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School Programs Division
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Contents

Marking Guidelines........................................................................................................... ii

Irregularities in Provincial Tests .................................................................................. ii

Presentation of the Student Samples ......................................................................... 1

Home Finance ................................................................................................................. 2

Probability ..................................................................................................................... 14

Vehicle Finance ............................................................................................................. 24

Geometry and Trigonometry ......................................................................................... 40

Precision Measurement ................................................................................................. 54

Statistics ........................................................................................................................ 64

Appendix: Irregularities in Provincial Tests................................................................. 73

Irregular Test Booklet Report......................................................................................... 75
Marking Guidelines


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

The recommended procedure for scoring student responses is as follows:

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

Irregularities in Provincial Tests

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

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

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

Test Item and Marking Guide

**Question 26**

A building is on the side of a hill. Calculate the length of shadow the building will cast.

**Answer:**

\[
\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} \\
\frac{30}{\sin 75^\circ} = \frac{x}{\sin 50^\circ} \quad \leftarrow 1 \text{ mark for process} \\
x = \frac{30 \times (\sin 50^\circ)}{\sin 75^\circ} \\
x = 23.8 \text{ ft} \quad \leftarrow 1 \text{ mark}
\]

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

Exemplar 1

\[x = \sin 60^\circ \left( \frac{30}{\sin 75^\circ} \right)\]

\[x = 23.79\text{ ft} \quad \leftarrow 1 \text{ mark}\]

Mark: 1 out of 2

Rationale:
- Correct process (1 mark)
- Incorrect final answer
Lorenzo wants to buy a house. His monthly property taxes will be $125, his monthly heating costs will be $160, and his monthly mortgage payment will be $1216. He has a gross income of $38,400 per year.

A) Calculate his Gross Debt Service Ratio (GDSR) as a percent. (3 marks)

Answer:

\[
GDSR = \frac{\text{Gross monthly income}}{\text{Monthly mortgage + property + heating}} \times 100
\]

\[
= \frac{\$1216 + \$125 + \$160}{\$3200} \times 100
\]

\[
= 47\% \text{ or } 0.47 \quad \leftarrow \text{1 mark}
\]

Note to marker: Units are not required.

B) Explain if his loan application will be approved based on the GDSR calculated in Part A. (1 mark)

Sample answers:

His GDSR is over 32%, so it will probably not be approved.

Note to marker: Student must refer to 32%.
Exemplar 1

(4 Marks)

A) \[ \text{GDSR} = \frac{1216 + 125 + 160}{2833.33} \times 100 = \$1341.06 \]

\[ 38400 \div 12 = 3200 \]

B) The bank will approve his mortgage loan application because it's over 40%.

Mark: 1 out of 4
Rationale: - Three correct substitutions in Part A (1 mark)
- Incorrect answer in Part A
- Incorrect response in Part B

Exemplar 2

(4 Marks)

A) \[ \text{GDSR} = \frac{125 + 160 + 1216}{3200} \times 100 = \$46.9 \]

B) No because he has a bad GDSR.

Mark: 2 out of 4
Rationale: - All correct substitutions in Part A (2 marks)
- Incorrect answer in Part A (units)
- Incorrect response in Part B

Exemplar 3

(4 Marks)

A) \[ \text{GDSR} = \frac{(125 + 160 + 1216) \times 100}{38400} = 3.90 \]

B) The bank will approve his mortgage loan application because his percentage is over 32% so that makes him able to receive a mortgage loan.

Mark: 2 out of 4
Rationale: - Three correct substitutions in Part A (1 mark)
- Correct answer in Part A (follow-through error) (1 mark)
- Incorrect response in Part B
State 2 ways to reduce the interest paid over the life of a mortgage.

Sample answers:

- larger down payment
- shorter amortization period
- larger monthly payments
- increase payment frequency
- negotiate a lower interest rate

(2 × 1 mark)
Exemplar 1 (2 Marks)

To reduce total interest paid:

1. Down payment

2. Shorter mortgage time (Pay larger chunks of cash)

Mark: 1 out of 2
Rationale: One correct response (shorter mortgage) (1 mark)

Exemplar 2 (2 Marks)

1) Pay weekly, biweekly or bimonthly

2) A bank will often allow a lump sum to be paid once a year, take advantage and put whatever you can on it at that time.

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

Exemplar 3 (2 Marks)

- Have a shorter mortgage time period
- Buy a less expensive house

Mark: 2 out of 2
Rationale: Two correct responses (2 × 1 mark)
Betty bought a house for $185 000. She already knows that for the first $150 000 the land transfer tax will cost $900. Calculate the total land transfer tax.

<table>
<thead>
<tr>
<th>Value of Property</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>On the first $30 000</td>
<td>0%</td>
</tr>
<tr>
<td>On the next $60 000 (i.e., $30 001 to $90 000)</td>
<td>0.5%</td>
</tr>
<tr>
<td>On the next $60 000 (i.e., $90 001 to $150 000)</td>
<td>1.0%</td>
</tr>
<tr>
<td>On the next $50 000 (i.e., $150 001 to $200 000)</td>
<td>1.5%</td>
</tr>
<tr>
<td>On amounts in excess of $200 000</td>
<td>2.0%</td>
</tr>
</tbody>
</table>

**Answer:**

*First $150 000: $900*

\[ \$185 000 - \$150 000 = \$35 000 \]

*Next $35 000: $35 000 \times 0.015 = $525 \leftarrow 1 \text{ mark}*

*Total land transfer tax: $900 + $525 = $1425 \leftarrow 1 \text{ mark}*
Exemplar 1

(2 Marks)

\[ 185\,000 \times 0.015 = 2775 \]

Land Transfer Tax = 2775

Mark: 0 out of 2
Rationale: - Incorrect amount for the next $35\,000
- Incorrect answer

Exemplar 2

(2 Marks)

\[ 185\,000 - 150\,000 = 35\,000 \]

\[ 35\,000 \times 0.005 = 175 \]

\[ 900 + 175 = 1075 \]

Mark: 1 out of 2
Rationale: - Incorrect amount for the next $35\,000
- Correct answer (follow-through error) (1 mark)

Exemplar 3

(2 Marks)

\[ 35\,000 \times 0.015 = \underline{525} \]

Mark: 1 out of 2
Rationale: - Correct amount for the next $35\,000 (1 mark)
- Incorrect answer
Linnea buys a house. Two (2) of her daily (on-going) expenses are heating costs and mortgage payments. State another 2 daily (on-going) house expenses.

