Grade 6 Assessment Highlights Mathematics

Alberta Provincial Achievement Testing **2021–2022**

Alberta

This document was written primarily for

Students		
Teachers	✓	Grade 6 Mathematics
Administrators	✓	
Parents		
General Audience		

2021–2022 Mathematics 6 Assessment Highlights

Distribution: This document is posted on the Alberta Education website.

Contents

This document contains assessment highlights from the 2022 Grade 6 Mathematics Provincial Achievement Test.

Assessment highlights provide information about the overall test, the test blueprint, and student performance on the provincial achievement test. This information is intended for teachers and is best used in conjunction with multi-year and detailed school reports that are available to schools. Assessment highlights reports for all provincial achievement test subjects and grades are posted on the Alberta Education website every year in the fall.

The examination statistics that are included in this document represent both French and English writers. If you would like to obtain English-only statistics or French-only statistics that apply to your school, please refer to your detailed reports, which are available on the Stakeholder File Exchange (SFX).

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The *2022 Grade 6 Mathematics Provincial Achievement Test*

This report provides teachers, school administrators, and the public with an overview of the performance of those students who wrote the *2022 Grade 6 Mathematics Provincial Achievement Test*. It complements the detailed school and jurisdiction reports.

How many students wrote the test?

A total of 47 902 students in Alberta wrote the *2022 Grade 6 Mathematics Provincial Achievement Test*.

What was the test like?

The *2022 Grade 6 Mathematics Provincial Achievement Test* consisted of two parts: Part A and Part B.

Part A consisted of 15 questions and represented 10% of the final overall test score. There were three addition questions, four subtraction questions, four multiplication questions, and four division questions. The format of the questions was numerical response, which required students to generate a response without the use of calculators (in symbolic form) to a particular problem, rather than selecting a response from a list of four options. Each response consisted of a maximum of four digits or, if a decimal point occurred in the answer, three digits.

Part B consisted of 40 questions and represented 90% of the final overall test score. The format of the questions was multiple choice, which provided students with four response options, of which only one was correct. The questions on the test required students to apply their understanding of one or more mathematical concepts from within and/or across the four strands: *Number, Patterns and Relations, Shape and Space, and Statistics and Probability*.
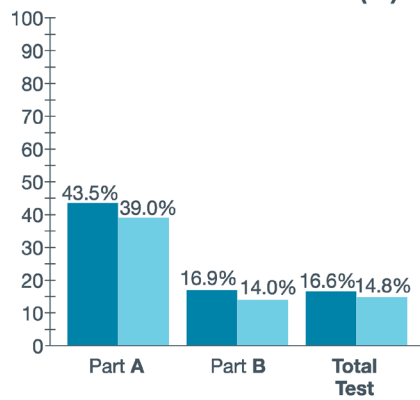
How well did students do?

The percentages of students meeting the acceptable standard and the standard of excellence in 2022 are shown in the graph below. The examination statistics that are included in this document represent both French and English writers. If you would like to obtain English-only or French-only statistics that apply to your school, please refer to the detailed reports that are available on the Stakeholder File Exchange (SFX).

Percentage of Students Meeting the Acceptable Standard (%)

	Part A	Part B	Total Test
2019	71.8%	81.3%	79.8%
2022	67.9%	77.3%	75.0%
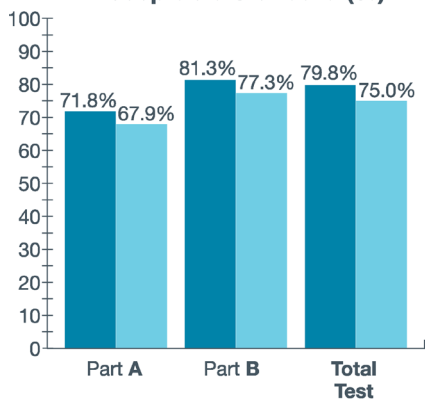
Percentage of Students Meeting the Standard of Excellence (%)

	Part A	Part B	Total Test
2019	43.5%	16.9%	16.6%
2022	39.0%	14.0%	14.8%

■ **2019 Achievement Standards:** The percentage of students in the province that met the acceptable standard and the standard of excellence on the *2019 Grade 6 Mathematics Provincial Achievement Test* (based on those who wrote)

■ **2022 Achievement Standards:** The percentage of students in the province that met the acceptable standard and the standard of excellence on the *2022 Grade 6 Mathematics Provincial Achievement Test* (based on those who wrote)

Test Blueprint and 2022 Student Achievement

In 2022, 75.0% of students who wrote the *Grade 6 Mathematics Provincial Achievement Test* achieved the acceptable standard, and 14.8% of students who wrote achieved the standard of excellence. There was a very strong positive correlation between student performance on *Part A* and performance on *Part B*. This suggests a strong relationship between routine algebraic operations and problem solving. Generally speaking, students who performed well on *Part A* also performed well on *Part B*, and vice versa.

