **against** the book being available are 1 : 99. The probability of the book being available is:

- a)  $\frac{2}{98}$
- b)  $\frac{99}{1}$
- c)  $\frac{1}{100}$
- d)  $\frac{99}{100}$

*Answer:*     d)



# Vehicle Finance

## Question 13

(2 Marks)

Omar buys a new car with a base price of \$21 800 and purchases the following options:

Navigation system: \$1000

Sound system: \$800

Calculate the cost, after taxes, of purchasing the new vehicle if he receives \$3000 for his trade-in.

*Answer:*

$$\begin{array}{r} \$21\,800 + \$1000 + \$800 = \$23\,600 \\ \text{Subtract trade-in:} \quad \underline{- \$3000} \\ \text{Subtotal:} \quad \quad \quad \underline{\$20\,600} \quad \leftarrow 1 \text{ mark} \\ \text{Add taxes:} \quad \quad \quad \times 1.13 \\ \text{Total Cost:} \quad \quad \quad \underline{\$23\,278} \quad \leftarrow 1 \text{ mark} \end{array}$$

**Test Item and Marking Guide**

**Exemplar 1**

(2 Marks)

$$\begin{array}{r}
 \text{base price} - 21800 \\
 \text{navigation system} - 1000 \\
 \text{sound system} - 800 \\
 \hline
 \$23600 \\
 \times 1.13 \\
 \hline
 \$26668 \\
 - 3000 \\
 \hline
 \$23668
 \end{array}$$

**Mark: 1 out of 2**

- Rationale:** - Incorrect subtotal  
 - Correct total (follow-through error) (1 mark)

**Exemplar 2**

(2 Marks)

$$\begin{array}{r}
 21,800 \\
 \text{trade} - 3000
 \end{array}$$

$$\begin{array}{r}
 \text{taxes} \\
 1000 \times 13 = 1130 \\
 800 \times 13 = 104
 \end{array}$$

$$21,800 - 3000 = 18,800$$

$$\begin{array}{r}
 1000 \\
 + 130 \\
 \hline
 \text{navigation} = 1130
 \end{array}$$

$$\begin{array}{r}
 \cancel{18,800} \\
 \cancel{1000} \\
 \hline
 \cancel{800} \\
 \hline
 \cancel{20,600}
 \end{array}$$

$$\begin{array}{r}
 \text{sound system} = 800 \\
 + 104 \\
 \hline
 904
 \end{array}$$

$$\begin{array}{r}
 20,244 \\
 + 1,130 \\
 904 \\
 \hline
 \boxed{22,278} \\
 \text{taxes}
 \end{array}$$

$$\begin{array}{r}
 18,800 \times 0.13 = 2,444 \\
 18,800 \\
 + 2,444 \\
 \hline
 20,244
 \end{array}$$

**Mark: 1 out of 2**

- Rationale:** - Correct subtotal (1 mark)  
 - Incorrect total cost

**Exemplar 3**

(2 Marks)

$$21\,800 - 3000 + 1000 + 800 = 20\,600 \times 1.13 = \$23\,278$$

**Mark: 2 out of 2**

- Rationale:** - Correct subtotal (1 mark)  
 - Correct total cost (1 mark)

**Question 14**

(1 Mark)

State 1 disadvantage of buying a used vehicle.

*Sample answers:*

- *no warranty*
- *you do not know how the car was taken care of before you purchased it*
- *hidden damage*
- *can't build a used car to order*
- *may not have all the newest safety features or technologies*
- *higher interest rate for financing*

**Exemplar 1**

(1 Mark)

*paying the same insurance as a new vehicle, maintenance costs a lot.*

**Mark: 0 out of 1****Rationale:** - Correct response not clearly indicated**Exemplar 2**

(1 Mark)

*it could have mechanical problems*

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

(1 Mark)

*you usually do not have any warranty left*

**Mark: 1 out of 1****Rationale:** - Correct response

**Question 15**

(2 Marks)

Michel is purchasing a new vehicle. The price of the vehicle is \$30 000 and it will depreciate 20% in the first year.

Calculate the value of the vehicle after the first year.

*Answer:*

$$\begin{aligned} \text{Depreciation amount: } & \$30\,000 \times 0.20 \\ & = \$6000 && \leftarrow 1 \text{ mark} \end{aligned}$$

$$\begin{aligned} \text{Value: } & \$30\,000 - \$6000 \\ & = \$24\,000 && \leftarrow 1 \text{ mark} \end{aligned}$$

**OR**

$$\begin{aligned} \text{Value: } & \$30\,000 \times 0.80 && \leftarrow 1 \text{ mark} \\ & = \$24\,000 && \leftarrow 1 \text{ mark} \end{aligned}$$

**Exemplar 1**

(2 Marks)

$$30,000 - 0.20\% = 29,999.80$$

**Mark: 0 out of 2****Rationale:** - Incorrect depreciation amount  
- Incorrect value**Exemplar 2**

(2 Marks)

 $\$24\,000$ **Mark: 1 out of 2****Rationale:** - Correct value (1 mark)**Exemplar 3**

(2 Marks)

 $\$30,000 - 20\% = \$24,000$  after the first year**Mark: 2 out of 2****Rationale:** - Correct depreciation amount (1 mark)  
- Correct value (1 mark)

## Question 16

(2 Marks)

Manhattan is considering leasing a vehicle for her courier company. State 2 reasons why she **should not** lease a vehicle.

