Grade 9
Subject Bulletin
Mathematics

Alberta Provincial Achievement Testing **2023–2024**

Alberta

This document was written primarily for

Students

Teachers   ✓   Grade 9 Mathematics

Administrators   ✓

Parents

General Audience

2023–2024 Mathematics 9 Subject Bulletin

Contents

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

Grade 9 Mathematics Provincial Achievement Test

General description

The *Grade 9 Mathematics Provincial Achievement Test* consists of two parts:

- **Part A** contains 20 numerical-response questions and assesses students' foundational skills and fluency in mental math, estimation, algebra, square roots, exponent laws, and arithmetic operations on rational numbers without the use of calculators. Examples of these questions are provided in Appendix 3.
- **Part B** contains 32 multiple-choice questions and 8 numerical-response questions and assesses students' ability to recall concepts and principles and to apply reasoning skills to solve problems. Examples of these questions are provided in Appendix 4.

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

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

Question format

The following bullets briefly describe the two question formats:

- Multiple-choice questions provide students with four response options, of which only one is correct.
- Numerical-response questions require students to generate a response (in symbolic form) to a particular problem, rather than selecting a response from a list of four options.

Test administration

Part A is designed to be completed in 30 minutes; however, each student may have up to 60 minutes to complete this part, should they need it.

Part B is designed to be completed in 80 minutes; however, each student may have up to 160 minutes to complete this part, should they need it.

Any [Alberta Education blank paper](#) needed for rough work must be provided to students by the supervisor, collected by the supervisor at the end of the provincial achievement test administration, and returned with test materials to Alberta Education. Alternatively, students can perform their rough work in the provided test booklet.

Description of Grade 9 Mathematics provincial assessment standards

The following statements describe what is expected of Grade 9 students at the acceptable standard and the standard of excellence based on outcomes in the Grade 9 Mathematics Program of Studies. These statements represent examples of the standards against which student achievement is measured. It is important to remember that one test cannot measure all the outcomes in the program of studies.

Acceptable standard	Standard of excellence
Students who meet the acceptable standard in Grade 9 Mathematics are typically able to	Students who meet the standard of excellence in Grade 9 Mathematics are typically able to
• recall and apply a moderate number of mathematical properties to solve routine problems	• recall and apply a variety of mathematical properties to solve novel problems
• use familiar problem-solving strategies to solve routine problems	• use a variety of problem-solving strategies to solve novel problems
• connect and apply personal experiences and problem-solving strategies to solve routine problems	• connect and apply personal experiences and strategies to check and verify solutions to novel problems
• recall and apply mathematical concepts and operational terms to solve routine problems	• apply abstract-thinking skills to reframe mathematical concepts to solve novel problems
• apply computation skills and formal mathematics vocabularies to solve routine problems	• generate linguistic and non-linguistic representations of knowledge to solve novel problems
• recognize and describe numerical and non-numerical patterns	• demonstrate fluency in working with patterns represented concretely, pictorially, or symbolically
• use semantic knowledge to construct correct mental representations of word problems	• use semantic knowledge to construct and reframe correct mental representations of word problems
• use logical processes to analyze and solve routine problems	• use logical processes to analyze complex problems, reach conclusions, and justify or defend conclusions
• recognize and use mathematical patterns to make predictions when solving routine problems	• recognize, extend, create, and use mathematical patterns to make and justify predictions when solving novel problems
• test generalizations from patterns to reach conclusions	• make generalizations from patterns to reach conclusions

Use of calculators and manipulatives

Part A: Manipulatives may be used, but use of a calculator is not permitted.

Part B: Students may use calculators and manipulatives.

The following calculator materials, properties, and/or configurations are **not** permitted in the provincial achievement test writing room:

- graphing calculator
- programmed memory content
- built-in notes, libraries, or formulae (e.g., definitions or explanations in alpha notation)
- upgraded or downloaded programs
- remote communication capabilities
- symbolic manipulation capabilities
- algebraic expression manipulation capabilities
- external (peripheral) devices and other support materials such as manuals, printed or electronic cards, printers, memory expansion chips or cards, external keyboards
- calculator cases

For solutions to questions using π, students may use the π button on a scientific calculator or the approximate value 3.14.

Use of a protractor 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 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* (except as an accommodation) or *Part B*.

