



Grade 6 Subject Bulletin Mathematics

Alberta Provincial Achievement Testing **2023–2024**

This document was written primarily for

Students

Teachers ✓ Grade 6 Mathematics

Administrators ✓

Parents

General Audience

2023–2024 Mathematics 6 Subject Bulletin

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You can find provincial achievement test-related materials and additional topics of interest on [Provincial Achievement Tests](#).



Grade 6 Mathematics Provincial Achievement Test

General description

Test items are created from the learning outcomes contained within each of the following seven organizing ideas of the Grade 6 Mathematics curriculum: Number, Algebra, Geometry, Coordinate Geometry, Measurement, Patterns, and Statistics.

Questions are categorized according to three levels of complexity: low, moderate, and high. (See Appendix 1 for a more detailed explanation of each complexity level.)

The use of a calculator is **not** permitted.

A dictionary, a thesaurus, or other reference materials are not permitted for students writing the test.

Use of calculators and manipulatives

Manipulatives may be used, but the use of a calculator is not permitted.

An acceptable manipulative is any mathematical tool that can be used by a student to help convert abstract ideas into concrete representations for the purpose of solving a problem (e.g., a protractor, a ruler, tracing paper, pattern blocks, tiles and cubes, geoboards, tangrams, counters, spinners, number lines). The manipulative cannot perform the mental conversion or provide the solution to a problem. A multiplication table is not an acceptable manipulative for use in completing *Part A* or *Part B* (except as an accommodation).

Suggestions for answering questions

- Before you begin, find out how much time you have.
- Ask questions if you are unsure of anything.
- Skim through the whole test before beginning. Find out how many questions there are, and plan your time accordingly.
- Answer the easier questions first; then go back to the more difficult ones.
- Do not spend too much time on any one question. Make a mark (* or ?) beside any questions that you have difficulty with, and go back to them if you have time.
- Read each question carefully, underline or highlight key words, and try to determine an answer before looking at the choices.
- Read all the choices and see which one best fits the answer.
- When you are not sure which answer is correct, cross out any choices that are wrong and then select the best of the remaining choices.
- If time permits, recheck your answers.
- Double-check to make sure that you have answered everything before handing in the test.
- Read the information given using the strategy that works best for you. You should either
 - look at all the information and think carefully about it before you try to answer the question

OR

 - read the questions first and then look at the information, keeping in mind the questions you need to answer.
- Make sure that you look at all forms of the information given. Information may be given in words, charts, pictures, graphs, or maps.
- When information is given for more than one question, go back to the information before answering each question.
- Check your work when you calculate an answer, even when your answer is one of the choices.
- When answering “best answer” questions, be sure to carefully read all alternatives before choosing the answer that you think is best. These questions will always include a boldfaced qualifier such as **best**, **most strongly**, or **most clearly** in their stems. All the alternatives are, to some degree, correct, but one of the alternatives will be “best” in that it takes more of the information into account or can be supported most strongly by reference to the information.

Opportunities to Participate in Test-development Activities

Field testing

All provincial achievement test questions are field tested before use. By “testing” the test questions, students who write field tests have an opportunity for a practice run at answering questions that could be used on future provincial achievement tests. As well, the teachers have an opportunity to comment on the appropriateness and quality of the test questions.

Through the online field-test request system, teachers can create and modify field-test requests and check the status of these requests. Information regarding the field-test process and the request system is available at [Provincial Achievement Tests](#).

Once the completed requests are received by Provincial Assessment, classes will be selected to ensure that a representative and sufficiently large sample of students from across the province take part in the field test. Every effort will be made to place field tests as requested; however, because field tests are administered to a prescribed number of students, it may not be possible to fill all requests.

Working groups

Teacher involvement in the development of provincial achievement tests is important because it helps to ensure the validity and appropriateness of the assessments.

Teacher working groups are used throughout the test-development process to create raw forms of test questions and to review and revise draft forms of provincial achievement tests. These working groups usually meet for one or two days, two or three times per year. Occasionally, these meetings are held on weekends.

To be eligible to serve on a test-development working group, a teacher must currently be teaching the course in question or must have taught the course within the past three years.