Note: Place one response per line.

Reason 1: \_\_\_\_\_

Reason 2: \_\_\_\_\_

*Sample answers:*

- *excess kilometres will cost more*
- *excess damage to the leased vehicle will result in more charges at the end of the lease (Damages may not need to be repaired on an owned vehicle if they are cosmetic in nature.)*
- *always have a monthly payment*
- *by leasing, the vehicle cannot be used as an asset to secure additional funds (borrowing from a bank)*
- *leasing is more expensive than buying in the long run*

*(2 × 1 mark)*

### Exemplar 1

(2 Marks)

- Because it's not 100% yours
- you have to keep it the way it is no changing anything about the car

**Mark: 1 out of 2**

**Rationale:** - Incorrect response (ownership)  
- Correct response (no modifications) (1 mark)

### Exemplar 2

(2 Marks)

- you don't keep the vehicle in the end
- There is a limit on how many kms you can drive it

**Mark: 1 out of 2**

**Rationale:** - Incorrect response (ownership)  
- Correct response (kms) (1 mark)

### Exemplar 3

(2 Marks)

- you get charged for extra km's you drive
- you don't get your deposit back if there are any damages, for example from gravel

**Mark: 2 out of 2**

**Rationale:** - Two correct responses

**Question 17**

(3 Marks)

The fuel economy of Gina's vehicle is 7 L/100 km. She is planning to drive her vehicle from Winnipeg to Toronto, a distance of 2230 kilometres.

- A) Determine the total amount of fuel in litres required for the trip. (2 marks)

*Answer:*

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

$$7\text{L}/100\text{ km} = \frac{\text{Fuel used in litres}}{2230\text{ km}} \quad \leftarrow 1\text{ mark}$$

$$\text{Fuel used in litres} = 2230\text{ km} \times \frac{7\text{ L}}{100\text{ km}}$$

$$\text{Fuel used in litres} = 156.1\text{ L} \quad \leftarrow 1\text{ mark}$$

**OR**

$$\left. \frac{7\text{ L}}{100\text{ km}} = \frac{x}{2230\text{ km}} \right\} \leftarrow 1\text{ mark for process}$$

$$x = 156.1\text{ L} \quad \leftarrow 1\text{ mark}$$

*Note to marker: Units are not required.*

- B) Determine the cost of the trip if the fuel price is \$1.30/L. (1 mark)

*Answer:*

$$\begin{aligned} \text{Cost} &= 156.1\text{ L} \times \$1.30/\text{L} \\ &= \$202.93 \end{aligned} \quad \leftarrow 1\text{ mark}$$

**Exemplar 1**

(3 Marks)

$$A) \frac{7L \times 100}{2230} = 0.31390L / 100km$$

$$B) \frac{1.30}{100} \times 2230$$

$$= \$28.99$$

**Mark: 0 out of 3**

- Rationale:**
- Incorrect process in Part A
  - Incorrect litres in Part A (units)
  - Incorrect answer in Part B

**Exemplar 2**

(3 Marks)

$$A) 7 \times 12.3 = 86 / L$$

$$B) 86.1 \times 1.30 = \$111.93$$

**Mark: 1 out of 3**

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

**Exemplar 3**

(3 Marks)

$$A) FE = \frac{7L \times 2230}{100} = 156L$$

$$B) 156L \times \$1.30 = \$202.80$$

**Mark: 3 out of 3**

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

## Question 18

(4 Marks)

Alicia is purchasing a new vehicle for \$24 000, after taxes. She is financing the vehicle for 4% over 5 years.

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

- A) Calculate Alicia's monthly vehicle payment. (2 marks)

*Answer:*

*Table value:*            18.42                      ← 1 mark

$$\begin{aligned} \text{Monthly payment: } & \frac{\$24\,000}{1000} \times 18.42 \\ & = \$442.08 \qquad \leftarrow 1 \text{ mark} \end{aligned}$$

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

- B) Calculate the total amount of interest she will pay over the 5 years. (2 marks)

*Answer:*

$$\begin{aligned} \text{Total amount paid: } & \$442.08 \times 12 \times 5 \\ & = \$26\,524.80 \qquad \leftarrow 1 \text{ mark} \end{aligned}$$

$$\begin{aligned} \text{Total interest: } & \$26\,524.80 - \$24\,000 \\ & = \$2524.80 \qquad \leftarrow 1 \text{ mark} \end{aligned}$$

**Exemplar 1**

(4 Marks)

A)  $\frac{24000}{1000} \times 22.58 = \text{\$}541.92$

B)  $I = prt$

$$I = 24000 \times 0.04 \times 5 = \text{\$}4800$$

**Mark: 1 out of 4**

- Rationale:**
- Incorrect table value in Part A
  - Correct monthly payment in Part A (follow-through error) (1 mark)
  - Incorrect answer in Part B

