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# GENERAL COMMENTS

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## Grade 12 Essential Mathematics Achievement Test (June 2014)

### Student Performance—Observations

The following observations are based on local marking results and on comments made by markers during the sample marking session. These comments refer to common errors made by students at the provincial level and are not specific to school jurisdictions.

Information regarding how to interpret the provincial test and assessment results is provided in the document *Interpreting and Using Results from Provincial Tests and Assessments* available at [www.edu.gov.mb.ca/k12/assess/support/results/index.html](http://www.edu.gov.mb.ca/k12/assess/support/results/index.html).

Various factors impact changes in performance over time: classroom-based, school-based, and home-based contexts, changes to demographics, and student choice of mathematics course. In addition, Grade 12 provincial tests may vary slightly in overall difficulty although every effort is made to minimize variation throughout the test development and pilot testing processes.

When considering performance relative to specific areas of course content, the level of difficulty of the content and its representation on the provincial test vary over time according to the type of test questions and learning outcomes addressed. Information regarding learning outcomes is provided in the document *Grades 9 to 12 Mathematics: Manitoba Curriculum Framework of Outcomes* (2009).

### Unit: Home Finance

#### Conceptual Knowledge

Students had difficulty distinguishing between ongoing costs associated with owning a property and those considered to be one-time or additional costs. Some students (in English, only) did not know that the terms “one-time costs” and “additional costs” could be used interchangeably. Most students limited the concept of rental property to apartment rentals or leases.

#### Procedural Skill

Students often had difficulty using the correct formulas. Students struggled to convert percentages to decimal formats. Factors influencing formulas were often not clearly understood. For example, students could not generalize “improving windows” and “improving furnace” to the concept of lowering one’s heating costs to influence a GDSR.

#### Communication

Work shown was often incomplete, even if the final answer was correct. Currency values often lacked dollar signs and two decimal places (not a mark deduction, currently). Students had difficulty justifying their responses when asked, or restated the question as their response (i.e., listing “ownership” as a benefit of owning a house). Students did not have a clear understanding of the responsibilities of owners/renters/landlords/etc. when it came to maintenance, property taxes, owner’s or renter’s insurance, and so on.

## **Unit: Vehicle Finance**

### **Conceptual Knowledge**

Students focused on the notion of leasing or buying when asked about the benefit of new or used. When calculating fuel economy students had difficulty with the placement of information into the formula.

### **Procedural Skill**

Some students applied both taxes to items that did not require any taxes. Students used various methods to calculate fuel economy, and also had difficulty using the formula correctly.

### **Communication**

Students tended to give more information than required. Many students subtracted residual value from the value of the vehicle when calculating the total cost of the lease.

## **Unit: Precision Measurement**

### **Conceptual Knowledge**

Students had difficulty distinguishing between the notions of accuracy, precision, tolerance, and uncertainty. Students offered additional information that was not needed which may have impacted them negatively. Students also struggled to identify the important information.

### **Procedural Skill**

Students interchanged nominal value and tolerance when creating minimum and maximum values. While they were able to state the uncertainty of a measuring device, they were unable to state the precision of the device.

### **Communication**

The information presented tended to be vague, with limited support for responses. Responses and explanations were not linked cohesively. When an explanation was provided, it was done in an indirect way. Students used precision and tolerance interchangeably.

## **Unit: Probability**

### **Conceptual Knowledge**

Many students did not know how to convert from odds to probability and from probability to odds. Students often were challenged with expected value questions, and had a hard time using probability to calculate real world values. Students were able to select numbers out of the question in order to create a probability fraction. Some students were able to write probability as a ratio, but this concept caused confusion for many. Students confused the concepts of odds and probabilities. The overall understanding of expected values was limited.

### **Procedural Skill**

Students did not often successfully substitute correct values into the expected value equation. Students did not demonstrate how to convert from odds to probability reliably. Students were able to convert between fractions and decimals.

### **Communication**

The ability to round a number appropriately continues to provide challenges for students.

## **Unit: Geometry and Trigonometry**

### **Conceptual Knowledge**

Students occasionally struggled to use properties of polygons to support their answers. Students often assumed given triangles were right triangles. Students sometimes did not use order of operations correctly and did not apply the square root when using cosine law.

### **Procedural Skill**

Generally, students substituted correctly into formulas. Errors were made when asked to solve for interior angle measures. Instead, they solved for the central angle measure.

### **Communication**

Students tended to have difficulty explaining and supporting their examples with written explanations and/or sketches. Occasionally students seemed to misinterpret the term “at least” which led them to answering a question incorrectly.

## **Unit: Statistics**

### **Conceptual Knowledge**

Many students understood percentile rank mathematically but misunderstood percentile rank conceptually when comparing with percentage.

### **Procedural Skill**

The mean, median, and mode question was poorly done. Students answered the question procedurally rather than conceptually. Answers given were numerical rather than stated as an “increase”, “decrease”, or “no change.” Many students substituted into the percentile rank formula correctly, but expressed their answers incorrectly (often using the percentage symbol or leaving their answers as decimal). Some students rounded inconsistently.

### **Communication**

When answering percentile rank, some students gave a final answer with no work shown—no evidence of process was demonstrated.

## Marking Accuracy and Consistency

Information regarding how to interpret the marking accuracy and consistency reports is provided in the document *Interpreting and Using Results from Provincial Tests and Assessments* available at [www.edu.gov.mb.ca/k12/assess/support/results/index.html](http://www.edu.gov.mb.ca/k12/assess/support/results/index.html).

These reports include a chart comparing the local marking results to the results from the departmental re-marking of sample test booklets. Provincially, 32.3% of the test booklets sampled were given nearly identical total scores. In 53.7% of the cases, local marking resulted in a higher score than those given at the department; in 14.2% of the cases, local marking resulted in a lower score. On average, the difference was approximately 2.9% with local marking resulting in the slightly higher average score.

## Survey Results

Teachers who supervised the Grade 12 Essential Mathematics Achievement Test in June 2014 were invited to provide comments regarding the test and its administration. A total of 212 teachers responded to the survey. A summary of their comments is provided below.

After adjusting for non-responses:

- 96.8% of the teachers indicated that the test content was consistent with the learning outcomes as outlined in the curriculum document.
- 93.6% of teachers indicated that the reading level of the test was appropriate and 93.5% of them indicated the difficulty level of the test was appropriate.
- 90.1% of the teachers indicated that students were able to complete the entire test in the allotted time.
- 94.3% of the teachers indicated that their students used a study sheet throughout the semester and 93.9% of teachers indicated that their students used a study sheet during the test.