<table>
<thead>
<tr>
<th>Expenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
</tbody>
</table>

Sample answers:
- Water and sewage bill
- Hydro bill
- Property taxes
- Home insurance

(2 × 1 mark)
### Exemplar 1

**Expenses**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>lawyer’s fee</td>
</tr>
<tr>
<td>2.</td>
<td>mortgage payment</td>
</tr>
</tbody>
</table>

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

### Exemplar 2

**Expenses**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 1. | Moving expense  
  Water and sewage bill |
| 2. | Telephone bill |

**Mark:** 1 out of 2  
**Rationale:** - Incorrect response in first box (correct response not clearly indicated)  
- One correct response (bill) (1 mark)

### Exemplar 3

**Expenses**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 1. | Hydro bill  
  Property taxes |
| 2. |   |

**Mark:** 2 out of 2  
**Rationale:** - Two correct responses (2 × 1 mark)
Homeowners are responsible for preventative maintenance and emergency repairs on the roof of a house.

A) Describe an example of preventative maintenance that should be done to the roof of a house. (1 mark)

*Sample answers:*
- clearing gutters
- trimming overhanging trees
- replacing shingles showing obvious wear
- replacing shingles starting to curl on ends
- shoveling snow off the roof

B) Describe an example of an emergency repair that would need to be done to the roof of a house. (1 mark)

*Sample answers:*
- fixing a leaking roof
- removing a tree that fell on the house
- replacing damaged or missing shingles after a bad storm

*Note to marker:* Student must describe the repair, not solely the cause of the repair.
Exemplar 1  (2 Marks)

A) The shingles are old, but the roof doesn't leak.

B) Strong wind blows off some of the shingles and the roof leaks.

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

Exemplar 2  (2 Marks)

A) When you don't like the colour of the shingles and you want something else.

B) An emergency would be when the roof is leaking and you need to repair it ASAP.

Mark: 1 out of 2
Rationale: - One correct response in Part B (1 mark)

Exemplar 3  (2 Marks)

A) A preventative situation would be for example you watch in the news that a heavy storm is your town in a couple hours. The first thing I would do is to re-shingle my roof make it stronger so the water doesn't come in.

B) An emergency re-shingle would be if for any reason your roof breaks and a big hole is on it. The weather is -40 and snowing. I would go buy supplies and get up there and start fixing it as soon as possible.

Mark: 2 out of 2
Rationale: - Two correct responses (2 × 1 mark)
Sacha recently purchased a new house with a 20-year mortgage of $174 000. Her monthly mortgage payment is $1096.20.

A) State the total amount that Sacha will have repaid to the bank at the end of the mortgage. (1 mark)

\[ \text{Answer:} \]

\[ \text{Total paid: } 1096.20 \times 12 \times 20 \]
\[ = 263 088 \quad \leftarrow 1 \text{ mark} \]

B) State the total amount of money paid in interest to the bank over the life of the mortgage. (1 mark)

\[ \text{Answer:} \]

\[ \text{Total interest: } 263 088 - 174 000 \]
\[ = 89 088 \quad \leftarrow 1 \text{ mark} \]
Exemplar 1  (2 Marks)

A) \[ 1096.20 \times 12 \times 20 = 263 088 \]
B) \[ \$263 088 \]

\[ \begin{array}{c}
\text{Mark: 0 out of 2} \\
\text{Rationale:} \\
\quad \text{- Incorrect answer (total paid) in Part A} \\
\quad \text{- Incorrect answer in Part B}
\end{array} \]

Exemplar 2  (2 Marks)

A) \[ 1096.20 \times 240 = 263 088 \]
B) \[ \begin{array}{c}
174 000 \\
-263 088 \\
\hline
98 088
\end{array} \]

\[ \text{Mark: 1 out of 2} \]
\[ \text{Rationale:} \\
\quad \text{- Correct answer in Part A (1 mark)} \\
\quad \text{- Incorrect answer in Part B} \]

Exemplar 3  (2 Marks)

A) \[ \$1096.20 \times 240 \text{ month} \]
\[ = \$263 088 \text{ repaid} \]
B) \[ \$263 088 \times 0.13 \]
\[ = \$34 201.44 \]

\[ \text{Mark: 1 out of 2} \]
\[ \text{Rationale:} \\
\quad \text{- Correct answer in Part A (1 mark)} \\
\quad \text{- Incorrect answer in Part B} \]
Probability

Question 7 (2 Marks)

There are 12 red and 28 blue marbles placed in a box.

A) State the probability of randomly selecting a red marble. (1 mark)

Answer:

\[
\frac{12}{40} \text{ or } 0.3 \text{ or } 30\% \text{ or } 3:10 \text{ or } \text{three out of ten}
\]

Note to marker: Accept equivalent representations.

B) State the odds against choosing a red marble. (1 mark)

Answer:

28:12 \text{ or } 28 \text{ to } 12

Note to marker: Accept equivalent ratios.
Exemplar 1

A) $\frac{12}{40}$

B) $\frac{28}{12}$

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

Exemplar 2

A) The probability of her randomly selecting a red marble are $12:28$ or $42.86\%$.

B) $16:12$ is the odds of her choosing a red marble against her.

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

Exemplar 3

A) $(12 + 28 = 40)$

B) $7:3$

$12 \times 100 \div 40 = 30\%$ or $0.30$

Mark: 2 out of 2
Rationale: - Correct answer in Part A (1 mark)
- Correct answer in Part B (1 mark)
State the probability of randomly choosing the letter “B” from the letters in the word “probability.”