**Exemplar 2**

(4 Marks)

A)  $\frac{24000}{1000} \times 18.42 = \text{\$}442.08$

B)  $24000 \times 4 \times 5 = \text{\$}4800$

**Mark: 2 out of 4**

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

**Exemplar 3**

(4 Marks)

A)  $\text{\$}24000 \times \frac{18.42}{1000} = \text{\$}442.08$

B)  $\text{\$}442.08 \times 5 = \text{\$}2210.40$

**Mark: 2 out of 4**

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

## Question 19

(2 Marks)

Julie is moving from rural Manitoba to Winnipeg for her job. Her insurance broker told her that it will now be more expensive to insure her car.

A) State why Julie's premiums will increase. (1 mark)

*Sample answers:*

- Higher traffic volume in Winnipeg. This means there is a higher risk of making a claim.
- She increased her third-party liability.
- Winnipeg is in Territory 1, and MPI charges more to insure the vehicle in this area.

B) Julie retires from her job and wants to continue driving her car. State what she can do to decrease her premiums. (1 mark)

*Sample answers:*

- Julie should change her insurance from all-purpose to pleasure.
- Julie could increase her deductible.
- Julie could decrease her third party liability.

## Exemplar 1

(2 Marks)

A) *There is a greater likelihood of her getting in an accident because there are more vehicles in the city.*

B) *She could get a different plan!*

**Mark: 1 out of 2**

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

## Exemplar 2

(2 Marks)

A) *She needs to drive to work every single day on city streets, which are busier so having an accident is more likely.*

*++Risk*

*++cost*

B) *Move back to the country, drive less.*

**Mark: 1 out of 2**

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

## Exemplar 3

(2 Marks)

A) *Risk*

B) *Change it from a work vehicle to pleasure*

**Mark: 1 out of 2**

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

# Geometry and Trigonometry

## Question 20

(2 Marks)

Pedro is building a triangular roof for a house. He would like to build it as steep as possible so snow does not accumulate on the roof.

- A) State whether Pedro's roof should be an equilateral or isosceles triangle. (1 mark)

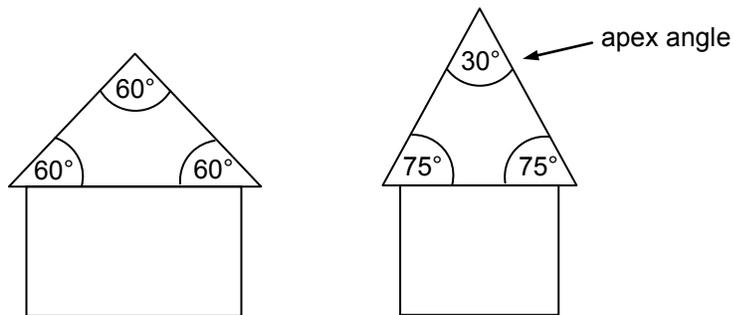
*Answer:*

*Isosceles*

- B) Justify your answer from Part A. (1 mark)

*Sample answers:*

- *Isosceles can provide the steepest pitch provided that the apex angle is less than  $60^\circ$ .*
- *Base angles are greater than  $60^\circ$ .*

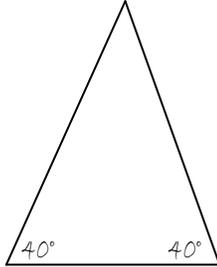


*Note to marker: Accept a properly labelled sketch as a justification.*

## Exemplar 1

(2 Marks)

- A) He should have an isosceles triangle so that the snow can evenly fall off both sides of the roof
- B)



**Mark: 1 out of 2**

- Rationale:**
- Correct triangle in Part A (1 mark)
  - Incorrect justification in Part B (base angle)

## Exemplar 2

(2 Marks)

- A) ISOSCELES
- B) BECAUSE THE ROOF WOULD BE AT ITS STEEPEST IF YOU MAKE 2 SIDES EQUAL RATHER THAN 3

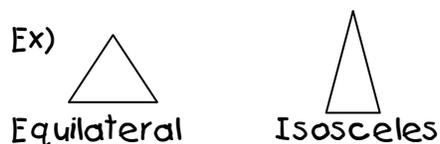
**Mark: 1 out of 2**

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

## Exemplar 3

(2 Marks)

- A) It should be an isosceles
- B) because then he could have longer sides and thus steeper angles.



