Information Bulletin
Mathematics 30–1

Diploma Examinations Program **2026–2027**

Alberta

This document was primarily written for:		
Students		
Teachers	✓	of Mathematics 30–1
Administrators		
Parents		
General Audiences		
Others		

2026–2027 Mathematics 30–1 Information Bulletin

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Please note that if you cannot access one of the direct website links referred to in this document, you can find diploma examination-related materials on the Alberta Education and Childcare website.

Introduction

The purpose of this bulletin is to provide teachers of Mathematics 30–1 with information about the diploma examinations scheduled for the 2026–2027 school year. This bulletin should be used in conjunction with the current Mathematics 30–1 Program of Studies, the *Mathematics 30–1 Assessment Standards and Exemplars* document, and the *Mathematics 30–1 Written-Response Information* document to ensure that the curriculum and standards are addressed.

This bulletin includes descriptions of the *Mathematics 30–1 Diploma Examinations* that will be administered in November 2026 and in January, April, June, and August 2027; descriptions of the acceptable standard and the standard of excellence; and subject-specific information.

Diploma exams will be weighted at 30%, and the school-awarded mark will constitute 70% of a student's final mark.

Teachers are encouraged to share the contents of this bulletin with students.

For further information about program implementation, refer to the Alberta Education and Childcare website.

Examination Security

All diploma examinations will be held secure until they are released to the public by the Minister (i.e., no longer confidential). No secure diploma examination is to be previewed until it is released to the public by the Minister. No secure diploma examination is to be previewed, discussed, copied, or removed from the room in which the examination is being written. However, for the January and June administrations only, teachers will be allowed to peruse the diploma examination for review purposes 1 hour after the examination has started.

For mathematics and science diploma examinations, all diploma examinations must be kept secure before, during, and after administration, without exception.

For humanities diploma examinations, the humanities *Part A: Written Response* examinations in the January and June administrations must be kept secure until after they are administered. All other humanities *Part A: Written Response* examinations, and all humanities *Part B* examinations, must be kept secure before, during, and after administration, without exception.

For more information about teacher perusal and examination security, please refer to the Administering diploma exams web page.

Time Limits on Diploma Examinations

All students may use extra time to write diploma examinations. This means that all students have up to 6 hours to complete the *Mathematics 30–1 Diploma Examination*, if they need it. The examination is nevertheless designed so that the majority of students can complete it within 3 hours. The examination instructions state both the designed time and the total time allowed.

Although extra time is allowed for diploma examinations in all subjects, the total time allowed is not the same in all subjects. For more information about accommodations and provisions for students, please refer to the Administering diploma exams web page.

Equating to Maintain Consistent Standards over Time on Diploma Examinations

A goal of Alberta Education and Childcare is to make scores achieved on examinations within the same subject directly comparable from session to session, to ensure fairness to students across administrations.

To achieve this goal, the examination has a number of questions in common with a previous examination. Common (anchor) items are used to find out if the student population writing in one administration differs in achievement from the student population writing in another administration. Common items are also used to find out if the unique items (questions that have never appeared in a previous examination) differ in difficulty from the unique (non-anchor) items on the baseline examination that sets the standard to which all students are held.

A statistical process called equating adjusts for differences in difficulty between examinations. Examination marks may be adjusted depending upon the difficulty of the examination written relative to the baseline examination. Therefore, the resulting equated examination scores have the same meaning regardless of when and to whom the examination was administered. Equated diploma examination marks are reported to students. More information about equating is available on the Administering diploma exams web page.

Because of the security required to ensure fair and appropriate assessment of student achievement over time, *Mathematics 30–1 Diploma Examinations* will be fully secured and will not be released at the time of writing.

Diploma Examinations: Multiple Forms

Some subjects may have two distinct forms (versions) of diploma examinations during major administrations (January and June). Like all other diploma examinations, the two forms are equated to the baseline examination to ensure that the same standard applies to both forms. Both forms adhere to the established blueprint specifications and are reviewed by a technical review committee.

To facilitate the analysis of school-level results, each school receives only one examination form per subject. In subjects offering a translated French-language examination, both forms are administered in English and in French.

For more information, contact the following:

Diploma exam format, content, confirming standards, marking, and results reporting
Diploma.Exams@gov.ab.ca

or

Diploma exam security, diploma exam rules, scheduling, and policy issues
Exam.Admin@gov.ab.ca

How to Get Involved

High-quality diploma examinations are the product of close collaboration between classroom teachers and Alberta Education and Childcare. Classroom teachers from across Alberta are involved in many aspects of diploma examination development, including the development of items; the building, reviewing, administering, and marking of field tests; the reviewing and validating of diploma examinations; the reviewing of support documents; and the marking of diploma examinations.