**Answer:**

$$\frac{2}{11} \text{ or } 0.18 \text{ or } 18\% \text{ or } \text{two out of eleven} \text{ or } 2:11$$
Exemplar 1
(1 Mark)

\[ \text{2:11} \]

\[ \text{20\%?} \]

Mark: 0 out of 1
Rationale: Incorrect answer (correct answer not clearly indicated)

Exemplar 2
(1 Mark)

\[ \text{2:9} \]

The probability of her choosing a “B” are 2:9 or 18.18%.

Mark: 0 out of 1
Rationale: Incorrect answer

Exemplar 3
(1 Mark)

odds 2:9

probability 2:11

Mark: 1 out of 1
Rationale: Correct answer (1 mark)
Howard spends $1.55 on each food sample he gives away at his restaurant. There is an 8% chance that after tasting the sample, the customer will order the new menu item. Howard earns $20 for every new menu item he sells.

A) Determine the expected value of the food sample. (3 marks)

\[ \text{Answer:} \]

\[ \text{Gain} = 20 - 1.55 \]
\[ = 18.45 \]

\[ \text{Loss} = 1.55 \]

\[ \text{EV} = P(\text{win}) \times \text{Gain} - P(\text{lose}) \times \text{Loss} \]
\[ = 0.08 \times 18.45 - 0.92 \times 1.55 \]
\[ = 0.05 \leftarrow 1 \text{ mark} \]

\[ \text{OR} \]

\[ 0.08 \times 20 = 1.60 \leftarrow 2 \text{ marks} \]
\[ \text{EV} = 1.60 - 1.55 \]
\[ = 0.05 \leftarrow 1 \text{ mark} \]

B) Justify whether Howard should be offering the food samples based on the expected value. (1 mark)

\[ \text{Answer:} \]

Yes, the expected value is greater than 0.
**Exemplar 1**

4 Marks

A) \[ EV = (0.08 \times 20) - (0.92 \times 1.55) \]
\[ EV = +$0.17 \]

B) It depends on how much money he has. An 8% chance is very low, and he will likely lose money.

Mark: 2 out of 4

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

**Exemplar 2**

4 Marks

A) \[ 20 - 1.55 = 18.45 \]

\[ \text{win} \quad \text{Expected value} = (\text{probability})(\text{payout}) \]
\[ = (0.08)(18.45) \]
\[ = 1.48 \]

\[ \text{Lose} \quad \text{Expected value} = (\text{prob.})(\text{pay.}) \]
\[ = (0.92)(-1.55) \]
\[ = 1.43 \]

\[ 1.48 - 1.43 = +$0.05 \text{ expected gain} \]

Mark: 3 out of 4

Rationale:
- Correct answer in Part A (3 marks)
- Incorrect response in Part B

**Exemplar 3**

4 Marks

A) \[ \begin{array}{c|c|c|c}
\text{win} & \frac{8}{100} & 20 & 1.55 \\
\text{Lose} & \frac{92}{100} & 0 & 1.55 \\
\end{array} \]

\[ \text{Ev: } 1.48 + (\text{ -1.13 } ) \]
\[ : 1.48 - 1.13 \]
\[ : +$0.05 \]

B) With his expected value being a positive, he can expect to make money so ya he should continue.

Mark: 4 out of 4

Rationale:
- Correct answer in Part A (3 marks)
- Correct response in Part B (1 mark)
Random testing of golf balls shows that 100 out of every 5000 are defective.

A) State the odds in favour of a golf ball being defective. (1 mark)

\[ 100 : 4900 \text{ or } 100 \text{ to } 4900 \]

\[ \leftarrow 1 \text{ mark} \]

**Note to marker:** Accept equivalent ratios.

B) State the probability of a golf ball **not** being defective. (1 mark)

\[ \frac{4900}{5000} \text{ or } 0.98 \text{ or } 98\% \text{ or } 4900 \text{ out of } 5000 \text{ or } 4900 : 5000 \]

\[ \leftarrow 1 \text{ mark} \]

**Note to marker:** Accept equivalent representations.

C) A company produces 80 000 golf balls. State the expected number of defective golf balls. (1 mark)

\[ \frac{100}{5000} \times 80 000 \]

\[ = 0.02 \times 80 000 \]

\[ = 1600 \leftarrow 1 \text{ mark} \]

**OR**

\[ \frac{x}{80 000} = \frac{100}{5000} \]

\[ x = 1600 \leftarrow 1 \text{ mark} \]
**Exemplar 1**

A) \(\frac{100}{5000} = \frac{1}{50}\)

B) \(\frac{5000}{100} = 50:1\)

C) \(80000 \div 5000 = 16\)
\(16 \times 100 = 1600\)
\(1600\) defective golf balls

Mark: 1 out of 3

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

**Exemplar 2**

A) \(\frac{100}{5000}\)

B) \(\frac{4900}{5000}\)

C) \(\frac{100 \times 16}{5000 \times 16} = \frac{1600}{80000}\)

\(\frac{80000}{5000} = 16\)

Mark: 2 out of 3

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

**Exemplar 3**

A) \(\frac{100}{4900}\)

B) \(\frac{4900}{5000}\)

C) \(\frac{80000}{5000} = 16 \times 100 = 16000\)

Mark: 2 out of 3

Rationale:
- Correct answer in Part A (1 mark)
- Correct answer in Part B (1 mark)
- Incorrect answer in Part C
The Teddy Bear Factory hosts birthday parties where children can build their own teddy bears. They offer 4 different party packages that are equally likely to be chosen. Their sales during the last month were as follows:

- Red package: 18
- Blue package: 34
- Green package: 16
- Yellow package: 12

A) The Smith family would like to book a party. State the experimental probability that the Smith family will choose the yellow package. (1 mark)

**Answer:**

\[
\frac{12}{80} \text{ or } 0.15 \text{ or } 15\% \text{ or } 12 : 80 \text{ or } 12 \text{ out of } 80
\]

B) State the theoretical probability that the Smith family will choose the yellow package. (1 mark)

**Answer:**

\[
\frac{1}{4} \text{ or } 0.25 \text{ or } 25\% \text{ or } 1 : 4 \text{ or } 1 \text{ out of } 4
\]