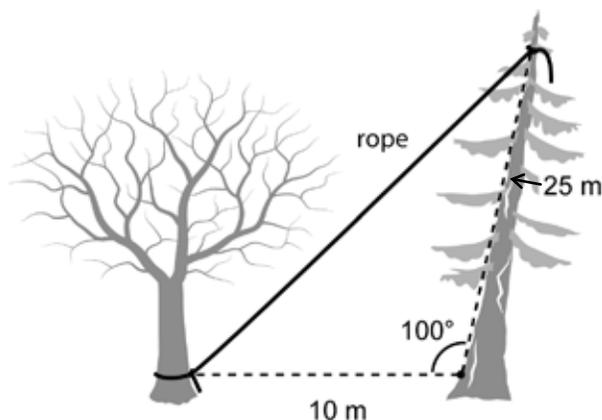
**Mark: 2 out of 2**

- Rationale:**
- Correct triangle in Part A (1 mark)
  - Correct justification in Part B (1 mark)

## Question 21

(2 Marks)

A gardener has been hired to stabilize a spruce tree that was damaged in a wind storm. The gardener decides to attach a rope from 25 metres up the spruce tree to the base of another tree 10 metres away. Calculate the length of the rope between the 2 trees, as shown in the diagram (excluding the knots).



*Answer:*

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

$$a^2 = (10)^2 + (25)^2 - 2(10)(25) \cos 100^\circ$$

$$a^2 = 100 + 625 - 500 \cos 100^\circ$$

$$a^2 = 725 - 500(-0.1736)$$

$$a^2 = 811.8$$

$$a = \sqrt{811.8}$$

$$a = 28.5 \text{ m}$$

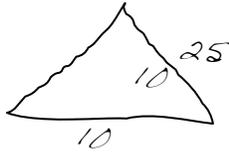
← 1 mark for process

← 1 mark

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

**Exemplar 1**

(2 Marks)



cosine

$$a^2 = 10^2 + 25^2 - 2(10)(25) \times \cos 100$$
$$100 + 625 - 500 \times .98$$
$$725 - 490$$
$$= 15.3m$$

**Mark: 1 out of 2**

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

**Exemplar 2**

(2 Marks)

cosine

$$a^2 = b^2 + c^2 - 2(b)(c) \cos A$$
$$a^2 = 25^2 + 10^2 - 2(25)(10) \cos 100^\circ$$
$$a^2 = 625 + 100 - 2(250) \cos 100$$
$$a^2 = 725 - 500 \cos 100$$
$$a^2 = 225 \cos 100$$

**Mark: 1 out of 2**

**Rationale:** - Correct process (1 mark)  
- Incorrect final answer

**Exemplar 3**

(2 Marks)

$$a^2 = 10^2 + 25^2 - 2(10)(25) \cos 100$$

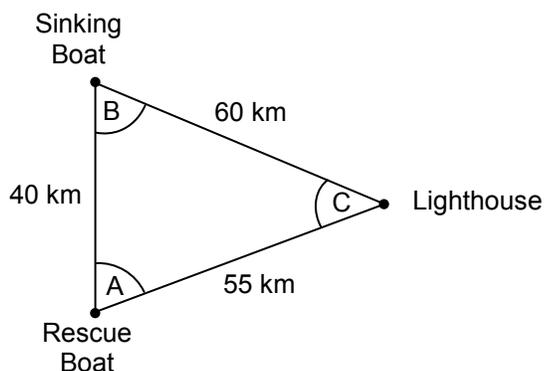
**Mark: 1 out of 2**

**Rationale:** - Correct process (1 mark)  
- Incorrect final answer

## Question 22

(2 Marks)

Given the following situation:



- A) Identify the formula that would be most appropriate to solve for angle A. (1 mark)

a)  $\cos A = \frac{\text{adj}}{\text{hyp}}$

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

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

d)  $\sin A = \frac{\text{opp}}{\text{hyp}}$

*Answer:*     b)    

- B) Justify your choice from Part A. (1 mark)

*Answer:*

*You are given three sides to solve an angle; therefore, you use cosine law.*

**Exemplar 1**

(2 Marks)

A) Answer:         *b*        B) *I would choose this method because it would find the angle more accurately.***Mark: 1 out of 2****Rationale:** - Correct answer in Part A (1 mark)  
- Incorrect justification in Part B**Exemplar 2**

(2 Marks)

A) Answer:         *B*        B) *you are given all the info, just have to plug it in***Mark: 1 out of 2****Rationale:** - Correct answer in Part A (1 mark)  
- Insufficient justification in Part B**Exemplar 3**

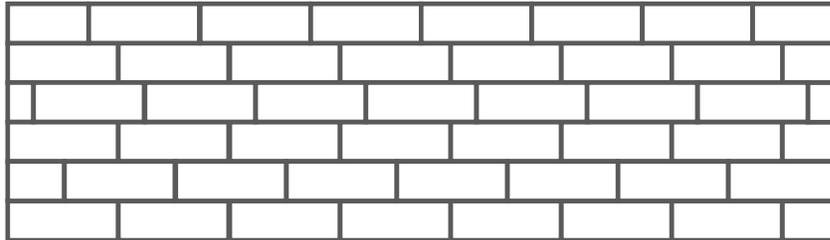
(2 Marks)

A) Answer:         *b*        B) *It is not right angle which eliminates a and d. It has 3 sides which means cosine law.***Mark: 2 out of 2****Rationale:** - Correct answer in Part A (1 mark)  
- Correct justification in Part B (1 mark)

**Question 23**

(2 Marks)

Bob is building a brick wall using rectangular bricks.