The blueprints below show the reporting categories by which 2022 summary data are reported to schools and school authorities. The blueprints also show the provincial average of student achievement by both raw score and percentage.

Part A Test Blueprint

Program of Study Strand	Reporting Category: Number Operations				Provincial Student Achievement (Average Raw Score and Percentage)
	Addition	**Subtraction**	**Multiplication**	**Division**	
Number	3	4	4	4	**10.2/15 (68.0%)**
Provincial Student Achievement (Average Raw Score and Percentage	2.3/3 (76.7%)	2.6/4 (65.0%)	2.8/4 (70.0%)	2.5/4 (62.5%)	

Part B Test Blueprint

Program of Study Strand	Level of Complexity*			Provincial Student Achievement (Average Raw Score and Percentage)
	Low	**Moderate**	**High**	
Number	5	9	0	8.9/14 (63.6%)
Patterns and Relations	2	5	2	6.0/9 (66.7%)
Shape and Space	4	5	3	7.0/12 (58.3%)
Statistics and Probability	3	2	0	3.2/5 (64.0%)
Provincial Student Achievement (Average Raw Score and Percentage	9.3/14 (66.4%)	13.1/21 (62.4%)	2.7/5 (54.0%)	Raw Score 25.3/40 (63.2%)

* Each question is categorized according to its level of complexity (low, moderate, or high). Descriptions of the levels of complexity can be found in the *2022-2023 Mathematics 6 Subject Bulletin*.

Sample Questions from the *2022 Grade 6 Mathematics Provincial Achievement Test—Part A*

The following six items illustrate substantial performance differences between students who performed at the standard of excellence, those at the acceptable standard, and those below the acceptable standard.

Item	Key	% of Students with Correct Solution	Number of Unique Errors	Content Reporting Category	Item Description
2	41.1	67.3	621	Subtraction	N.2 - Solve a problem involving subtraction of a whole number from a decimal number, without regrouping (Gr 5, N.11)

Standard Achieved by Students on *Part A*	% of Students with Correct Solution	Number of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence (*n* = 18 665)	95.4	31	48.3 (158)	57.1 (29)	49.1 (22)
Students Achieving Acceptable Standard* (*n* = 32 549)	72.4	296	48.3 (3 857)	30.9 (561)	48.2 (510)
Students Below Acceptable Standard (*n* = 15 008)	38.1	541	48.3 (2 287)	49.7 (591)	48.2 (459)

* Includes those students who achieved the acceptable standard, but not the standard of excellence

2. What is $49.1 - 8$?

   Answer: _____

Common correct response:

$$\begin{array}{r} 49.1 \\ -\ 8.0 \\ \hline 41.1 \end{array}$$

Common incorrect responses:

$$\begin{array}{r} \overset{8}{} \\ -\ 49.1 \\ \hline 49.7 \end{array}$$

$$\begin{array}{r} \overset{8}{4\!\!\!/9}.1 \\ -\ \ \ \ 8 \\ \hline 4\ 8.\ 3 \end{array}$$

$$\begin{array}{r} \overset{8}{4\!\!\!/9}.10 \\ -\ \ \ \ 8 \\ \hline 4\ 8.\ 2 \end{array}$$

Item	Key	% of Students with Correct Solution	Number of Unique Errors	Content Reporting Category	Item Description
5	3 358	55.4	3004	Multiplication	N.2 - Solve a problem involving multiplication of a 2-digit whole number by a 2-digit whole number (Gr.5, N.11)

Standard Achieved by Students on *Part A*	% of Students with Correct Solution	Number of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence (*n* = 18 665)	89.0	185	3 258 (60)	3 368 (55)	460 (51)
Students Achieving Acceptable Standard* (*n* = 32 549)	59.4	1 839	298 (785)	460 (546)	3 258 (454)
Students Below Acceptable Standard (*n* = 15 008)	21.4	2 180	298 (960)	358 (370)	460 (183)