**Note to marker:** Accept equivalent representations.
Exemplar 1  (2 Marks)

A) \( \frac{12}{80} = 0.15 \) 15%  
B) \( \frac{1}{4} = 2.5\% \) 0.25

\( \frac{1}{4} = 0.25 \) 25%

Mark: 1 out of 2  
Rationale:  
- Incorrect answer in Part A (correct answer not clearly indicated)  
- Correct answer in Part B (1 mark)

Exemplar 2  (2 Marks)

A) Experimental probability = \( \frac{\text{desired events}}{\text{total observed}} \)
\( EP = \frac{12}{80} \)  
\( EP = 0.15 \)

B) \( tp = \frac{\text{desired}}{\text{total possible}} \)
\( tp = \frac{12}{68} = 0.176 \)

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

Exemplar 3  (2 Marks)

18 red packages  
34 blue packages  
16 green packages  
12 yellow packages
\( \left\{ \begin{array}{c} 80 \end{array} \right\} \)

A) \( p = \frac{12}{80} \times 100 = 15\% \)

\( 15\% \)

B) \( \frac{100 + 4}{4} = 25 \)

Mark: 2 out of 2  
Rationale:  
- Correct answer in Part A (1 mark)  
- Correct answer in Part B (1 mark)
Describe 2 disadvantages of leasing a new car.

**Sample answers:**
- cannot modify the car
- mileage restriction (extra costs if over km limit)
- extra costs for wear and tear
- if always leasing you’ll have monthly payments forever
- no equity gained
- more expensive to buy it out at the end of the lease

(2 × 1 mark)
Exemplar 1 (2 Marks)

1) monthly payment

2) you pay for km

Mark: 0 out of 2
Rationale: Two incorrect responses

Exemplar 2 (2 Marks)

- It costs more than buying a car
- You have to give it back when your lease is done

Mark: 1 out of 2
Rationale: One correct response (costs more) (1 mark)

Exemplar 3 (2 Marks)

You don't get to own it and pay for damages when you return it?

Mark: 1 out of 2
Rationale: One correct response (pay for damages) (1 mark)
Carter is purchasing a new vehicle for $27,800, after taxes. He makes a down payment of $3000. The bank offers financing for 5 years at a rate of 6.25%.

### Monthly Vehicle Loan Payments

<table>
<thead>
<tr>
<th>Interest Rate (%)</th>
<th>Years to Repay Loan</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.00</td>
<td>$85.61</td>
<td>$43.87</td>
<td>$29.97</td>
<td>$23.03</td>
<td>$18.87</td>
<td></td>
</tr>
<tr>
<td>5.25</td>
<td>85.72</td>
<td>43.98</td>
<td>30.08</td>
<td>23.14</td>
<td>18.99</td>
<td></td>
</tr>
<tr>
<td>5.50</td>
<td>85.84</td>
<td>44.10</td>
<td>30.20</td>
<td>23.26</td>
<td>19.10</td>
<td></td>
</tr>
<tr>
<td>5.75</td>
<td>85.95</td>
<td>44.21</td>
<td>30.31</td>
<td>23.37</td>
<td>19.22</td>
<td></td>
</tr>
<tr>
<td>6.00</td>
<td>86.07</td>
<td>44.32</td>
<td>30.42</td>
<td>23.49</td>
<td>19.33</td>
<td></td>
</tr>
<tr>
<td>6.25</td>
<td>86.18</td>
<td>44.43</td>
<td>30.54</td>
<td>23.60</td>
<td>19.45</td>
<td></td>
</tr>
<tr>
<td>6.50</td>
<td>86.30</td>
<td>44.55</td>
<td>30.65</td>
<td>23.71</td>
<td>19.57</td>
<td></td>
</tr>
<tr>
<td>6.75</td>
<td>86.41</td>
<td>44.66</td>
<td>30.76</td>
<td>23.83</td>
<td>19.68</td>
<td></td>
</tr>
<tr>
<td>7.00</td>
<td>86.53</td>
<td>44.77</td>
<td>30.88</td>
<td>23.95</td>
<td>19.80</td>
<td></td>
</tr>
</tbody>
</table>

### A) Calculate the monthly payment. (3 marks)

**Answer:**

**Principal:** $27,800 − $3000

= $24,800 ← 1 mark

**Monthly payment:** $24,800 \times \frac{19.45}{12} ← 1 mark

= $482.36 ← 1 mark

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

### B) Calculate the total paid for the vehicle by the end of the 5-year term. (1 mark)

**Answer:**

**Total cost:** ($482.36 \times 12 \times 5) + $3000

= $31,941.60 ← 1 mark
Exemplar 1

A) \[ 27,800 + 3000 \div 12 = 25,66 \]

B) \[ 27,800 + 3000 \times 19.45 = 86,150 \]

Mark: 0 out of 4
Rationale: - Incorrect answer in Part A
- Incorrect answer in Part B

Exemplar 2

A) \[ 27,800 - 3000 = 24,800 \times 5 \times 19.45 = 2,411,800.00 \]

B)

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

Exemplar 3

A) \[ 27,800 \times 1.13 = 31,414 - 3000 \]

\[
\text{monthly payment} \frac{28,414}{1000} \times 19.45 = 552.65
\]

B) \[ 552.65 \times 60 = 33,159 + \text{down payment} \]

\[ \underline{36,159} \]

Mark: 3 out of 4
Rationale: - Correct table value in Part A (1 mark)
- Correct total in Part A (follow-through error) (1 mark)
- Correct answer in Part B (follow-through error) (1 mark)
A previously leased vehicle with an original value of $18,300 is for sale at a Manitoba dealership. The residual value is 58%. Calculate the total cost to buy the car, after taxes.