State 2 properties of polygons that allow for a rectangular wall to be completed using the bricks.

Note: Place one response per line.

Property 1: \_\_\_\_\_

Property 2: \_\_\_\_\_

*Sample answers:*

- *Opposite sides are the same length*
- *Opposite sides are parallel*
- *Four right angles*
- *Diagonals are congruent*

*(2 × 1 mark)*

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

**Exemplar 1**

(2 Marks)

Property 1: *because all sides are equal*

Property 2: \_\_\_\_\_

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

(2 Marks)

Property 1: *parallel sides the same*Property 2: *Flat edges***Mark: 1 out of 2****Rationale:** - One correct response (parallel sides) (1 mark)**Exemplar 3**

(2 Marks)

Property 1: *opposite sides lengths or widths are equal*Property 2: *angles fit together because they are all  $90^\circ$* **Mark: 2 out of 2****Rationale:** - Two correct responses (2 x 1 mark)

**Question 24**

(2 Marks)

Consider a regular polygon with 17 sides.

A) State the number of diagonals in this polygon. (1 mark)

*Answer:*

$$\begin{aligned} D &= \frac{n(n-3)}{2} \\ &= \frac{17(17-3)}{2} \\ &= 119 \text{ diagonals} \quad \leftarrow 1 \text{ mark} \end{aligned}$$

B) State the central angle of this polygon. (1 mark)

*Answer:*

$$\begin{aligned} C &= \frac{360^\circ}{n} \\ &= \frac{360^\circ}{17} \\ &= 21.18^\circ \quad \leftarrow 1 \text{ mark} \end{aligned}$$

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

**Exemplar 1**

(2 Marks)

A)  $\frac{360}{17} = 21.17 = 22$

B)

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

(2 Marks)

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

$$D = \frac{17(17-3)}{2}$$

$$D = \frac{17 \times 3}{2}$$

$$D = 25.5$$

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

$$C = \frac{360^\circ}{17}$$

$$C = 21.17$$

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

(2 Marks)

A)  $\frac{17(14)}{2} = 119$  DIAGONALS

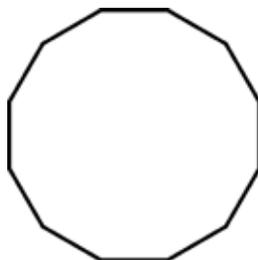
B)  $\frac{360}{17} = 21.2^\circ$

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

**Question 25**

(2 Marks)

A regular dodecagon is a 12-sided figure.

**Dodecagon**

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

*Answer:*

$$\begin{aligned} S &= 180^\circ(n - 2) \\ &= 180^\circ(12 - 2) \\ &= 180^\circ(10) \\ &= 1800^\circ \quad \leftarrow 1 \text{ mark} \end{aligned}$$

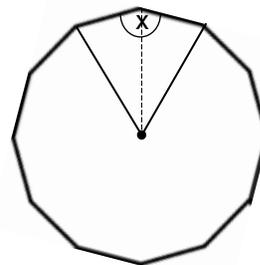
B) State the measure of one interior angle. (1 mark)

*Answer:*

$$\begin{aligned} \text{Interior angle} &= \frac{1800}{n} \\ &= \frac{1800}{12} \\ &= 150^\circ \quad \leftarrow 1 \text{ mark} \end{aligned}$$

**OR**

$$\begin{aligned} \text{Central angle:} & \quad \frac{360^\circ}{n} = 30^\circ \\ \text{Angle at base of triangle:} & \quad \frac{180 - 30}{2} = 75^\circ \\ \text{Interior angle:} & \quad 75 \times 2 \\ & \quad = 150^\circ \end{aligned}$$



$\leftarrow 1 \text{ mark}$

*Note to marker: Units are not required.*

**Exemplar 1**

(2 Marks)

A)  $18 \quad 180^\circ(12-2)10$

B)

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

(2 Marks)

A)  $180^\circ(12-2) = 1800$

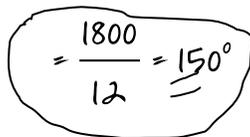
B)  $30^\circ$ **Mark: 1 out of 2****Rationale:** - Correct answer in Part A (1 mark)  
- Incorrect answer in Part B**Exemplar 3**

(2 Marks)

A)  $180(12-2)$

$$\underline{1800^\circ}$$

B)  $150^\circ$ 

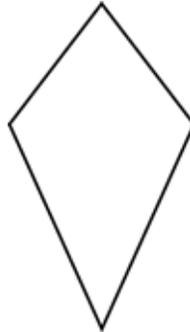

$$= \frac{1800}{12} = \underline{150^\circ}$$

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

**Question 26**

(2 Marks)

A kite is a type of polygon. State 2 properties of this polygon.

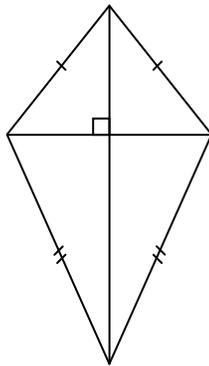


Note: Place one response per line.

