
GENERAL COMMENTS

Grade 12 Essential Mathematics Achievement Test (January 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.

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

Most students understood what to do, including using formulas, looking up table values, finding totals, and writing responses. Some students confused emergency repairs with ongoing monthly expenses.

Procedural Skill

Some students used an incorrect order of operations (calculations were done on a calculator, without brackets for the numerator in a fraction), used an incorrect table value, improperly used mill rates, or added a property tax credit instead of subtracting it.

Communication

Many students poorly communicated their responses and answers. The GDSR was not presented as a percent (no percentage sign, or it was stated as money). Many responses were vague (e.g., emergency repairs like “heating or wiring”), or included causes of emergencies (e.g., flooding) without stating a financial cost to repair.

Unit: Probability

Conceptual Knowledge

Students did not explain the difference between odds and probability (usually defining only one term). Concepts of theoretical and experimental probabilities were confused, leading students to use the wrong numbers when answering questions. Expected value was sometimes defined as the overall money won, or the chance of winning.

Procedural Skill

Odds were often stated as fractions, and probability was often flipped (as an improper fraction).

Communication

Many students rounded answers incorrectly (e.g., converting two thirds to 0.66).

Unit: Vehicle Finance

Conceptual Knowledge

Many students did not understand how to calculate the cost of financing a vehicle given the monthly payment and length of term. When calculating fuel economy using proportions and ratios, students struggled with the correct placement of information and/or units. Students confused vehicle insurance terms with those of home insurance, or believed factors such as “colour of car” would influence premiums. Students were often unable to tax various items at the correct rate, or they subtracted a trade-in value after taxes were calculated instead of before. In some cases students attempted to use the formula for simple interest to calculate the cost of borrowing.

Procedural Skill

Students understood the procedures of this unit.

Communication

Students often gave more answers than was required (e.g., attempting three or more responses when asked for two).

Unit: Geometry and Trigonometry

Conceptual Knowledge

Students often used the wrong formula when trying to solve for missing sides or angles in a given triangle (using Sine Law for Cosine Law and vice versa, or right-angled trigonometry identities). When asked for the measure of an angle, answers were often left as a trigonometric ratio. Many students used an incorrect formula to find the number of diagonals in a polygon.

Procedural Skill

Students did not use the proper order of operations when solving a Cosine Law question, even though they correctly substituted the values. When asked for a real-world example of the application of the Sine Law, many examples were vague definitions of the law or trigonometric problems that would be solved by other methods (i.e., not unique to Sine Law). Some students drew triangles but did not label enough information to be convincing. Many students were unable to provide real-world examples of the application of the various properties of polygons. Answers were vague (no mention of which polygon was being discussed), or students simply believed that something in the shape of a polygon was an application of its properties (e.g., a stop sign). Many students attempted to draw and count the number of diagonals in a polygon but were unsuccessful.

Communication

Students truncated instead of rounding their answers. Real-world connection descriptions were vague.

Unit: Precision Measurement

Conceptual Knowledge

Students were unsure when a numerical or a written response was needed (i.e., students explained uncertainty instead of providing its value). Students confused the terms accuracy, precision, uncertainty and tolerance (e.g., they provided examples of tolerance when asked why accuracy was important).

Procedural Skill

Students understood the procedures used in this unit.

Communication

Students often provided vague responses with limited support, and struggled with proper use of terms to support their ideas.

Unit: Statistics

Conceptual Knowledge

Students often did not order numbers from least to greatest (or the reverse) when stating the median value. There was some confusion as students calculated the mean, instead of stating the median or mode. When calculating a percentile rank, students did not recognize unrealistic answers when an error occurred (answers greater than 100).

Procedural Skill

Students understood the concept of a trimmed mean, but often removed too many numbers before calculating. Errors occurred in the addition of the remaining scores, or in dividing by the incorrect number of scores remaining. Some students are still using the old definition of percentile rank (“percent of scores below or equal to”). Substitution errors were sometimes made.

Communication

A percent sign was sometimes used in the final answer of percentile rank. Students had difficulty stating what percentile rank means, and were not able to compare a score’s ranking to the rest of the data.

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.

These reports include a chart comparing the local marking results to the results from the departmental re-marking of sample test booklets. Provincially, 29.6% of the test booklets sampled were given nearly identical total scores. In 54.1% of the cases, local marking resulted in a higher score than those given at the department; in 16.3% of the cases, local marking resulted in a lower score. On average, the difference was approximately 2.6% with local marking resulting in the slightly higher average score.

Survey Results

Teachers who supervised the Grade 12 Essential Mathematics Achievement Test in January 2014 were invited to provide comments regarding the test and its administration. A total of 168 teachers responded to the survey. A summary of their comments is provided below.

After adjusting for non-responses:

- 89.6% of the teachers indicated that the test content was consistent with the learning outcomes as outlined in the curriculum document.
- 94.4% of teachers indicated that the reading level of the test was appropriate and 94.3% of them indicated the difficulty level of the test was appropriate.
- 87.4% of the teachers indicated that students were able to complete the entire test in the allotted time.
- 76.8% of the teachers indicated that their students used a study sheet throughout the semester and 90.5% of teachers indicated that their students used a study sheet during the test.