
GENERAL COMMENTS

Grade 12 Essential Mathematics Achievement Test (June 2015)

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* (2014)

Summary of Test Results (Province)

June 2015	January 2015	June 2014	January 2014
57.0%	55.9%	57.1%	57.5%

Unit: Home Finance (provincial mean: 63.7%)

Conceptual Knowledge

The reference of being below 32% for the GDSR (Gross Debt Service Ratio) is being confused with other values by some students. Some students did not understand the concept for reducing the interest paid ‘over the life of the mortgage’ and are confusing it with GDSR, energy efficiency, and concepts from vehicle finance. Some students misunderstood how to convert a percentage to a decimal. Some students confused preventative repairs and emergency repairs, as well as the concept of ongoing and one-time repair.

Procedural Skill

To calculate GDSR, some students did not change the annual salary to monthly for substitution into the formula. Some students had difficulty determining the rate to use when calculating land transfer tax as well as the value of property for which the rate applied.

Communication

More than two examples (house expenses) were given when the question asked for two. Some students provided a number of answers in a box requiring one. Some students did not identify their answer and completed their work for Part B within the Part A space.

Unit: Vehicle Finance (provincial mean: 64.0%)

Conceptual Knowledge

Questions regarding vehicle depreciation and the calculation of gas mileage were done well. Students were able to successfully identify the disadvantages of leasing a vehicle. When asked to calculate the monthly payment for a new car, students often forgot to deduct the down payment. When asked to calculate the total paid for a vehicle at the end of a term, students often forgot to include the down payment amount.

Procedural Skill

Some students still struggled to determine the taxes applicable for a used vehicle despite being given a table that outlined the taxes.

Communication

While students could identify the disadvantages of leasing a vehicle, their explanations were limited and required more information.

Unit: Precision Measurement (provincial mean: 50.1%)

Conceptual Knowledge

Students struggled with degree measurements on a protractor when solving for precision.

Procedural Skill

Often students did not state the nominal value (as the midpoint) given a tolerance and maximum value. Commonly, they used the maximum value and subtracted the entire tolerance. Many times when given a midpoint nominal value, the entire tolerance was added and subtracted to find the maximum and minimum values.

Communication

Students struggled with explaining how tolerance is used in the real world, with many referring to uncertainty. Explanations of accuracy were often vague.

Unit: Probability (provincial mean: 51.4%)

Conceptual Knowledge

Students continue to confuse the concepts of probability and odds.

Procedural Skill

Students struggled when asked to solve for ratios. When presenting odds, students often presented them as a fraction.

Communication

When asked to provide a justification in the context of an expected value question, students did not make reference to the expected value that was calculated.

Unit: Geometry and Trigonometry (provincial mean: 46.7%)

Conceptual Knowledge

Students used the central angle formula correctly to find the number of sides of a polygon, however, some students identified the type of polygon with this number of sides incorrectly. When asked to sketch a rhombus and label all congruent parts, students often drew a parallelogram without any labels. Students were able to provide a sketch that could be solved using Sine Law; however, often there was extra information provided, and the triangle could have also been solved using Cosine Law, or not enough information was provided and the third angle would have to be found in order to use Sine Law. Overall, students are recognizing when to use Cosine Law and Sine Law to solve for unknown sides or angles in a given diagram.

Procedural Skill

When using the Cosine Law formula, students are substituting correctly; however, many students are not remembering order of operations and seem to be working left to right through the equation, not recognizing that $(2bc \cos A)$ needs to be subtracted from $b^2 + c^2$, not just $(2bc)$. Rounding errors are occurring, with students rounding too soon or truncating their answers. Overall, students seem to be using the Sine Law correctly. Occasionally, students assumed that there was a right angle in a given diagram, and used Pythagorean or basic trig functions to solve for an unknown side. Generally, students used the central angle formula correctly to calculate the number of sides in a regular polygon.

Communication

Although students provided an example of where polygons can be used in the real world, often their explanations did not refer to the polygon property that their example demonstrated. Students could provide an example of how Sine Law is used in the real world, however, their explanation did not refer back to their diagram. Even though students often labelled the congruent sides OR angles in a rhombus, they did not label ALL congruent parts as asked in the question. When asked to identify the type of triangle in a given diagram, students seemed to not look at the markings which indicated congruent sides and angles, and therefore identified the type of triangle incorrectly.

Unit: Statistics (provincial mean: 59.6%)

Conceptual Knowledge

Students continue to be unable to distinguish between percent and percentile rank.

Procedural Skill

Students struggled with the calculation of the median. They also had difficulty working with a frequency table when asked to calculate percentile rank.

Communication

A percent sign continues to be used when presenting a percentile rank.

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, 41.5% of the test booklets sampled were given nearly identical total scores. In 47.2% of the cases, local marking resulted in a higher score than those given at the department; in 11.3% of the cases, local marking resulted in a lower score. On average, the difference was approximately 2.0% with local marking resulting in the slightly higher average score.

Survey Results

Teachers who supervised the Grade 12 Essential Mathematics Achievement Test in June 2015 were invited to provide comments regarding the test and its administration. A total of 201 teachers responded to the survey. A summary of their comments is provided below.

After adjusting for non-responses:

- 95.6% of the teachers indicated that the test content was consistent with the learning outcomes as outlined in the curriculum document.
- 93.8% of teachers indicated that the reading level of the test was appropriate and 94.4% of them indicated the difficulty level of the test was appropriate.
- 86.7% of the teachers indicated that students were able to complete the entire test in the allotted time.
- 83.7% of the teachers indicated that their students used a study sheet throughout the semester and 91.0% of teachers indicated that their students used a study sheet during the test.