Please refer to [Provincial Achievement Tests](#) for further information.

Scoring and reporting

Marking keys will be provided to teachers for marking purposes. Teachers are expected to record and report the raw scores achieved on the test by their students to parents. Raw scores achieved by students on *Part A* and *Part B* are to be reported separately to parents and are not to be combined into a total test score.

Blueprints

Test Component	Number of Questions	Question Format	Weighting on Total Test
Part A	20	Numerical Response	20%
Part B	32	Multiple Choice	80%
	8	Numerical Response	

Content Domain of Test (Strand)	*Part A:* Percentage of Questions	*Part B:* Percentage of Questions
Number	70–80%	25–35%
Patterns and Relations	20–30%	35–45%
Shape and Space		20–30%
Statistics and Probability		5–10%

Cognitive Domain of Test (Complexity Level)	*Part A:* Percentage of Questions	*Part B:* Percentage of Questions
Low	80–90%	30–40%
Moderate	10–20%	45–55%
High		10–20%

Preparing Students for the *Grade 9 Mathematics Provincial Achievement Test*

Suggestions for preparing students

The best way to prepare students for writing the provincial achievement test is to teach the Mathematics Program of Studies well and to ensure that students know what is expected. Many of the skills and attitudes that support test writing are, in fact, good skills and strategies for approaching all kinds of learning tasks.

Note that most of the questions on the mathematics test are placed in real-life contexts.

Teachers are encouraged to familiarize their students with the types of questions that will appear on the test. Released materials from previously secured tests are available on the Alberta Education website.

Teachers are also encouraged to share the following information with their students to help them prepare for the *Grade 9 Mathematics Provincial Achievement Test.*

Special-format practice tests

To give students an opportunity to practise provincial achievement test-style questions and content in Braille, audio, large print, or coloured print versions, Alberta Education produces special-format practice tests for all subjects that have a provincial achievement test. Alberta schools with registered Alberta K–12 students may place orders for these tests. Braille versions are available in English and, by request, in French. All tests are provided free of charge, but limits may be placed on order volumes to ensure access for all students.

For the greatest benefit, special-format practice tests should be written under conditions similar to those of the corresponding provincial achievement test. The same rules regarding the use of resources and devices should be followed.

Braille versions must be returned to Alberta Education after use.

For more information or to place an order, contact Field.Test@gov.ab.ca.

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 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 four alternatives (A, B, C, and D) 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 (A, B, C, and D) 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 jurisdictions. 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	Moderate Complexity	High 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.	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.	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.

Low Complexity	Moderate Complexity	High Complexity
- 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.	- 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.	- 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: Grade 9 Mathematics Formula Sheet

Tear-Out Page

Grade 9 Mathematics Formula Sheet

The following information may be useful in writing this test.

Area (A)

Circle	$A = \pi r^2$
Rectangle	$A = lw$
Triangle	$A = \dfrac{bh}{2}$

Volume (V)

Right Cylinder	$V = \pi r^2 h$
Prism	$V = (\text{Base Area})(h)$

Circumference (C)

Circle	$C = \pi d$ or $2\pi r$

Pythagorean Theorem

$c^2 = a^2 + b^2$ where c is the hypotenuse
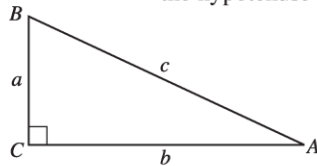
Appendix 3: Example of *Part A* Instructions Pages and Examples of Sample Questions

Example of *Grade 9 Mathematics Part A* instructions pages

Grade 9 Provincial Achievement Test

Mathematics
Part A

Description

- This test consists of 20 numerical-response questions, each worth 1 mark.

Time: 30 minutes. You have up to 60 minutes to complete this test should you need it.

Instructions

- Turn to the last page of the test booklet. Carefully fold and tear out the machine-scored answer sheet along the perforation.

- Use **only** an **HB** pencil to mark your answer.

- You may use manipulatives; however, use of a calculator is **not** permitted.

- You may **not** use a dictionary, a thesaurus, or other reference materials.

- Try to answer every question.

- If you change an answer, **erase** your first mark or marks **completely**.

- When you have completed the test, please answer the **survey question**, which appears after the last test question.

You may write in this booklet if you find it helpful. Make sure that your answers are placed on the answer sheet.