**Answer:**

*Residual value:*

\[ 18,300 \times 0.58 = 10,614 \leftarrow 1 \text{ mark} \]

*Total cost:*

\[ 10,614 \times 1.13 = 11,993.82 \leftarrow 1 \text{ mark} \]

**OR**

*Taxes:*

\[ 18,300 \times 1.13 = 20,679 \leftarrow 1 \text{ mark} \]

*Total cost:*

\[ 20,679 \times 0.58 = 11,993.82 \leftarrow 1 \text{ mark} \]

**OR**

\[ \frac{18,300 \times 0.58 \times 1.13}{1 \text{ mark}} = 11,993.82 \leftarrow 1 \text{ mark} \]
Exemplar 1

(2 Marks)

\[
\begin{align*}
\text{Price} & \quad 18300.00 \times 0.13 = 2379.00 \\
\text{Interest} & \quad 18300.00 + 2379.00 \\
\end{align*}
\]

\[
\begin{align*}
\text{Total Cost} & \quad 20679.00 \times 0.58 = 11993.82 \\
\end{align*}
\]

\[
\begin{align*}
20679.00 + 11993.82 \\
32672.82 \text{ is the total cost to buy the car}
\end{align*}
\]

Mark: 1 out of 2
Rationale: - Correct taxes (1 mark)
- Incorrect total cost

Exemplar 2

(2 Marks)

\[
\begin{align*}
\$18300 \times 0.58 = \$10614 \\
\$18500 - \$10614 = \$7886
\end{align*}
\]

Mark: 1 out of 2
Rationale: - Correct residual value (1 mark)
- Incorrect total cost
Paige is planning to go on a 3000 km road trip. She owns a truck and a car. The truck uses 8.5 L of fuel per 100 km. The car uses 6 L of fuel per 100 km.

A) State which vehicle Paige should use if she wants to get the best fuel economy. (1 mark)

Answer:

The car ← 1 mark

B) State the number of litres used during the trip by the vehicle selected in Part A. (1 mark)

Answer:

Number of litres: \[ \frac{6 \text{ L}}{100 \text{ km}} \times 3000 \text{ km} = 180 \text{ L} \] ← 1 mark

C) State the total cost of fuel for the trip if gas costs $1.23/L. (1 mark)

Answer:

Cost of the fuel: \[ 180 \text{ L} \times $1.23/\text{L} = $221.40 \] ← 1 mark
Exemplar 1 (3 Marks)

A) She should use the truck

B) $8.5 \times 30 = 255 \text{ L used}$

C) $255 \div 1.23 = $207.31$

Mark: 1 out of 3

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

Exemplar 2 (3 Marks)

A) the car!

B) $\frac{180}{3000} \text{ km} \times 100 = 600 \text{ L}/3000 \text{ km}$

C) $\frac{255}{3000} \text{ km} \times 100 = 850 \text{ L}/3000 \text{ km}$

Mark: 2 out of 3

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

Exemplar 3 (3 Marks)

A) $\frac{25500}{3000} \text{ km} \times 100 = 850 \text{ L}/3000 \text{ km}$

B) $600 \text{ L of fuel were used by the car in the trip}$

C) $\frac{18000}{3000} \text{ km} \times 100 = 600 \text{ L}/3000 \text{ km}$

Mark: 2 out of 3

Rationale:
- Correct answer in Part A (1 mark)
- Incorrect answer in Part B
- Correct answer in Part C (follow-through error) (1 mark)
Desarae is purchasing a vehicle in Manitoba through a private sale for $12 000. A lien search was done for $18. The book value of the vehicle is listed as $13 500. Desarae has a safety check performed for $40. Calculate the total cost of purchasing the vehicle after taxes using the table below.

<table>
<thead>
<tr>
<th>Taxes on Vehicle Purchases</th>
</tr>
</thead>
<tbody>
<tr>
<td>PST</td>
</tr>
<tr>
<td>Buying New</td>
</tr>
<tr>
<td>Buying Used from Dealership</td>
</tr>
<tr>
<td>Buying Used (Private)</td>
</tr>
<tr>
<td>Safety</td>
</tr>
<tr>
<td>Materials and Labour</td>
</tr>
<tr>
<td>Lien Search</td>
</tr>
</tbody>
</table>

**Answer:**

*Vehicle cost: $12 000*

\[
PST: \quad 13 500 \times 0.08 = 1080 \quad \text{← 1 mark}
\]

\[
Safety: \quad 40 \times 1.05 = 42 \quad \text{← 1 mark}
\]

*Lien search: $18*

\[
Total \ cost: \quad 12 000 + 1080 + 42 + 18 = 13 140 \quad \text{← 1 mark}
\]
Exemplar 1

$12,000 + $18.00 + $13,500 + $40.00 = $25,558.00/total cost vehicle

Mark: 0 out of 3
Rationale: - Incorrect PST calculation
- Incorrect safety calculation
- Incorrect total cost

Exemplar 2

12,000
18
40
12,058

Mark: 1 out of 3
Rationale: - Incorrect PST calculation
- Incorrect safety calculation
- Correct total cost (follow-through error) (1 mark)

Exemplar 3

car $12,000 x 8% = $960 + $12,000 = $12,960
lien search $18
safety check $40 x 5% = $2 + $40 = $42

$12,960 + $18 + $42 = $13,020

Mark: 2 out of 3
Rationale: - Incorrect PST calculation
- Correct safety calculation (1 mark)
- Correct total cost (follow-through error) (1 mark)
Bill had his vehicle’s exhaust system repaired at a Manitoba car dealership. Labour charges were $110 per hour. The cost of the exhaust system parts were: converter $350, muffler $120 and exhaust pipe $80. The job required 1.5 hours of labour to complete.

Calculate the total cost of the repairs, after taxes.

Answer:

Materials: $350 + $120 + $80 = $550
Labour: 1.5 × $110 = $165
Subtotal: $715 ← 1 mark

Total cost: $715 × 1.13
= $807.95 ← 1 mark
Exemplar 1

(2 Marks)

converter $350
muffler $120
exhaust pipe $80

$550 \times 1.13 = 621.50

110 \times 1.5 = 165

621.50 + 165 = $786.50

Mark: 1 out of 2
Rationale:  
- Incorrect subtotal (tax on labour not calculated)
- Correct total cost (follow-through error) (1 mark)

Exemplar 2

(2 Marks)

$110/\text{hr.}$

$350 \times 1.13 = 395.5$

$120 \times 1.13 = 135.6$

$80 \times 1.13 = 90.4$

$110 \times 1.5 = 165 \times 1.08 = 178.2$

$395.5 + 135.6 + 90.4 + 178.2 = $799.7 for the total cost of repairs.