The development of test items from when they are written until when they appear on an examination takes at least one year. All items on the *Mathematics 30–1 Diploma Examinations* are written and/or validated by Mathematics 30–1 teachers from across Alberta. After provincial implementation of the program of studies, items are field tested to ensure their reliability and validity. Diploma examinations are reviewed by editors; a technical advisory working group composed of mathematics experts from post-secondary institutions, teachers, and curriculum staff; translators; and a French validation working group.

Alberta Education and Childcare values the involvement of teachers and annually asks school authorities for the names of teachers who are interested in being involved in any of the development processes for diploma examinations. Teachers who are interested in developing items, constructing field tests, or reviewing and validating examinations are encouraged to talk to their principals about how they can submit their names for approval to be involved in these processes. Although the call for submissions for working groups occurs each fall, teachers are welcome to have their names submitted at any time.

Teachers may also be nominated by their school authority to mark written-response assignments for humanities and mathematics diploma examinations. The call for nominations of markers occurs in early September (for January and April marking) and again in February (for June, August, and November marking). Teachers who would like to be nominated to mark diploma exams are encouraged to talk to their principals.

Field Testing

Field testing is an essential stage in the development of fair, valid, and reliable provincial examinations. Field testing is a process of collecting data on questions before the questions become part of a diploma examination. Potential diploma examination questions are administered to students in field tests for diploma courses throughout the province to determine the difficulty and appropriateness of the questions. Each field test requires a large student sample to provide the examination developers with reliable information (i.e., statistical data and written validation comments from teachers and students).

How do field tests help teachers and students?

Teachers receive each student's score promptly, gaining useful information about their students' performance. Students benefit from writing a test that duplicates some of the experience of writing a diploma examination. Field tests provide students and teachers with examples of the format and content of questions that may appear on diploma examinations. Finally, because of field testing, students, teachers, and parents can be reassured that the questions on diploma examinations have undergone a rigorous development, improvement, and validation process.

How are field test data used?

The data received from field tests indicate the validity, reliability, and fairness of each question. Questions that meet specific standards are selected for use on future diploma examinations.

Some questions or sets of questions may not initially perform as well as we require. These questions may be revised and tested again in field tests. Revisions are influenced by the written comments of students and teachers, who provide valuable advice about the appropriateness of the questions, the adequacy of writing-time limits, test length, text readability, artwork/graphics clarity and suitability, and question difficulty.

Mathematics field tests

Mathematics field tests are offered exclusively through the digital assessment platform.

Students may use paper formula sheets for all mathematics field tests. These formula sheets also appear in the digital assessment platform. Students should have scrap paper, which may be accessed in the "Forms" section on the Administering diploma exams web page. All paper formula sheets and scrap paper with markings must be securely shredded at the end of the field test administration.

Teachers are provided with data on how their students performed. Test items address learning outcomes in the program of studies, which allows teachers to use field test results to learn more about their students' strengths and areas for improvement.

The security of field test items remains vital to the administration of diploma examinations. Participating teachers must commit to maintaining the security of field test items.

More information about field test registration deadlines, administration, and security is available in the *Field Testing Guide 2026–2027* on the Teacher participation in provincial assessments web page.

How can teachers schedule field tests?

Field tests are offered digitally on the digital assessment platform. To schedule a field test, teachers must have a digital assessment platform teacher account.

For information about how to schedule and administer a field test, please refer to the *Field Testing Guide 2026–2027* on the Teacher participation in provincial assessments web page or contact Field.Test@gov.ab.ca.

Detailed instructions for how to schedule a field test can also be found on the digital assessment platform Help web page.

For more information, contact the following:

Diploma exam format, content, confirming standards, marking, and results reporting
Diploma.Exams@gov.ab.ca

or

Diploma exam security, diploma exam rules, scheduling, and policy issues
Exam.Admin@gov.ab.ca

*NEW Mathematics 30–1 Field Testing

Mathematics 30–1 offers topic and end-of-course field tests.

There are two different types of topic field tests. One topic field test is 50 minutes in length and contains machine-scored items only. The other topic field test is 60 minutes in length and contains machine-scored items as well as one written-response item.