Numerical Response

- Record your answer on the answer sheet provided by writing it in the boxes and then by filling in the corresponding circles.

- **Enter your answer, with one digit per box, beginning in the left-hand box. Each of the following, if needed, goes in its own box: a decimal point (.), a fraction bar (/), and a negative sign (–). Do not include a plus sign (+) if the answer is positive. Leave any unused boxes blank.**

- You may fill in the circles below the boxes for each of your answers as you do the test; however, you may also fill in the circles **after** you have completed this test and your teacher has collected your test booklet.

Example 1

Answer: −4

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Example 2

Answer: 9.2

Record 9.2 on the answer sheet ➔ $\boxed{9 \mid . \mid 2 \mid }$

Fill in the corresponding circles

Example 3

Answer: −0.3

Record −0.3 on the answer sheet ➔ $\boxed{- \mid 0 \mid . \mid 3}$

Fill in the corresponding circles

Example 4

Answer:

$\boxed{9}$ (Record the **numerator** in the **first** column.)

(Record the **fraction bar** in the **second** column.)

$\boxed{2 \mid 0}$ (Record the **denominator** in the **third** and **fourth** columns.)

Record 9/20 on the answer sheet ➔ $\boxed{9 \mid / \mid 2 \mid 0}$

Fill in the corresponding circles

Example 5

Answer:

$\boxed{}$
$\boxed{3}$ (Record the **negative sign** in the **first** column.)

(Record the **numerator** in the **second** column.)

− (Record the **fraction bar** in the **third** column.)

$\boxed{5}$ (Record the **denominator** in the **fourth** column.)

Record −3/5 on the answer sheet ➔ $\boxed{- \mid 3 \mid / \mid 5}$

Fill in the corresponding circles

Example 6

Answer:

(Record the **whole number** in the **first** column.)

$8\dfrac{1}{2}$ (Record the **numerator** in the **second** column.)
(Record the **fraction bar** in the **third** column.)
(Record the **denominator** in the **fourth** column.)

Record 8 1/2 on the answer sheet ⟶ | 8 | 1 | / | 2 |

Fill in the corresponding circles

Example 7

Inequality Symbols			
Symbol 1	**Symbol 2**	**Symbol 3**	**Symbol 4**
$>$	$\geq$	$<$	$\leq$

Answer: x _____ _____

Symbol Number   **Value**

(Record in the **first** column)   (Record in the **second** column)

Answer: < 5

Record: 35 (Record the **symbol number** in the **first** column.)
(Record the **value** in the **second** column.)

Record 35 on the answer sheet ⟶ | 3 | 5 | | |

Fill in the corresponding circles

Examples of *Grade 9 Mathematics Part A* questions

1. What is $(5^2 - 3^3)^2$?

   Answer: _____

   (Record your answer as an **integer** value on the answer sheet.)

2. Evaluate $(-1)^2 - (-1)^3 - 1^4$.

   Answer: _____

   (Record your answer as an **integer** value on the answer sheet.)

3. What is the value of $\dfrac{(-3)^2 \times (-3)^3 \times (-3)^4}{(-3)^6}$?

   Answer: _____

   (Record your answer as an **integer** value on the answer sheet.)

4. What is the value of $\dfrac{1}{5} + 0.2 \times \dfrac{2}{3}$? Express your answer as a fraction in simplest form.

   Answer: $\dfrac{\square}{\square}$ (Record the **numerator** in the **first** column.)
   (Record the **fraction bar** in the **second** column.)
   (Record the **denominator** in the **third** column.)

   (Record your answer as a **fraction** on the answer sheet.)

5. What is the value of $\dfrac{25}{75} \times \dfrac{16}{24} \div \dfrac{8}{27}$? Express your answer as a fraction in simplest form.

   Answer: $\dfrac{\square}{\square}$ (Record the **numerator** in the **first** column.)
   (Record the **fraction bar** in the **second** column.)
   (Record the **denominator** in the **third** column.)

   (Record your answer as a **fraction** on the answer sheet.)

6. What is the value of $\frac{1}{8} + 0.25 + 0.5$? Express your answer as a fraction in simplest form.

Answer: $\frac{\square}{\square}$ (Record the **numerator** in the **first** column.)
(Record the **fraction bar** in the **second** column.)
(Record the **denominator** in the **third** column.)