Mark: 1 out of 2
Rationale:  
- Incorrect subtotal
- Correct total cost (follow-through error) (1 mark)

Exemplar 3

(2 Marks)

$25 \times 0.13 = 4.5$

$120 \times 0.13 = 15.6$

$8 \times 0.13 = 1.04$

$15 \times 110 = 165$

$165 \div 0.13 = 12.45$

$350 + 48.5 = 398.50$

$120 + 15.6 = 135.6$

$80 + 104 = 90.4$

$105 + 21.45 = 126.45$

$867.95$

Mark: 2 out of 2
Rationale:  
- Correct subtotal (1 mark)
- Correct total cost (1 mark)
State 2 factors that affect the cost of vehicle insurance premiums other than driving record, traffic tickets, and at-fault accidents.

Sample answers:

- use of vehicle
- deductible
- electronic immobilizer
- type of vehicle (passenger protection/vehicle characteristics/vehicle body size/vehicle year, make, and model/repair costs of vehicle)
- third party liability
- territory/location

(2 × 1 mark)
Exemplar 1

(2 Marks)

demers
no license
accidents

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

Exemplar 2

(2 Marks)

condition of vehicle
your driving record

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

Exemplar 3

(2 Marks)

how often vehicle is driven
age of driver?

Mark: 0 out of 2
Rationale: - Two incorrect responses
A car collector owns a vehicle worth $37 500. The vehicle depreciates 20% per year. Calculate the value of the vehicle after the first year.

**Answer:**

*Amount of depreciation:*

\[ 37 500 \times 0.2 \]

\[ = 7500 \quad ← 1 \text{ mark} \]

*Vehicle value:*

\[ 37 500 - 7500 \]

\[ = 30 000 \quad ← 1 \text{ mark} \]

**OR**

*Vehicle value:*

\[ 37 500 \times 0.8 \]

\[ = 30 000 \quad ← 1 \text{ mark} \]
Exemplar 1

\[ \$37\,500 \times 0.2 = \$7500 \quad 0.2 = 20\% \]

Mark: 1 out of 2
Rationale:  
- Correct amount of depreciation (1 mark)
- Incorrect vehicle value

Exemplar 2

\[ \$30\,000 \]

Mark: 1 out of 2
Rationale:  
- Correct vehicle value (1 mark)

Exemplar 3

\[ \$37\,500 \times 0.20 = \$7500 \]
\[ \$37\,500 - \$7500 = \$30\,000 \]

deprecated $7500 in year 1

Mark: 2 out of 2
Rationale:  
- Correct amount of depreciation (1 mark)
- Correct vehicle value (1 mark)
A construction company needs to calculate the length of support wires required to install an antenna on a roof. Calculate the length of the shorter support wire.

**Answer:**

\[
a^2 = b^2 + c^2 - 2bc \cos A \\
a^2 = 10^2 + 20^2 - 2(10)(20)\cos 50^\circ \\
a^2 = 500 - 257.12 \quad \left\{ \text{← 1 mark for process} \right. \\
a = \sqrt{242.88} \\
a = 15.6 \text{ ft} \quad \left\{ \text{← 1 mark} \right.
\]

**Note to marker:** Units are not required. Allow for appropriate roundings.
**Exemplar 1**

(2 Marks)

\[
\sin 50^\circ = \frac{x}{20 \text{ ft}}
\]

\[
0.766044443 = \frac{x}{20 \text{ ft}}
\]

\[
x = 15.3 \text{ ft}
\]

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

**Exemplar 2**

(2 Marks)

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

\[
a^2 = 64.29\text{ ft}
\]

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

**Exemplar 3**

(2 Marks)

\[
b^2 = a^2 + c^2 - 2ac \cos B
\]

\[
b^2 = 10^2 + 20^2 - 2(10)(20) \cos 50^\circ
\]

\[
b^2 = 100 + 400 - 400 \cos 50^\circ
\]

\[
b = 8
\]

Mark: 1 out of 2
Rationale: - Correct process (1 mark)
- Incorrect answer
The Sine 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 Sine Law can be used in the real world. (1 mark)

Answer:

1 mark for sketch

B) Explain how the Sine Law was used in your diagram. (1 mark)

Answer:

1 mark for explanation
Exemplar 1

A) 

![Diagram of a roof with angles and measurements]

B) 

When building roof supports if you only know the sides and you want to know the angle.

Mark: 0 out of 2
Rationale:
- Incorrect sketch
- Incorrect explanation

Exemplar 2

A) 

![Diagram of a roof with angles and measurements]

B) 

1. Sine law is used in architecture
2. Sine Law is used when you have an angle, it's opposite side, and one other side, or if you have an angle, its opposite side, and one other side.

Mark: 0 out of 2
Rationale:
- Incorrect sketch
- Incorrect explanation

Exemplar 3

A) 

![Diagram of a building plan with measurements]

B) 

Building Plans
To determine the angle support beams should be installed when you know the other measurements like length of beam & length of room (or space) and the other angle of where the beam should go.

Mark: 2 out of 2
Rationale:
- Correct sketch (1 mark)
- Correct explanation (1 mark)
A regular polygon has central angles of 45°.

A) State the number of sides for this polygon. (1 mark)

\[ C = \frac{360°}{n} \]

\[ \frac{360°}{n} = 45° \]

\[ n = 8 \quad \leftarrow 1 \text{ mark} \]

B) State the name of this polygon. (1 mark)

Answer:

Octagon
Exemplar 1

(2 Marks)

A) 4

B) rhombus

Mark: 0 out of 2
Rationale: - Incorrect answer in Part A
- Incorrect response in Part B (not all rhombuses are regular polygons)

Exemplar 2

(2 Marks)

A) \[ \frac{180}{45} = 4 \]

B) square

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

Exemplar 3

(2 Marks)

A) 

B) octagon

Mark: 1 out of 2
Rationale: - Incorrect answer in Part A
- Correct response in Part B (1 mark)
Choose the letter that best completes the statement below.

The following triangle is:

a) scalene  
b) equilateral  
c) isosceles  
d) right

*Answer: c*
This page was intentionally left blank.
Question 24
(2 Marks)

Sketch a rhombus and label all of the congruent parts.