Property 1: \_\_\_\_\_

Property 2: \_\_\_\_\_

*Sample answers:*



- *Diagonals intersect at  $90^\circ$*
- *Two pairs of adjacent congruent sides*
- *Angles between unequal sides are equal*
- *One of the diagonals bisects the other diagonal*

*(2 × 1 mark)*

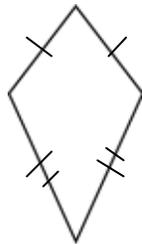
**Note to marker:** Award a maximum mark of 1 mark for each line.

**Exemplar 1**

(2 Marks)

Property 1: equal lengthsProperty 2: equal angles**Mark: 0 out of 2****Rationale:** - Two incorrect responses**Exemplar 2**

(2 Marks)

Property 1: All sides have an equal other sideProperty 2: can determine the angle if needed to**Mark: 1 out of 2****Rationale:** - One correct response (sides—as marked on the diagram) (1 mark)**Exemplar 3**

(2 Marks)

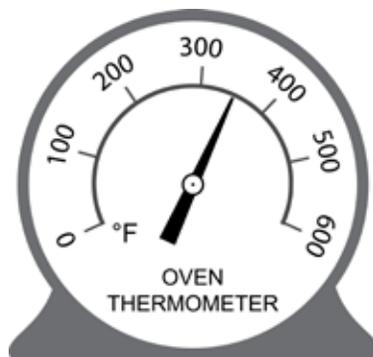
Property 1: opposite sides have equal lengthProperty 2: measure of consecutive angles are not equal**Mark: 1 out of 2****Rationale:** - One correct response (angles) (1 mark)

# Precision Measurement

## Question 27

(2 Marks)

State the precision and uncertainty of the oven thermometer shown below.



Precision: \_\_\_\_\_

Uncertainty: \_\_\_\_\_

*Answer:*

Precision: 100°F ← 1 mark

Uncertainty: 50°F ← 1 mark

(2 × 1 mark)

*Note to marker: Units are not required.*

**Exemplar 1**

(2 Marks)

Precision: 50Uncertainty: 350**Mark: 0 out of 2****Rationale:** - Two incorrect answers**Exemplar 2**

(2 Marks)

Precision: 1Uncertainty:  $1/2 = .5$   
 $350 \pm .5$ **Mark: 1 out of 2****Rationale:** - One correct answer (uncertainty) (follow-through error) (1 mark)**Exemplar 3**

(2 Marks)

Precision: 100Uncertainty: 50**Mark: 2 out of 2****Rationale:** - Two correct answers (2 x 1 mark)

**Question 28**

(1 Mark)

A student measured a piece of rope using 5 different measuring tapes with the same precision. He recorded the following measurements:

5.34 m	5.32 m	5.37 m	5.34 m	5.38 m
--------	--------	--------	--------	--------

State the precision of the measuring tapes.

*Answer:*

*0.01 m (units are not required) or 1 cm (units are required) ← 1 mark*

**Exemplar 1**

(1 Mark)

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

(1 Mark)

5.34 m	+	5.32 m	+	5.37 m	+	5.34 m	+	5.38 m
--------	---	--------	---	--------	---	--------	---	--------

*705**= 5.35***Mark: 0 out of 1****Rationale:** - Incorrect answer**Exemplar 3**

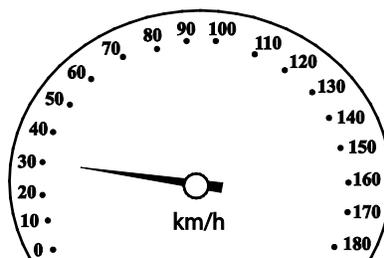
(1 Mark)

*0.01***Mark: 1 out of 1****Rationale:** - Correct answer

**Question 29**

(1 Mark)

The speed limit in a school zone is 30 km/h. Evan's speedometer reads 30 km/h. Explain why Evan may be pulled over for exceeding the speed limit using one of the following concepts: accuracy, tolerance, uncertainty, or precision.



*Sample answers:*

- *Evan's speedometer could be inaccurate.*
- *The speedometer's reading has an uncertainty of 5 km/hr.*
- *The officer's radar instrument may not be calibrated accurately.*
- *The officer's radar instrument may have a very low tolerance for speeding (e.g.,  $30 \text{ km}_0^{4\text{km/hr}}$ ).*

**Exemplar 1**

(1 Mark)

EVAN'S SPEEDOMETER MIGHT BE WRONG.

**Mark: 0 out of 1**

**Rationale:** - Insufficient response

**Exemplar 2**

(1 Mark)

*Because cops can be mean.*

*But seriously the speedometer could be off by  $\pm 1$  km*

**Mark: 1 out of 1**

**Rationale:** - Correct response

**Exemplar 3**

(1 Mark)

*because it might not be very accurate*

**Mark: 1 out of 1**

**Rationale:** - Correct response

**Question 30**

(2 Marks)

A company makes sticks for frozen fruit snacks with a measurement of  $15.5 \text{ cm}^{+0}_{-0.2 \text{ cm}}$ .