(Record your answer as a **fraction** on the answer sheet.)

7. Given $(4 \times 5)^7 = 4^{\blacksquare} \times 5^7$, what is the value of $\blacksquare$?

Answer: $\blacksquare$ = _____

(Record your answer on the answer sheet.)

8. In simplest form, what is the value of $\left(3.25 + \frac{3}{4}\right) \div 0.25$?

Answer: _____

(Record your answer as an **integer** value on the answer sheet.)

9. Solve for x in the equation $\frac{3}{x} = 0.5$.

Answer: x = _____

(Record your answer as an **integer** value on the answer sheet.)

10. Solve for x in the equation $2.6 + x = 4x + 1.4$. Express your answer to the nearest tenth.

Answer: x = _____

(Record your answer as a **decimal** value on the answer sheet.)

11. Solve for x in the equation $-2(3x - 4) = 2(x + 6)$. Express your answer to the nearest tenth.

Answer: $x =$ _____

(Record your answer as a **decimal** value on the answer sheet.)

12. Solve for x in the equation $6\left(\dfrac{5}{6}x - \dfrac{2}{3}\right) = -9.$

Answer: $x =$ _____

(Record your answer as an **integer** value on the answer sheet.)

13. If $x = -1$, evaluate $-4(7 - 2x)$.

Answer: _____

(Record your answer as an **integer** value on the answer sheet.)

14. Approximate $\sqrt{\dfrac{145}{4}}$ to the nearest whole number.

Answer: _____

(Record your answer on the answer sheet.)

15. How many integers are between $-\dfrac{17}{4}$ and $\sqrt{40}$?

Answer: _____ **integers**

(Record your answer on the answer sheet.)

16. Order the following rational numbers from **smallest** value to **greatest** value, using the numbers **1**, **2**, **3**, and **4**.

Use the number **1** to represent the **smallest** value.
Use the number **4** to represent the **greatest** value.

Answer: _____ _____ _____ _____

| Rational Number: | -0.75 | $\dfrac{-3}{-5}$ | $-0.\overline{6}$ | $-\left(\dfrac{-5}{-2}\right)$ |

(Record all **four digits** of your answer on the answer sheet.)

17. What is the value of $0.4 \div 2 + \sqrt{\dfrac{9}{36}} \times 1\frac{1}{5}$? Express your answer as a fraction in simplest form.

Answer: $\dfrac{\square}{\square}$ (Record the **numerator** in the **first** column.)
(Record the **fraction bar** in the **second** column.)
(Record the **denominator** in the **third** column.)

(Record your answer as a **fraction** on the answer sheet.)

Use the following information to answer question 18.

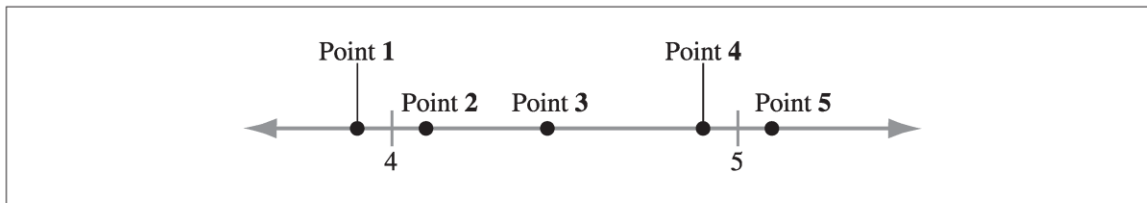| **Inequality Symbols**			
Symbol 1	**Symbol 2**	**Symbol 3**	**Symbol 4**
$>$	$\geq$	$<$	$\leq$

18. Solve the inequality $10 - 2x \geq -4$.

Answer: x _____ _____

Symbol number   Value

(Record in the **first** column.)   (Record in the **second** column.)

(Record **both digits** of your answer on the answer sheet.)