Teachers participating in working groups are selected from the working-group nominees approved by superintendents of school authorities. The call for nominations usually occurs in September. However, we will accept further nominations throughout the year. In some subjects, more teachers may be nominated for working groups than are needed. When teachers are selected, there must be a balance of first-time and experienced working-group members and regional representation by zone, school authority, and school. Unfortunately, not everyone whose name is submitted will be selected.

Appendix 1: Levels of Item Complexity

LEVELS OF ITEM COMPLEXITY

Low Complexity

Items in this category require students to rely heavily on recalling and recognizing previously learned concepts and principles. Items typically specify what students are to do, which is often to carry out some procedure that can be performed mechanically. Students would not be expected to come up with original methods for finding a particular solution. The following list illustrates some of the demands that items of low complexity may make of students.

- Recall or recognize a fact, term, or property.
- Recognize an example of a concept.
- Perform a specified procedure.
- Evaluate an expression in an equation or a formula for a single variable.
- Solve a one-step word problem.
- Draw or measure simple 2-D shapes or 3-D objects.
- Retrieve information from a graph, table, or figure.

Moderate Complexity

Items in this category involve more flexibility of thinking and choice among alternatives than those in the low-complexity category. Moderate-complexity items require a response that goes beyond the habitual, is not specified, and may require more than a single step. The student is expected to decide what to do, using informal methods of reasoning and problem-solving strategies, and to bring together skills and knowledge from various domains. The following list illustrates some of the demands that items of moderate complexity may make of students.

- Solve a word problem requiring multiple steps.
- Compare figures or statements.
- Provide a justification for steps in a solution process.
- Interpret a visual representation.
- Retrieve information from a graph, table, or figure and use it to solve a problem requiring multiple steps.
- Interpret a simple argument.
- Generalize a pattern.

High Complexity

Items in this category make heavy demands on students by requiring them to engage in more abstract reasoning, planning, analysis, judgment, and creative thought. The following list illustrates some of the demands that items of high complexity may make of students.

- Perform a procedure having multiple steps and multiple decision points.
 - Analyze similarities and differences between procedures and concepts.
 - Formulate an original problem, given a situation.
 - Solve a problem in more than one way.
 - Explain and justify a solution to a problem.
 - Describe, compare, and contrast solution methods.
 - Formulate a mathematical model for a complex situation.
 - Analyze the assumptions made in a mathematical model.
 - Analyze or produce a deductive argument.
 - Provide a mathematical justification.
-

Appendix 2: Examples of Descriptions Used in Audio Versions of the *Mathematics 6 Provincial Achievement Test*

This appendix has been prepared by Alberta Education Provincial Assessment staff. Its purpose is to provide school staff with examples of the descriptions of diagrams, illustrations, and visuals used in provincial achievement test audio versions, which are available to students as an accommodation. These examples are neither exhaustive nor prescriptive. Test content is shown in black text and descriptions in blue text.

For students who are enrolled with a school, and who typically use audio for their coursework, no application is required to receive this accommodation when writing provincial achievement tests. Such students may have visual impairments, physical disabilities, or learning disabilities. The audio version is used by students in conjunction with a print, digital, or Braille version of the test.

Units

Unit	Read as
s	seconds
min	minutes
h	hours
m	metres
cm ²	square centimetres
m ³	cubic metres
L	litres
mL	millilitres
g	grams
mg	milligrams
m/s	metres per second
km/h	kilometres per hour
°C	degrees Celsius
\$1.25	one dollar and twenty-five cents

Numerical values

Numerical Value	Read as
183.48	one hundred eighty-three decimal four eight
2 321	two thousand three hundred twenty-one
$\frac{3}{5}$	three over five
-5	negative five
$\frac{6+3}{2}$	six plus three all over two
π	pi

Note: Common fractions, such as $\frac{1}{2}$, may be read as “one over two” or “one half.”

Symbols and notation

Symbol	Read as
+	plus
-	minus
×	times
÷	divided by
=	equals or is equal to
a^2	a squared
b^3	b cubed
c^4	c to the exponent four
$(2n + 1)$	open bracket, two n plus one, closed bracket
$x > 0$	x is greater than zero
$x \leq 0$	x is less than or equal to zero
$x = 0$	x is equal to zero
$\sqrt{\frac{16}{9}}$	the square root of (pause) sixteen over nine
$\frac{\sqrt{16}}{9}$	the square root of sixteen all over nine
15:64	fifteen to sixty-four

Note: Commas are to be read only when reading ordered pairs.