* Includes those students who achieved the acceptable standard, but not the standard of excellence

5. What is 46×73?

Answer: _____

Common correct responses:

$$40 \times 3 = 120$$
$$70 \times 6 = 420$$
$$6 \times 3 = 18$$
$$40 \times 70 = \dfrac{2800}{3358}$$

	70	3
40	2800	120
6	420	18

Common incorrect responses:

$$\begin{array}{r} 46 \\ 73 \\ \hline 18 \\ 280 \\ \hline 298 \end{array}$$

$$
\begin{array}{r}
46 \\
\times\ 73 \\
\hline
{}^1 18 \\
2\,80 \\
\hline
460
\end{array}
$$

$$
\begin{array}{r}
46 \\
\times\ 73 \\
\hline
38 \\
3220 \\
\hline
3258
\end{array}
$$

Item	Key	% of Students with Correct Solution	Number of Unique Errors	Content Reporting Category	Item Description
6	5.87	57.1	952	Subtraction	N.2 - Solve a problem involving subtraction of decimal numbers, with regrouping (Gr. 5, N.11)

Standard Achieved by Students on *Part A*	% of Students with Correct Solution	Number of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence (*n* = 18 665)	94.1	53	5.93 (141)	5.77 (33)	5.97 (32)
Students Achieving Acceptable Standard* (*n* = 32 549)	63.2	500	5.93 (3 227)	6.13 (1 154)	0.11 (602)
Students Below Acceptable Standard (*n* = 15 008)	19.5	810	5.93 (1 518)	6.13 (1 517)	0.11 (734)

* Includes those students who achieved the acceptable standard, but not the standard of excellence

6. What is $6.4 - 0.53$?

Answer: _____

Common correct response:

Common incorrect responses:

$$
\begin{array}{r}
6.\overset{4}{\cancel{3}} \\[-2pt]
-\ \\
\hline
.1
\end{array}
$$

$$
\begin{array}{r}
6.40 \\
-\ 0.53 \\
\hline
6.13
\end{array}
$$

$$
\begin{array}{r}
\overset{5}{\cancel{6}}.{}^{1}410 \\
-\ 0.53 \\
\hline
5.97
\end{array}
$$

$$
\begin{array}{r}
\overset{5}{\cancel{6}}.{}^{1}40 \\
-\ 0.53 \\
\hline
5.93
\end{array}
$$

Item	Key	% of Students with Correct Solution	Number of Unique Errors	Content Reporting Category	Item Description
7	0.4	59.0	1006	Division	N.8 - Demonstrate an understanding of division of a decimal number by a 1-digit natural number divisor

Standard Achieved by Students on *Part A*	% of Students with Correct Solution	Number of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence (*n* = 18 665)	94.0	68	4 (127)	2.5 (80)	2 (19)
Students Achieving Acceptable Standard* (*n* = 32 549)	65.0	525	4 (3 532)	2 (586)	2.4 (471)
Students Below Acceptable Standard (*n* = 15 008)	23.3	847	4 (1 666)	2.4 (370)	0 (340)

* Includes those students who achieved the acceptable standard, but not the standard of excellence

7. What is $3.2 \div 8$?

Answer: _____

Common correct response:

Common incorrect responses:

$$\frac{2}{3.2\,\overline{)\,8}}$$

$$\frac{4}{8\,\overline{)\,3.2}}$$

$$3.2\,\overline{)\,\begin{array}{l}2.5\\8.00\\6\,4\downarrow\\\hline 1\,6\,0\end{array}}$$

Item	Key	% of Students with Correct Solution	Number of Unique Errors	Content Reporting Category	Item Description
8	9.09	63.0	1 043	Addition	N.2 - Solve a problem involving addition of a whole number and decimal numbers, with regrouping. (Gr.5, N.11)

Standard Achieved by Students on *Part A*	% of Students with Correct Solution	Number of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence (n = 18 665)	94.2	62	8.37 (137)	4.14 (36)	4.09 (35)
Students Achieving Acceptable Standard* (n = 32 549)	69.6	455	8.37 (2 204)	4.14 (2 012)	3.42 (7.25)
Students Below Acceptable Standard (n = 15 008)	27.9	904	4.14 (1 715)	8.37 (1 256)	3.42 (971)

* Includes those students who achieved the acceptable standard, but not the standard of excellence