Answer:

1 mark for all sides labelled as congruent
1 mark for opposite angles labelled as congruent

Note to marker: Accept a properly labelled square.

(2 \times 1 \text{ mark})
Exemplar 1

Mark: 1 out of 2
Rationale: - One correct answer (sides) (1 mark)

Exemplar 2

Mark: 1 out of 2
Rationale: - One correct answer (angles) (1 mark)

Exemplar 3

Mark: 1 out of 2
Rationale: - One correct answer (sides) (1 mark)
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

(2 \times 1 mark)
**Exemplar 1**  (2 Marks)

A) 

B) *Putting in floor tiles to each polygon could be used to fit together so there are no spaces*

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

**Exemplar 2**  (2 Marks)

A) 

B) *)When tiling a floor or wall you must use polygons that have vertices that add up to 360° if you want the tiles to fit nicely together*

ex) 2 regular octagons and a square, 135° + 135° + 90° = 360°

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

**Exemplar 3**  (2 Marks)

A) 

B) If I'm building a gazebo that has 5 sides (pentagon) and need to know what angle to cut the wood to meet at each corner. I know each corner will be 108°.

\[
\frac{(5-2) \times 180}{5} = 108°
\]

Mark: 2 out of 2  
Rationale: - Two correct responses (2 × 1 mark)
A building is on the side of a hill. Calculate the length of shadow (x) the building will cast on the ground.

**Answer:**

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

\[
\frac{30}{\sin 75^\circ} = \frac{x}{\sin 50^\circ} \quad \rightarrow 1 \text{ mark for process}
\]

\[
x = \frac{30 \times (\sin 50^\circ)}{\sin 75^\circ}
\]

\[
x = 23.8 \text{ ft} \quad \rightarrow 1 \text{ mark}
\]

**Note to marker:** Units are not required. Allow for appropriate roundings.
Exemplar 1  (2 Marks)

\[ x = \sin 50^\circ \left( \frac{30}{\sin 75^\circ} \right) \]

\[ x = 23.79 \text{ feet} \]

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

Exemplar 2  (2 Marks)

\[ \text{Sine law} \quad \frac{\sin C}{c} = \frac{\sin B}{b} \]

\[ \frac{\sin 50^\circ}{30 \text{ ft}} = \frac{\sin 75^\circ}{x} \]

\[ = 37.8 \text{ ft} \]

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

Exemplar 3  (2 Marks)

\[ \frac{75^\circ}{30} = \frac{50^\circ}{x} \]

\[ 50 \times 30 = 75 
\]

\[ = 23.8 \text{ ft} \]

Mark: 1 out of 2
Rationale: - Incorrect process
- Correct final answer (1 mark)
Cailyn works as a production engineer. She is working with a machine part that has a tolerance of 0.04 mm and a nominal value of 0.50 mm which is halfway between the maximum and minimum values. State the maximum and minimum values of the machine part.

Maximum: __________________
Minimum: ___________________

**Answer:**

Maximum: ________0.52 mm________ ← 1 mark

Minimum: ________0.48 mm________ ← 1 mark

**Note to marker:** Units are not required.
Exemplar 1

Maximum: 0.50
Minimum: 0.04

Mark: 0 out of 2
Rationale: - Incorrect answer for maximum
- Incorrect answer for minimum

Exemplar 2

0.50 0.04

Maximum: 0.54 mm
Minimum: 0.46

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

Exemplar 3

0.52

Maximum: 0.50 ± 0.02

Minimum: 0.50 ± 0.02
0.48

Mark: 2 out of 2
Rationale: - Two correct answers (2 × 1 mark)
State the precision and uncertainty of the protractor.

Precision: ________________

Uncertainty: ______________

*Answer:*

Precision: _______10°________ ← 1 mark

Uncertainty: _______5°________ ← 1 mark

*Note to marker:* Degrees are not required. Accept ±5°.
Exemplar 1

Precision: ___________

Uncertainty: _________

Mark: 1 out of 2

Rationale: - Incorrect answer for precision
- Correct answer (follow-through error) for uncertainty (1 mark)

Exemplar 2

Precision: _________

Uncertainty: _________

Mark: 1 out of 2

Rationale: - Incorrect answer for precision
- Correct answer (follow-through error) for uncertainty (1 mark)

Exemplar 3

Precision: _________

Uncertainty: _________

Mark: 2 out of 2

Rationale: - Correct answers (2 × 1 mark)
Tolerance is often used in construction, commercial, industrial, or artistic applications.

- State a specific example where tolerance is used. (1 mark)
- Support your example with an explanation of how tolerance was required. (1 mark)

**Answer:**

1 mark for example

1 mark for explanation
Exemplar 1  (2 Marks)

When boring the cylinders in engine blocks you have to be precise to make sure the pistons fit properly there is a very small tolerance.

Mark: 1 out of 2
Rationale: - Correct example (1 mark)
- Insufficient explanation

Exemplar 2  (2 Marks)

A baker would have to use tolerance when measuring ingredients for a cake, they would only be able to be off by a bit or their cake or baking wouldn’t taste properly.

Mark: 2 out of 2
Rationale: - Correct example (1 mark)
- Correct explanation (1 mark)

Exemplar 3  (2 Marks)

- When people are measuring holes for putting in poles/street lights/bus stops.
- They check how much space they need to insert it in. If it’s too big that’s okay they can always fill it in but if it’s too small then they have to fix it.

Mark: 2 out of 2
Rationale: - Correct example (1 mark)
- Correct explanation (1 mark)
Chris owns a candy factory that specializes in making chocolate candies. Explain why Chris needs to be very accurate when measuring his ingredients.

**Sample answers:**

- to help him determine his prices
- consistency (taste, texture, appearance, quality)
Exemplar 1

He has to be accurate so he does not put too much or too little of an ingredient.

example: flour, sugar

Mark: 0 out of 1
Rationale: - Insufficient response

Exemplar 2

because its probably a hard business to be in and he can't waste money on extra ingredients with fear of going broke.

he also would want the best tasting result for his customers.

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

Exemplar 3

Chris has to be very accurate because he doesn't want his candy too sweet but he also doesn't want them bitter, he also doesn't want to use more than needed because it will cost him more money.