End-of-course field tests contain machine-scored items as well as one written-response item. Each semester, one end-of-course field test will be translated into French.

The table below shows the content, test length, and number of questions for field tests available for the 2026–2027 school year.

Content	Test Length (minutes)	Number of Questions
Topic: Exponential and Logarithmic Functions; Transformations; Function Operations	50	10 machine-scored items
Topic: Exponential and Logarithmic Functions; Transformations; Function Operations	60	10 machine-scored and 1 written-response item
Topic: Polynomial, Radical, and Rational Functions; Transformations; Function Operations	50	10 machine-scored items
Topic: Polynomial, Radical, and Rational Functions; Transformations; Function Operations	60	10 machine-scored and 1 written-response item
Topic: Trigonometry	50	10 machine-scored items
Topic: Trigonometry	60	10 machine-scored and 1 written-response item
End-of-Course	60	10 machine-scored and 1 written-response item

The field tests are designed to be completed in the times listed in the table; however, an additional 15 minutes may be used, if available.

An additional 10 minutes of time is required for each field test administration to complete the set-up procedures and go through the instructions with students.

All field tests with a written-response component will require teachers to download and print written-response answer sheets.

After administration, all students' written-response answer sheets must be scanned and uploaded to the platform by an administrator within 48 hours. After the upload has been successfully completed, all student written-response answer sheets, scrap paper, and formula sheets must be securely shredded.

For information about how to schedule and administer a field test, please refer to the *Field Testing Guide 2026–2027* on the Teacher participation in provincial assessments web page or contact Field.Test@gov.ab.ca.

Practice Tests

To give students an opportunity to practise answering questions similar to those used on diploma examinations that address learning outcomes in the program of studies, Alberta Education and Childcare produces practice tests for subjects that have a diploma examination. Students can access these practice tests using Alberta Education and Childcare's digital assessment platform.

Special-format Practice Tests

To give students an opportunity to practise answering questions similar to those used on diploma examinations that address learning outcomes in the program of studies in Braille, large print, or coloured print versions, Alberta Education and Childcare produces special-format practice tests for all subjects that have a diploma examination. 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 diploma examination. The same rules regarding the use of resources and devices should be followed.

Braille versions must be returned to Alberta Education and Childcare after use.

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

Audio Descriptions

A support document, *Examples of Descriptions Used in Audio-enabled Versions of Mathematics Diploma Exams*, has been developed to assist teachers and students planning to use an audio version during the administration of a mathematics diploma examination.

A Grade 12 Practice Test (machine scored) and humanities *Part A* (written response) practice tests with text-to-speech enabled can be accessed on Alberta Education and Childcare's digital assessment platform.

Course Objectives

The Mathematics 30–1 course contains topics and outcomes, as specified in the program of studies, that will provide students with the knowledge base, mathematical understandings, and critical-thinking skills identified for entry into post-secondary programs that require the study of calculus. In Mathematics 30–1, algebraic, numerical, and graphical approaches are used to solve problems. Technology is used to enable students to explore and create patterns, examine relationships, test conjectures, and solve problems.

Students are expected to communicate solutions clearly and effectively when solving both routine and non-routine problems. Students are also expected to develop both conceptual and procedural understandings of mathematics and apply them to real-life problems. It is important for students to realize that it is acceptable to solve problems in different ways, using a variety of strategies.

The program of studies is available online.

Mathematical Processes

The seven mathematical processes are critical aspects of learning, doing, and understanding mathematics. Students must encounter these processes regularly in a mathematics program in order to achieve the goals of mathematics education.

The Mathematics 30–1 Program of Studies incorporates the following interrelated mathematical processes. They are to permeate the teaching and learning of mathematics.

	Students are expected to:
Communication [C]	use *communication* in order to learn and express their understanding
Connections [CN]	make *connections* among mathematical ideas, other concepts in mathematics, everyday experiences, and other disciplines
Mental Mathematics and Estimation [ME]	demonstrate fluency with *mental mathematics and estimation*
Problem Solving [PS]	develop and apply new mathematical knowledge through *problem solving*
Reasoning [R]	develop mathematical *reasoning*
Technology [T]	select and use *technology* as a tool for learning and solving problems
Visualization [V]	develop *visualization* skills to assist in processing information, making connections, and solving problems

For further details about each of these processes, refer to the Mathematics Grades 10–12 Program of Studies.