Tables

Introduce the table starting with the title, if there is one, and then identify the number of columns and rows. Tables can be read in two different ways. One way is to list the column headings and any corresponding units first. Next, read across each row from left to right, stating the column heading before reading the data in each cell. Read empty spaces in tables as “blank.”

Number of People (n)	Cost (c)
2	\$55.00
4	\$64.50
6	\$74.00
8	\$83.50

There is a table with two columns and four rows. The column headings are “Number of People, n ” and “Cost, c .”

Number of People: two; Cost: fifty-five dollars and zero cents

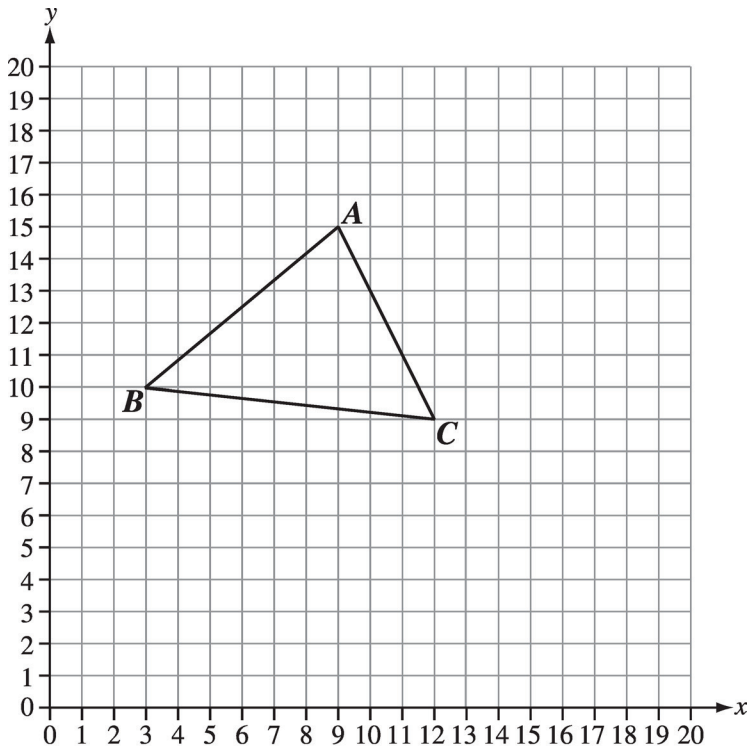
Number of People: four; Cost: sixty-four dollars and fifty cents

Number of People: six; Cost: seventy-four dollars and zero cents

Number of People: eight; Cost: eighty-three dollars and fifty cents

Graphs

Introduce the graph starting with the title, if there is one, and then describe the labels and scales for the horizontal axis and the vertical axis. If there are no marks or scale on the axis, state this. When there are four graphs for each of the multiple-choice options (A, B, C, and D), describe the similarities between the graphs, such as the horizontal axis and the vertical axis, and then describe the shape of the line for each of the choices.



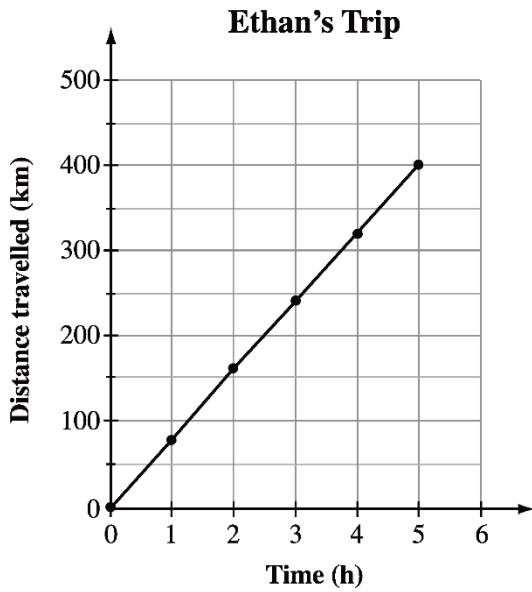
There is a grid representing the first quadrant of the Cartesian plane. The horizontal axis and vertical axis are scaled from zero to twenty, marked and labelled in increments of one. Triangle ABC is located on the grid.