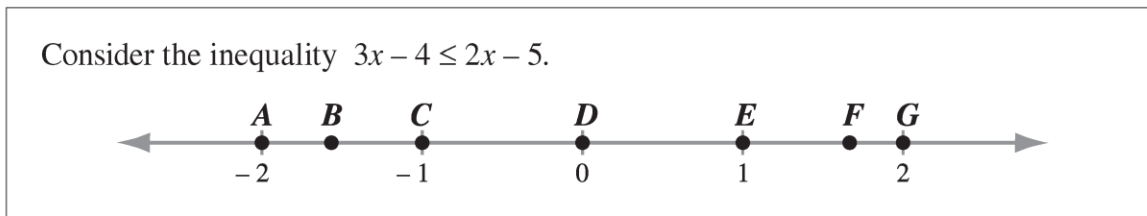*Use the following information to answer question 19.*

19. Which points **best** represent an approximate value for $\sqrt{17}$, $\sqrt{23}$, and $\sqrt{27}$?

Answer: **Point:** _____ _____ _____

Number: $\sqrt{17}$ $\qquad\quad$ $\sqrt{23}$ $\qquad\quad$ $\sqrt{27}$

(Record all **three digits** of your answer on the answer sheet.)

_____

Use the following information to answer question 20.

Consider the inequality $3x - 4 \leq 2x - 5$.

20. How many of the points labelled with a letter on the number line above satisfy the inequality?

Answer: _____ **points**

(Record your answer on the answer sheet.)

Example of *Grade 9 Mathematics Part A* answer sheet - blank

GRADE 9 MATHEMATICS **Part A**

Example of *Grade 9 Mathematics Part A* answer sheet - key

GRADE 9 MATHEMATICS **Part A**

#	Answer
1	4
2	1
3	– 2 7
4	1 / 3
5	3 / 4
6	7 / 8
7	7
8	1 6
9	6
10	0 . 4
11	– 0 . 5
12	– 1
13	– 3 6
14	6
15	1 1
16	2 4 3 1
17	4 / 5
18	4 7
19	2 4 5
20	3
S1	(min)

Appendix 4: Example of *Part B* Instructions Pages and Examples of Questions

Example of *Grade 9 Mathematics Part B* instructions pages

Grade 9 Provincial Achievement Test

Mathematics
Part B

Description

- This test consists of 40 machine-scored questions: 32 multiple-choice questions, each worth one mark, and 8 numerical-response questions, each worth 1 mark.

- **Time: 80 minutes.** You have up to 160 minutes to complete this test should you need it.

You may write in this booklet if you find it helpful. Make sure that your answers are placed on the answer sheet.

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Instructions

- Turn to the last two pages of the test booklet. Carefully fold and tear out the formula sheet and the machine-scored answer sheet along the perforations.

- The formula sheet is available at the end of the test booklet.

- Use **only** an **HB** pencil to mark your answer.

- You may use a ruler, manipulatives, and a calculator; however, a graphing calculator is **not** permitted. Use of a protractor is also **not** permitted.

- You may **not** use a dictionary, a thesaurus, or other reference materials.

- Read each question carefully and choose the **correct** or **best** answer.

- Try to answer every question.

- If you change an answer, **erase** your first mark **completely**.

- When you have completed the test, please answer the **survey question**, which appears after the last test question.

- Now read the detailed instructions for answering multiple-choice and numerical-response questions.

Multiple Choice

- Each question has four possible answers from which you are to choose the **correct** or **best** answer.

- Locate the question number on the separate answer sheet provided and fill in the circle that corresponds to your choice.

Example

This test is for the subject of

  A. language arts
  B. mathematics
  C. social studies
  D. science

Answer Sheet
Ⓐ ● Ⓒ Ⓓ

Numerical Response

- Record your answer on the answer sheet provided by writing it in the boxes and then by filling in the corresponding circles.

- If an answer is a value between 0 and 1 (e.g., 0.25), then be sure to record the 0 before the decimal place.

- **Enter your answer, one digit per box, beginning in the left-hand box. A decimal point, if needed, goes in its own box. Leave any unused boxes blank.**

Calculation Questions and Solutions
Example 1

If you have a 3 m long piece of fabric and a 1 m long piece of fabric, then how much fabric do you have in total, in metres?

Answer: _____ m

(Record your answer in the numerical-response section on the answer sheet.)

Answer: 4

Record 4 on the answer sheet ⟶

Fill in the corresponding circle

Example 2

The value of 2.2 ÷ 6.6, to the nearest tenth, is _____.

(Record your answer in the numerical-response section on the answer sheet.)

Calculator value: 0.333333…
Answer: 0.3

Record 0.3 on the answer sheet ⟶

Fill in the corresponding circles

Correct-order Question and Solution Example

In the table below, the two numbers in each horizontal row add to 7.

