Test of Mathematical Abilities for Gifted Students (TOMAGS)

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Purpose:
• Group- or individually-administered, norm-referenced test used to identify mathematical talent in children ages 6-12. The test is not to be used for diagnostic purposes (per the author). The test is divided into two levels: Primary Level (ages 6-9; 39 problems), and Intermediate Level (ages 9-12; 47 problems). The test consists of open-ended questions provided in a problem-solving format. The test was designed with an emphasis on assessing flexibility in math reasoning/problem solving and the authors sought alignment in test construction to National Council of Teachers of Mathematics (NCTM) standards.

Provides:
• Total score.

Standardization Issues:
• The standardization sample was relatively small (Normal Sample: 935 students for the TOMAGS Primary, and 637 for the TOMAGS Intermediate; Gifted Sample: 617, and 513, respectively), compared to other nationally-normed tests. The final demographic breakdown was based on 1990 US Census data, which is 20 years old at this point. Demographics by geographic location does not match the census data, particularly with the Gifted sample (significant over-representation from the South). The Normal sample includes an over-representation of rural students vs. those from urban communities.

Reliability and Validity Issues:
• Internal consistency estimates ranged from an acceptable .86-.92 (though these “may” be slightly inflated due to the purposeful interdependence in sets of items). The authors’ studies of performance by subgroups of age, gender, and ethnicity (African Americans and Hispanics) yielded fairly consistent mean scores and estimates of reliability. Test-retest data presented estimates of .84 at the Primary level and .94 at the Intermediate level, and mean inter-rater agreement was .99. The validity evidence provided in general was sufficient, and included alignment with NCTM standards, factor-analysis with item content, high item-discrimination coefficients, and clear differentiation between Normal and Gifted samples on both levels.
**Additional Points:**

- Hand-scoring may be tedious.
- Sets of items are dependent upon each other. This may have implications on overall performance in the case of simple, “clerical” errors. The item-dependency also may artificially “inflate” estimates of internal reliability.
- The provision of two-sets of norms (Normal and Gifted) could potentially be confusing in the case of a student’s score resulting in a relatively high ranking compared to the Normal norms, yet relatively “low” compared within the Gifted set of norms. Examiners are encouraged to use results from the Normal normative sample when making score interpretations.
- The norms are broken down into 6-month cells. The manual does not indicate the number of cases comprising each 6-month cell, however, given the number of examinees reported by 1-year increments, some of these 6-month cells may be yielding score distributions on fewer than 50 cases (less than recommended).
- While the test was designed to assess each of the respective NCTM curricular standards, the Intermediate Level’s open-ended questions are more heavily-weighted to assessing geometry skills.
- Bias studies conducted and reported by the authors revealed little-to-no bias.
- The test’s emphasis on applied math reasoning is consistent with gifted research which has emphasized applied math reasoning over rote computational skill.