Point A is located at nine comma fifteen.

Point B is located at three comma ten.

Point C is located at twelve comma nine.

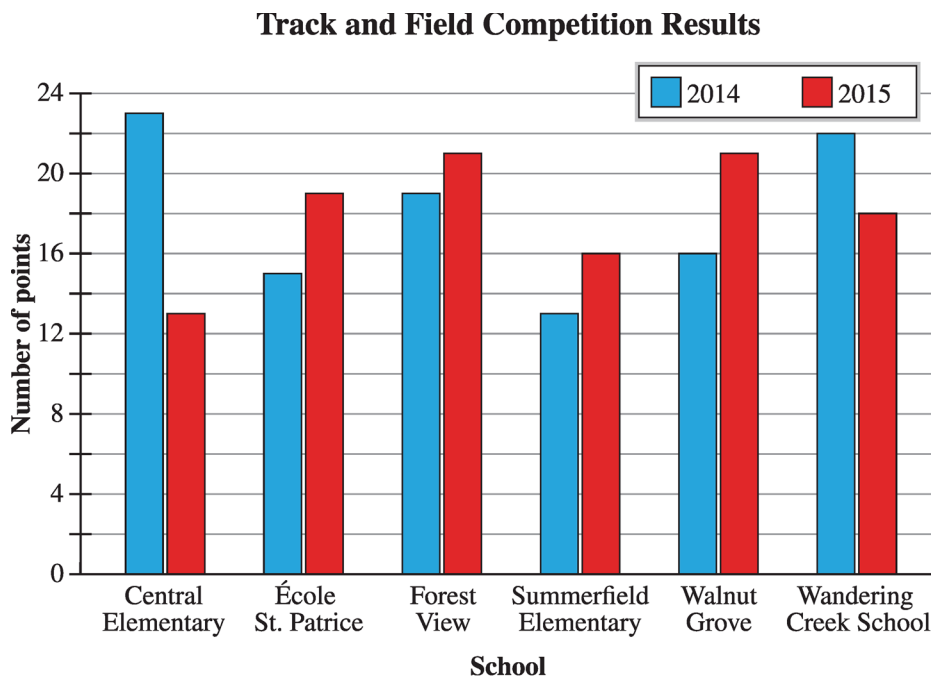
Line graphs



There is a line graph titled “Ethan’s Trip.” The horizontal axis is labelled “Time” in hours, scaled from zero to six, marked and labelled in increments of one. The vertical axis is labelled “Distance travelled” in kilometres, scaled from zero to five hundred, marked in increments of fifty and labelled in increments of one hundred. The dots have been connected in order by straight lines.

Bar graphs

Introduce the graph starting with the title, then describe the label for the horizontal axis. List the label for each bar, and then describe the label and scale for the vertical axis. Describe the legend if available.

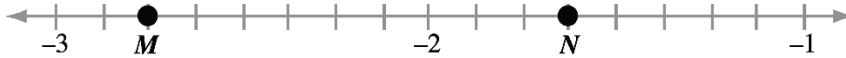


There is a double bar graph titled “Track and Field Competition Results.” The horizontal axis is labelled “School” and from left to right the bars are labelled “Central Elementary,” “École St. Patrice,” “Forest View,” “Summerfield Elementary,” “Walnut Grove,” and “Wandering Creek School.” The vertical axis is labelled “Number of points,” scaled from zero to twenty-four, marked in increments of two and labelled in increments of four.

Two bar graphs are shown. A legend shows that the blue bar graph represents 2014 and the red bar graph represents 2015.

Number lines

Introduce the number line by describing the tick marks and arrows. Identify if it has open or solid, closed circles and their locations.



There is a diagram of a number line that has arrows at each end with two labelled points indicated by solid, closed circles. The number line is marked and labelled, reading from left to right, negative three, negative two, negative one; and there are seven tick marks between each label. Point M is located two tick marks to the right of negative three. Point N is located three tick marks to the right of negative two.

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