8. What is $3.29 + 0.8 + 5$?

Answer: _____

Common correct response:

Common incorrect responses:

$$
\begin{array}{r}
3.29 \\
0.8 \\
\underline{5} \\
3.42
\end{array}
$$

$$
3.29 + 0.8 = 4.9
$$
$$
\begin{array}{r}
+5 \\
\hline
4.14
\end{array}
$$

$$
3.29 + 0.8 = 3.37
$$
$$
\begin{array}{r}
+5 \\
\hline
8.37
\end{array}
$$

$$
3.29 + 0.8 = 4.09
$$

Item	Key	% of Students with Correct Solution	Number of Unique Errors	Content Reporting Category	Item Description
13	8.07	52.4	1 483	Division	N.8 - Demonstrate an understanding of division of a decimal number by a 1-digit natural number divisor

Standard Achieved by Students on *Part A*	% of Students with Correct Solution	Number of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence (*n* = 18 665)	89.6	62	8.7 (470)	8.01 (32)	8.06 (30)
Students Achieving Acceptable Standard* (*n* = 32 549)	58.3	707	8.7 (4 992)	80.7 (508)	87 (442)
Students Below Acceptable Standard (*n* = 15 008)	16.0	1 279	8.7 (1 424)	8.35 (396)	87 (347)

* Includes those students who achieved the acceptable standard, but not the standard of excellence

13. What is $40.35 \div 5$?

Answer: _____

Common correct response:

Common incorrect responses:

$$
\begin{array}{r}
87 \\
5\overline{)4035} \\
\underline{40}\downarrow \\
035
\end{array}
$$

$$
\begin{array}{r}
8 \\
5\overline{)40.35} \\
\underline{40} \\
.35
\end{array}
$$

$$
\begin{array}{r}
8.7 \\
5\overline{)40.35} \\
\underline{40}\downarrow \\
035
\end{array}
$$

Provincial Achievement Testing Program Support Documents

The Alberta Education website contains several documents that provide valuable information about various aspects of the provincial achievement testing program. To access these documents, go to the [Alberta Education website](#). Click on one of the specific links to access the following documents.

Provincial Achievement Testing Program General Information Bulletin

The *[General Information Bulletin](#)* is a compilation of several documents produced by Alberta Education and is intended to provide superintendents, principals, and teachers with easy access to information about all aspects of the Provincial Achievement Test Program. Sections in the bulletin contain information pertaining to schedules and significant dates; security and test rules; test administration directives, guidelines, and procedures; calculator and computer policies; test accommodations; test marking and results; field testing; resources and web documents; forms and samples; and Provincial Assessment Sector contacts.

Subject bulletins

At the beginning of each school year, subject bulletins are posted on the Alberta Education website for all provincial achievement test subjects for grades 6 and 9. Each bulletin provides descriptions of assessment standards, test design and blueprinting, and scoring guides (where applicable) as well as suggestions for preparing students to write the tests and information about how teachers can participate in test development activities.

Examples of the standards for students' writing

For provincial achievement tests in grades 6 and 9 English Language Arts and Français/French Language Arts, writing samples are designed for teachers and students to enhance students' writing and to assess this writing relative to the standards inherent in the scoring guides. The exemplars documents contain sample responses with scoring rationales that relate student work to the scoring categories and scoring criteria.

Previous provincial achievement tests and answer keys

All January provincial achievement tests (parts A and B) for Grade 9 semestered students are secured and must be returned to Alberta Education. All May/June provincial achievement tests are secured except *Part A* of grades 6 and 9 English Language Arts and Français/French Language Arts. Unused or extra copies of only these *Part A* tests may be kept at the school after administration. Teachers may also use the released items and/or tests that are posted on the Alberta Education website.

Parent guides

Each school year, versions of the [Alberta Provincial Achievement Testing Parent Guide](#) for grades 6 and 9 are posted on the Alberta Education website. Each guide answers frequently asked questions about the Provincial Achievement Test Program and provides descriptions of, and sample questions for, each provincial achievement test subject.

Involvement of teachers

Teachers of grades 6 and 9 are encouraged to take part in activities related to the Provincial Achievement Test Program. These activities include item development, test validation, field testing, and marking. In addition, arrangements can be made through the Alberta Regional Professional Development Consortia for teacher in-service workshops on topics such as interpreting provincial achievement test results to improve student learning.