A) State the maximum length. (1 mark)

*Answer:*

*15.5 cm*

B) State the minimum length. (1 mark)

*Answer:*

*15.3 cm*

*Note to marker: Units are not required.*

**Exemplar 1**

(2 Marks)

A)  $15.5 + 0 = 15.5$

B)  $15.5 - 0.2$   
 $= 15.7$

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

(2 Marks)

A)  $15.7 < 18$

B)  $15.3 < 18$

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

(2 Marks)

A)  $15.5$

B)  $15.3$

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

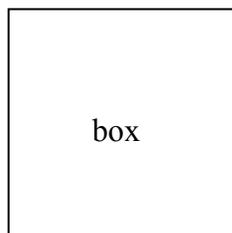
**Question 31**

(2 Marks)

Rajiv places 4 boxes side by side. Each box is built to measure  $12'' \pm \frac{1}{32}''$  in width.

Calculate the combined width of the boxes in the format:

**measurement  $\pm$  uncertainty**



$$12'' \pm \frac{1}{32}''$$

*Answer:*

$$12'' \pm \frac{1}{32}''$$

$$12'' \pm \frac{1}{32}''$$

$$12'' \pm \frac{1}{32}''$$

$$12'' \pm \frac{1}{32}''$$

---

$$\underbrace{48''}_{1 \text{ mark}} \pm \underbrace{\frac{4}{32}}_{1 \text{ mark}}''$$

*Note to marker: Units are not required.*

**Exemplar 1**

(2 Marks)

$$484/128$$

$$32 \times 4 = 128$$

**Mark: 0 out of 2**

**Rationale:** - Incorrect measurement  
- Incorrect uncertainty

**Exemplar 2**

(2 Marks)

$$\text{total width} = 48.0 \text{ in} \pm 0.5 \text{ in}$$

**Mark: 1 out of 2**

**Rationale:** - Correct measurement (1 mark)  
- Incorrect uncertainty

**Exemplar 3**

(2 Marks)

$$\begin{aligned} &12'' \pm 0.03125 \\ &\frac{12.03125 + 11.96875}{2} \\ &= 12 \end{aligned}$$

$$\text{total width} = 48'' \pm 1/32$$

**Mark: 1 out of 2**

**Rationale:** - Correct measurement (1 mark)  
- Incorrect uncertainty

# Statistics

## Question 32

(2 Marks)

Nikolai received a test score of 84%. He was told he scored in the 95th percentile.

- A) Explain what his test score indicates. (1 mark)

*Sample answer:*

*The test score represents the percentage of points that Nicolai was awarded for the questions that he answered correctly.*

- B) Explain what his percentile rank indicates. (1 mark)

*Sample answers:*

*Nicolai's percentile rank indicated that he did better than 95% of the people in his class on the test.*

**OR**

*Nicolai's percentile rank indicates that 5% of the people in his class did better than him.*

**Exemplar 1**

(2 Marks)

- A) *that he got 84% of it correct*
- B) *that he scored better than 95 other people*

**Mark: 1 out of 2**

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

**Exemplar 2**

(2 Marks)

- A) *it means that 84% was 95th percentile*
- B) *if there were 100 people you would have scored higher than 95 of them*

**Mark: 1 out of 2**

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

**Exemplar 3**

(2 Marks)

- A) *His test score indicates how he did on the test.*
- B) *His percentile rank indicates how he did overall in the class on the test.*

**Mark: 2 out of 2**

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

**Question 33**

(2 Marks)

Athena is trying to calculate her final mark on her test. The table below shows the percent she received and the weightings for each category.

Category	% correct	Weight
Multiple choice	87%	50%
Short answer	61%	20%
Long answer	68%	30%

Calculate Athena's final mark using a weighted mean.

*Answer:*

$$\begin{array}{l} \text{Final mark: } \left. \begin{array}{l} 87 \times 0.50 = 43.5 \\ 61 \times 0.20 = 12.2 \\ 68 \times 0.30 = 20.4 \end{array} \right\} \leftarrow 1 \text{ mark for process} \\ \qquad \qquad \qquad = 76.1\% \quad \leftarrow 1 \text{ mark} \end{array}$$

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

**Exemplar 1**

(2 Marks)

$$87 \times .5 = 43.5$$

$$61 \times .2 = 12.2$$

$$68 \times .3 = 20.4$$

$$43.5 + 12.2 + 20.4 = 76.1\%$$

**Mark: 1 out of 2**

- Rationale:** - Incorrect process  
- Correct final mark (follow-through error) (1 mark)

**Exemplar 2**

(2 Marks)

$$87 \times .5 = 43.5 / 50$$

$$61 \times .2 = 12.2 / 20$$

$$68 \times .3 = 20.4 / 30$$

$$76.1 / 100$$

**76.1%****Mark: 2 out of 2**

- Rationale:** - Correct process (1 mark)  
- Correct final mark (1 mark)

**Exemplar 3**

(2 Marks)

$$87\% \times .5 = 43.5$$

$$12.2$$

$$20.4$$

$$= 76.1\%$$

**Mark: 2 out of 2**

- Rationale:** - Correct process (1 mark)  
- Correct final mark (1 mark)

**Question 34**

(3 Marks)

The following set of data represents the number of homeruns hit by 9 players on a baseball team:

62	14	25	7	48	31	14	47	4
----	----	----	---	----	----	----	----	---

State the mean, median, and mode.