1	*a*
b	2
c	4

In the table above, the value of

a is _____ (Record in the **first** column)
b is _____ (Record in the **second** column)
c is _____ (Record in the **third** column)

(Record all **three digits** of your answer in the numerical-response section on the answer sheet.)

Answer: 653

Record 653 on the answer sheet ⟶ | 6 | 5 | 3 | |

Fill in the corresponding circles

Matching Question and Solution Example

The following pictures are of 2-D shapes.

| 1 | 2 | 3 | 4 |

Match each shape, as numbered above, with its name, as given below.

Number: _____ _____ _____ _____
 Shape: Triangle   Pentagon   Circle   Quadrilateral

(Record all **four digits** of your answer in the numerical-response section on the answer sheet.)
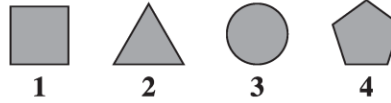
Answer: 2431

Record 2431 on the answer sheet ⟶ | 2 | 4 | 3 | 1 |

Fill in the corresponding circles

Examples of *Grade 9 Mathematics Part B* questions

Low complexity

Use the following information to answer question 1.

According to a weather forecast for a particular city on a given day, the probability of precipitation is 20%.

1. Based on this forecast, a reasonable prediction can be made that in the city

   A. the rainfall will be very light
   B. it will rain on 2 of the next 10 days
   C. 20% of the area will have rain on that day
   D. it is more likely to be dry than wet on that day

Moderate complexity

Use the following information to answer question 2.

The table shown below lists the cost of renting a rock-climbing gym for different numbers of people.

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

2. Which of the following equations could be used to calculate the cost, c, to rent the rock-climbing gym for any number of people, n?

   A. $c = 45.50 + 4.75n$
   B. $c = 45.50n + 4.75$
   C. $c = 45.50 + 9.5n$
   D. $c = 45.50n + 9.5$

Moderate complexity

> *Use the following information to answer numerical-response question 1.*

The diagram shown below is a scale drawing of an Inukshuk. It is drawn with a scale factor of $\frac{1}{25}$.

3.5 cm

Numerical Response

1. The height of the actual Inukshuk is _____ cm.

(Record your answer in the numerical-response section on the answer sheet.)

High complexity

Use the following information to answer numerical-response question 2.

A basketball coach orders enough pizza for 24 players. He determines that $\frac{1}{4}$ of the players will each eat 3 slices of pizza, $\frac{2}{3}$ of the players will each eat 2 slices of pizza, and the remaining players will each eat 1 slice of pizza.

Pizza Size	Number of Slices	Price Including GST ($)
Large	12	15.00

Numerical Response

2. What is the total cost of the order?

Answer: $_____**.00**

(Record your answer in the numerical-response section on the answer sheet.)

Example of *Grade 9 Mathematics Part B* answer sheet - blank

GRADE 9 MATHEMATICS **Part B**

Day

January
May
June

Time Taken: Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓕ

NUMERICAL RESPONSE

1   2   3   4

5   6   7   8

MULTIPLE CHOICE

1	Ⓐ Ⓑ Ⓒ Ⓓ	12	Ⓐ Ⓑ Ⓒ Ⓓ	23	Ⓐ Ⓑ Ⓒ Ⓓ
2	Ⓐ Ⓑ Ⓒ Ⓓ	13	Ⓐ Ⓑ Ⓒ Ⓓ	24	Ⓐ Ⓑ Ⓒ Ⓓ
3	Ⓐ Ⓑ Ⓒ Ⓓ	14	Ⓐ Ⓑ Ⓒ Ⓓ	25	Ⓐ Ⓑ Ⓒ Ⓓ
4	Ⓐ Ⓑ Ⓒ Ⓓ	15	Ⓐ Ⓑ Ⓒ Ⓓ	26	Ⓐ Ⓑ Ⓒ Ⓓ
5	Ⓐ Ⓑ Ⓒ Ⓓ	16	Ⓐ Ⓑ Ⓒ Ⓓ	27	Ⓐ Ⓑ Ⓒ Ⓓ
6	Ⓐ Ⓑ Ⓒ Ⓓ	17	Ⓐ Ⓑ Ⓒ Ⓓ	28	Ⓐ Ⓑ Ⓒ Ⓓ
7	Ⓐ Ⓑ Ⓒ Ⓓ	18	Ⓐ Ⓑ Ⓒ Ⓓ	29	Ⓐ Ⓑ Ⓒ Ⓓ
8	Ⓐ Ⓑ Ⓒ Ⓓ	19	Ⓐ Ⓑ Ⓒ Ⓓ	30	Ⓐ Ⓑ Ⓒ Ⓓ
9	Ⓐ Ⓑ Ⓒ Ⓓ	20	Ⓐ Ⓑ Ⓒ Ⓓ	31	Ⓐ Ⓑ Ⓒ Ⓓ
10	Ⓐ Ⓑ Ⓒ Ⓓ	21	Ⓐ Ⓑ Ⓒ Ⓓ	32	Ⓐ Ⓑ Ⓒ Ⓓ
11	Ⓐ Ⓑ Ⓒ Ⓓ	22	Ⓐ Ⓑ Ⓒ Ⓓ		