Performance Expectations

Curriculum standards

Provincial curriculum standards help to communicate how well students need to perform in order to be judged as having achieved the learning outcomes specified in the Mathematics 30–1 Program of Studies. The specific statements of standards are written primarily to inform Mathematics 30–1 teachers of the extent to which students must know the Mathematics 30–1 curriculum and demonstrate the required skills in order to pass the examination.

Diploma exams are designed to match the program of studies of each subject, but what the diploma exams measure may not be the same in scope as what teachers measure. Diploma exam marks and teacher-awarded marks should reflect the same standard, however, because both assess students based on the same program of studies (curriculum). Alberta Education and Childcare works with teachers to set and maintain the standards of achievement for diploma exams. This information bulletin is intended to assist teachers in understanding the provincial standards for Mathematics 30–1.

Performance Standards

Acceptable standard

Students who attain the acceptable standard, but not the standard of excellence, will receive a final course mark between 50% and 79%, inclusive. Typically, these students have gained new skills and a basic knowledge of the concepts and procedures relative to the general and specific outcomes defined for Mathematics 30–1 in the program of studies. They demonstrate mathematical skills, as well as conceptual understanding, and they can apply their knowledge to familiar problem contexts.

Standard of excellence

Students who attain the standard of excellence will receive a final course mark of 80% or higher. Typically, these students have gained a breadth and depth of understanding regarding the concepts and procedures, as well as the ability to apply this knowledge and conceptual understanding to a broad range of familiar and unfamiliar problem contexts.

When analyzing the data in Table 1 of the detailed reports, note that the percentage of students who achieved the acceptable standard includes students who achieved the standard of excellence.

Assessment Standards and Exemplars

The *Mathematics 30–1 Assessment Standards and Exemplars* document that describes acceptable standard and standard of excellence performance levels appropriate to the Mathematics 30–1 Program of Studies can be found on the Alberta Education and Childcare website. This document also contains notes and exemplars to assist teachers and students with the interpretation of curricular outcomes in the program of studies.

Examples of Written-response Questions

The *Math 30–1 Written-Response Information* document, the *Mathematics 30-1 Released Items 2019* document, and the *Mathematics 30-1 Practice Test 2022* document contain examples of written-response questions, sample responses, and scoring rationales as they relate to the general scoring guides and can be found on the Writing diploma exams web page. These documents can help teachers and students understand the intent of the written-response component of the diploma examination, provide information about how the scoring guide is applied to specific questions, and encourage the use of the General Scoring Guide in class assignments. Teachers and students should note that certain directing words are bolded in written-response questions. A list of these directing words and their definitions can be found on page 22 of this bulletin.

Explanation of Cognitive Levels

Procedural

The assessment of students' knowledge of mathematical procedures should involve recognition, execution, and verification of appropriate procedures and the steps contained within them. The use of technology can allow for conceptual understanding prior to specific skill development or vice versa. Students must appreciate that procedures are created or generated to meet specific needs in an efficient manner and thus can be modified or extended to fit new situations. Assessment of students' procedural knowledge will not be limited to an evaluation of their proficiency in performing procedures but will be extended to reflect the skills presented above.

Conceptual

An understanding of mathematical concepts goes beyond a mere recall of definitions and recognition of common examples. Assessment of students' knowledge and understanding of mathematical concepts should provide evidence that they can compare, contrast, label, verbalize, and define concepts; identify and generate examples and counter-examples as well as properties of a given concept; recognize the various meanings and interpretations of concepts; and defend procedures and personal strategies. Students who have developed a conceptual understanding of mathematics can also use models, symbols, and diagrams to represent concepts. Appropriate assessment provides evidence of the extent to which students have integrated their knowledge of various concepts.

Problem solving

Appropriate assessment of problem-solving skills is achieved by allowing students to adapt and extend the mathematics they know and by encouraging the use of strategies to solve unique and unfamiliar problems. Assessment of problem solving involves measuring the extent to which students use these strategies and knowledge, and their ability to verify and interpret results. Students' ability to solve problems develops over time as a result of their experiences with relevant situations that present opportunities to solve various types of problems. Evidence of problem-solving skills is often linked to clarity of communication. Students demonstrating strong problem-solving skills should be able to clearly explain the processes they have chosen, using appropriate language and correct mathematical notation and conventions.

Examination Specifications and Design

Each *Mathematics 30–1 Diploma Examination* is designed to reflect the content outlined in the Mathematics 30–1 Program of Studies. The percentage weightings shown below will not necessarily match the percentage of class time devoted to each topic.