Mean: \_\_\_\_\_

Median: \_\_\_\_\_

Mode: \_\_\_\_\_

*Answer:*

Mean: 28 ← 1 mark

Median: 25 ← 1 mark

Mode: 14 ← 1 mark

**Exemplar 1**

(3 Marks)

<del>62</del>	<del>14</del>	25	<del>7</del>	<del>48</del>	<del>31</del>	<del>14</del>	<del>47</del>	<del>4</del>
---------------	---------------	----	--------------	---------------	---------------	---------------	---------------	--------------

Mean: 14Median: 25Mode: 196.94, 7, 14, 14, 25, 31, 47, 48, 62**Mark: 1 out of 3****Rationale:** - One correct answer (median) (1 mark)**Exemplar 2**

(3 Marks)

4	7	14	14	75	31	47	48	62
62	<del>14</del>	25	<del>7</del>	48	<del>31</del>	<del>14</del>	47	<del>4</del>

Mean: 28Median: 14Mode: 25**Mark: 1 out of 3****Rationale:** - One correct answer (mean) (1 mark)**Exemplar 3**

(3 Marks)

62	<del>14</del>	25	<del>7</del>	48	<del>31</del>	<del>14</del>	47	<del>4</del>
----	---------------	----	--------------	----	---------------	---------------	----	--------------

Mean:  $62 + 14 + 25 + 7 + 48 + 31 + 14 + 47 + 4 = 252$   
252       $252 \times 9 = 2268$ Median: 4, 7, 14, 14, 25, 31, 47, 48, 62Mode: 14**Mark: 2 out of 3****Rationale:** - Two correct answers (median, mode) (2 x 1 mark)

**Question 35**

(3 Marks)

Jimbo has the following marks on his tests:

41%	78%	84%	69%	75%
-----	-----	-----	-----	-----

- A) Explain why he might ask that his test mark be calculated using a trimmed mean. (1 mark)

*Sample answers:*

- His mark of 41 will drag his average down.
- Removing the lowest and the highest mark could leave behind the marks that more accurately represent his understanding.
- The mean is 69.4 and the trimmed mean is 74 so he would ask for the higher mark.

- B) Calculate his trimmed mean if the teacher agrees and trims his highest and lowest test marks. (2 marks)

*Answer:*

$$\begin{array}{r}
 \text{Trimmed mean: } \frac{69 + 75 + 78}{3} \\
 \frac{222}{3} \\
 = 74\%
 \end{array}
 \left. \vphantom{\begin{array}{r} \frac{69 + 75 + 78}{3} \\ \frac{222}{3} \\ = 74\% \end{array}} \right\} \leftarrow 1 \text{ mark for process}$$

← 1 mark

*Note to marker: Units are not required.*

**Exemplar 1**

(3 Marks)

A) To calculate his higher test scores only.

$$B) \frac{69 + 75 + 78}{3} = 74$$

**Mark: 2 out of 3**

- Rationale:**
- Incorrect response in Part A
  - Correct process in Part B (1 mark)
  - Correct final answer in Part B (1 mark)

**Exemplar 2**

(3 Marks)

$$A) 41, 78, 84, 69, 75 = 347 \div 5 = 69.4$$
$$78, 84, 69, 75 = 306 = 76.5$$

Eliminating the lowest mark gave Jimbo a better mark cause this mark wasn't really as important as the others which boosted.

$$B) 78, 84, 69, 75 = 306 \div 4 = 76.5\%$$

**Mark: 2 out of 3**

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

**Exemplar 3**

(3 Marks)

A) because he only has 1 bad test

$$B) 78 + 69 + 75 = \frac{222}{3}$$

$$= 74\%$$

**Mark: 3 out of 3**

- Rationale:**
- Correct response in Part A (1 mark)
  - Correct process in Part B (1 mark)
  - Correct final answer in Part B (1 mark)

**Question 36**

(1 Mark)

Choose the letter that best completes the statement below.

The measure of central tendency that is most affected by outliers is:

- a) mode
- b) mean
- c) median
- d) trimmed mean

*Answer:*     *b*    

**Test Item and Marking Guide**





# 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.:** \_\_\_\_\_

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**Problem(s) noted:** \_\_\_\_\_

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**Question(s) affected:** \_\_\_\_\_

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**Action taken or rationale for assigning marks:** \_\_\_\_\_

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**Follow-up:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Decision:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Marker's Signature:** \_\_\_\_\_

**Principal's Signature:** \_\_\_\_\_

<p><b>For Department Use Only—After Marking Complete</b></p> <p><b>Consultant:</b> _____</p> <p><b>Date:</b> _____</p>
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