Fold and tear along perforation.

Example of *Grade 9 Mathematics Part B* answer sheet - key

GRADE 9 MATHEMATICS **Part B**

Day

○ January
○ May
○ June

Time Taken: Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓕ Ⓖ

NUMERICAL RESPONSE

1: 1 8 7 . 5
2: 2 7 5
3:
4:
5:
6:
7:
8:

MULTIPLE CHOICE

1: D
2: A
3–32: (blank)

Fold and tear along perforation.

Appendix 5: Examples of Descriptions for Audio Versions of the *Mathematics 9 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
$\dfrac{3}{5}$	three over five
–5	negative five
$\dfrac{6+3}{2}$	six plus three all over two
π	pi

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

Symbols and notation

Symbol	Read as
$+$	plus
$-$	minus
$\times$	times
$\div$	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
$\sqrt{\dfrac{16}{9}}$	the square root of (pause) sixteen over nine
$\dfrac{\sqrt{16}}{9}$	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 labels and scales for 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.
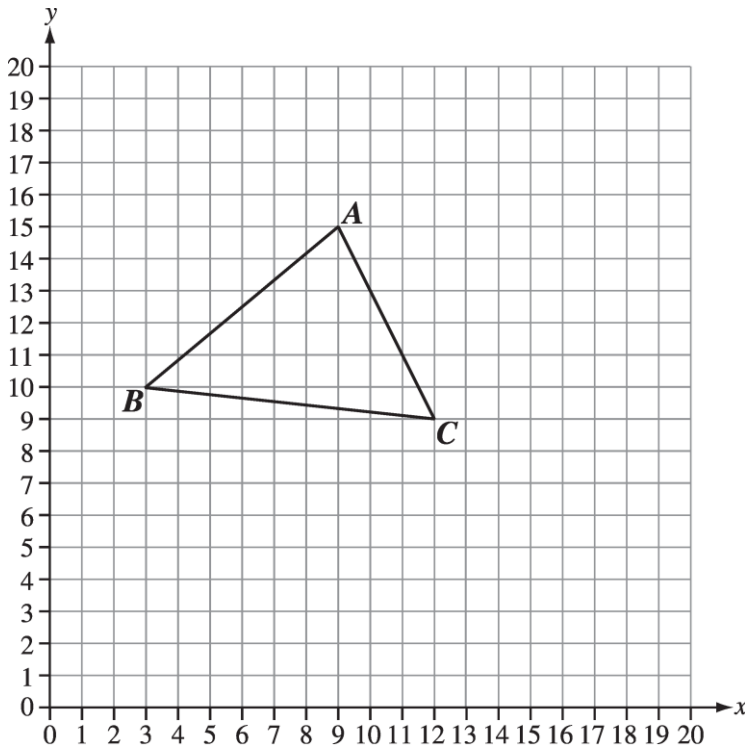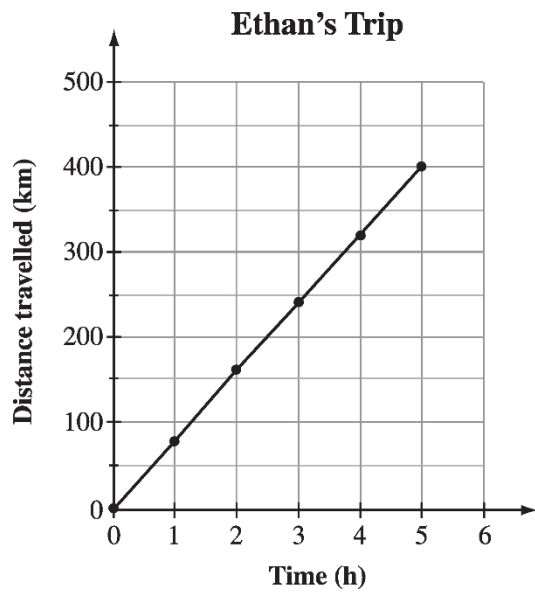