Mark: 1 out of 1
Rationale: - Correct response (1 mark)
The maximum amount of stuffing that can fit in a pillow is 1500 grams. The tolerance is 100 grams. State the nominal value (which is halfway between the minimum and maximum values).

Answer:

1450 grams

Note to marker: Units are not required.
**Exemplar 1**

(1 Mark)

\[
\begin{align*}
100/2 &= 50 \\
1500 \text{ g} - 50 &= 1450 \text{ g} \\
\text{min} &= 1450 \text{ g} \\
\text{nominal value} &= 1450 - 50 \\
&= 1400 \text{ g}
\end{align*}
\]

Mark: 0 out of 1  
Rationale: Incorrect answer

**Exemplar 2**

(1 Mark)

\[
\begin{align*}
\text{max} +1550 \\
-1450
\end{align*}
\]

Mark: 0 out of 1  
Rationale: Incorrect answer

**Exemplar 3**

(1 Mark)

1450 grams (±50) or 1400 g (+100)

Mark: 0 out of 1  
Rationale: Incorrect answer (correct answer not clearly indicated)
Nicole is calculating her final mark in an Essential Mathematics course. Her projects are worth 45%, her tests are worth 35%, and her final exam is worth 20%.

Nicole earned

40% on her projects
60% on her tests
75% on her final exam

Calculate her final mark using a weighted mean.

*Answer:*

\[
\begin{align*}
40 \times 0.45 &= 18 \text{ (projects)} \\
60 \times 0.35 &= 21 \text{ (tests)} \\
75 \times 0.20 &= 15 \text{ (final exam)}
\end{align*}
\]

Final mark: \(18 + 21 + 15 = 54\%\)

*Note to marker: Units are not required.*
Exemplar 1

(2 Marks)

\[
\frac{40 + 60 + 75}{3} = 58.3
\]

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

Exemplar 2

(2 Marks)

\[
\begin{align*}
40 \times 0.45 &= 18 \\
60 \times 0.35 &= 21 \\
75 \times 0.20 &= 15 \\
18 + 21 + 15 &= 54 \\
\frac{54}{3} &= 18
\end{align*}
\]

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

Exemplar 3

(2 Marks)

\[
\begin{align*}
45 \times 0.4 &= 18 \\
35 \times 0.6 &= 21 \\
75 \times 0.2 &= 15 \\
54
\end{align*}
\]

Mark: 2 out of 2
Rationale: - Correct process (1 mark)
- Correct answer (1 mark)
Explain the difference between Jill receiving 80% on a test and being in the 80th percentile for the same test.

**Answer:**

80% is the percentage of questions that Jill answered correctly. The 80th percentile is where Jill ranked in relation to the class.

1 mark for percentage
1 mark for percentile rank
the difference is Jill got 80% but the other people in her class all might have better marks then her or lower marks.

Mark: 0 out of 2
Rationale: - Incorrect response (percentage)
- Incorrect response (percentile rank)

If she got 80% on the test, she did fairly well but if she was in the 80th percentile, it doesn’t necessarily mean she did well. It just means 20 people did better than she did but the highest score could have been something like 45%.

Mark: 1 out of 2
Rationale: - Correct response (percentage) (1 mark)
- Incorrect response (percentile rank)

Jill receiving 80% on a test means that out of the test she wrote, she got 80% percent of them right as an INDIVIDUAL.

80th percentile means that she did better than 80% of the class, but that doesn’t mean the she necessarily got 80% – she could easily have gotten 49% while the 80% other than her got worse.

Mark: 2 out of 2
Rationale: - Two correct responses (2 × 1 mark)
Using the following data:

<table>
<thead>
<tr>
<th>63</th>
<th>47</th>
<th>88</th>
<th>91</th>
<th>76</th>
</tr>
</thead>
<tbody>
<tr>
<td>41</td>
<td>51</td>
<td>74</td>
<td>76</td>
<td>83</td>
</tr>
</tbody>
</table>

A) State the mean. (1 mark)

*Answer:*

\[
\text{Mean: } \frac{690}{10} = 69 \leftarrow 1 \text{ mark}
\]

B) State the median. (1 mark)

*Answer:*

\[
\text{Median: } \frac{74 + 76}{2} = 75 \leftarrow 1 \text{ mark}
\]

C) State the mode. (1 mark)

*Answer:*

\[
\text{Mode: } 76 \leftarrow 1 \text{ mark}
\]
Exemplar 1

A) \[63 + 47 + 88 + 91 + 76 + 41 + 51 + 74 + 76 + 83 = 690\]

B) \[41, 47, 51, 63, 74, 76, 76, 83, 88, 91\]

C) 76 is the mode because it occurs more

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

Exemplar 2

A) 69

B) \[41, 47, 51, 63, 74, 76, 76, 83, 88, 91\]

\[\frac{74 + 76}{2} = 112\]

C) mode = 2

Mark: 1 out of 3
Rationale: - Correct answer in Part A (1 mark)
- Incorrect answer in Part B
- Incorrect answer in Part C
Question 35

The annual salaries for employees at Turnbull’s manufacturing plant are:

<table>
<thead>
<tr>
<th>Salary</th>
<th>$12,000</th>
<th>$29,000</th>
<th>$36,000</th>
<th>$40,000</th>
<th>$55,000</th>
<th>$80,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of employees</td>
<td>10</td>
<td>8</td>
<td>7</td>
<td>8</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

Margaret, one of the employees, has an annual salary of $36,000. Calculate her percentile rank.

**Answer:**

\[
PR = \frac{b}{n} \times 100
\]

\[
= \frac{18}{40} \times 100
\]

\[
= 45
\]

\[
\therefore 45 \text{ or } 45\text{th} \text{ or } PR_{45} \leftarrow 1 \text{ mark}
\]
Exemplar 1  

\[
\frac{18}{40} \times 100 = 45\% 
\]

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

Exemplar 2  

\[
\frac{6}{40} \times 100 = 15\text{th percentile} 
\]

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

Exemplar 3  

\[
\frac{18}{40} = 45\text{th percentile} 
\]

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