There is a grid representing the first quadrant of the Cartesian plane. The horizontal axis and vertical axis are scaled from zero to twenty, marked and labelled in increments of one. Triangle *ABC* is located on the grid.

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

Ethan's Trip

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.

Track and Field Competition Results
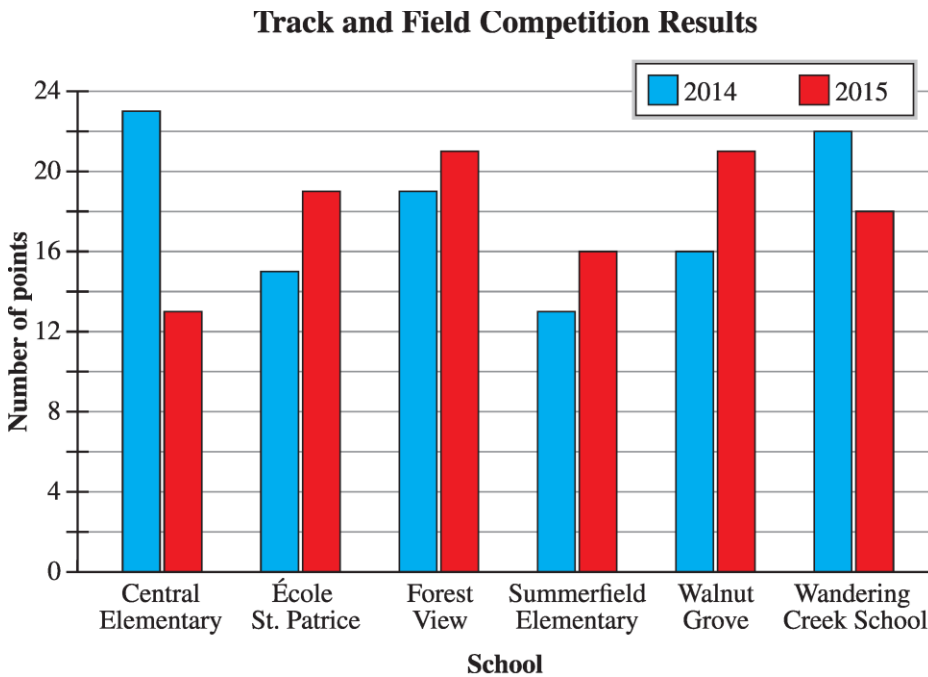
There is a double bar graph titled "Track and Field Competition Results." The horizontal axis is labelled "School" and from left to right the bars are labelled "Central Elementary," "École St. Patrice," "Forest View," "Summerfield Elementary," "Walnut Grove," and "Wandering Creek School." The vertical 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.
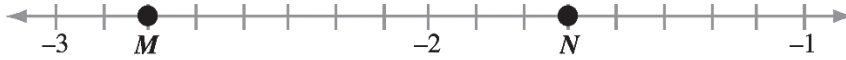
There is a diagram of a number line that has arrows at each end with two labelled points indicated by solid, closed circles. The number line is marked and labelled, reading from left to right, negative three, negative two, negative one; and there are seven tick marks between each label. Point *M* is located two tick marks to the right of negative three. Point *N* is located three tick marks to the right of negative two.

Numerical-response blanks

Order:	_____	_____	_____	_____
Rational Number:	$\sqrt{\dfrac{9}{25}}$	$\dfrac{3}{4}$	$(0.7)^2$	$0.7\overline{5}$

Order: Blank one; Rational Number: the square root of (pause) nine over twenty-five

Blank two: three over four

Blank three: open bracket, zero decimal seven, closed bracket, exponent two

Blank four: zero decimal seven five with a bar over the digit five

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