Specifications

The format and content of the *Mathematics 30–1 Diploma Examinations* in the 2026–2027 school year are as follows:

Question Format	Number of Questions	Emphasis
Machine Scored	32	75%
Written Response	3	25%

Notes: The three written-response questions are equally weighted.

Topic	Emphasis
Relations and Functions	53%–58%
Trigonometry	27%–33%
Permutations, Combinations, and Binomial Theorem	14%–18%

Procedural, conceptual, and problem-solving cognitive levels are addressed throughout the examination. The approximate emphasis of each cognitive level is given below.

Cognitive Level	Emphasis
Conceptual	34%
Problem Solving	36%
Procedural	30%

Machine-scored questions

The **machine-scored questions** on the diploma exam can be written using a variety of question types. Information required to answer these questions is often located in a box preceding the question.

For multiple-choice questions, students are to choose the correct or best possible answer from four alternatives.

For other types of machine-scored questions, students may be required to calculate a numerical answer and then record their answer in the response box on their screen. If the answer can be a decimal value, then students are asked to record their answer to the nearest tenth or nearest hundredth, as specified in the question. If an answer is a value between 0 and 1 (e.g., 0.25), then students should ensure that they record the 0 before the decimal place. Students should retain all decimals throughout the question, and **rounding should occur only in the final answer**.

When the answer to be recorded cannot be a decimal value, students are asked to determine a whole number value (e.g., "the number of people is _____" or "the number of different routes is _____").

Some machine-scored questions require students to record their understanding of a concept. These questions may require students to select or match appropriate responses from a list or a table, to arrange items in a specific order, or to identify an error in the steps of a solution or proof.

For examples of different machine-scored questions on the digital format of the diploma exam, please refer to the Mathematics 30–1 Practice Tests on the digital assessment platform.

Written-response questions

The written-response component is designed to assess the degree to which students can draw on their mathematical experiences to solve problems, explain mathematical concepts, and demonstrate their algebraic skills. A written-response question may cover more than one specific outcome and will require students to make connections between concepts. Each written-response question will consist of two parts and will address multiple cognitive levels. Students should be encouraged to try to solve the problems in both parts because an attempt at a solution may be worth partial marks.

Students may be asked to solve, explain, or prove in a written-response question. Students are required to know the definitions and expectations of directing words such as **algebraically**, **compare**, **determine**, **evaluate**, **justify**, and **sketch**. A list of these directing words and their definitions can be found on page 22 of this bulletin.

Students are required to record their responses to the written-response items on student written-response answer sheets. Five days prior to the diploma examination, school administrators will have access to download and print the student written-response answer sheets. After the administration of the exam, all students' written-response answer sheets will be collected by the exam supervisor. The sheets must then be scanned and uploaded to the digital assessment platform by a school administrator within five days of the exam date. After the upload has been successfully completed, all student written-response answer sheets, scrap paper, and formula sheets must be securely shredded.

For more information regarding the downloading, printing, and uploading of student written-response sheets, please refer to the *Administering the Mathematics 30–1/30–2 Diploma Exams* document on the digital assessment platform Help web page.

General Scoring Guides

The General Scoring Guide, developed in consultation with teachers and Alberta Education and Childcare staff, describes the criteria and performance level at each score-point value. The General Scoring Guide will be used to develop specific scoring descriptions for each written-response question.

In scoring the written-response questions, markers will evaluate how well students

- demonstrate their understanding of the problem or the mathematical concept
- correctly apply mathematical knowledge and skills
- use problem-solving strategies and explain their solutions and procedures
- communicate their solutions and mathematical ideas

2-MARK PART

Score	General Scoring Guide
NR	No response is provided.
0	In the response, the student does not address the question or provides a solution that is invalid.
0.5	
1	In the response, the student demonstrates basic mathematical understanding of the problem by applying an appropriate strategy or relevant mathematical knowledge to find a partial solution.
1.5	
2	In the response, the student demonstrates complete mathematical understanding of the problem by applying an appropriate strategy or relevant mathematical knowledge to find a complete and correct solution.

3-MARK PART

Score	General Scoring Guide
NR	No response is provided.
0	In the response, the student does not address the question or provides a solution that is invalid.
0.5	
1	In the response, the student demonstrates minimal mathematical understanding of the problem by applying an appropriate strategy or some relevant mathematical knowledge to complete initial stages of a solution.
1.5	
2	In the response, the student demonstrates good mathematical understanding of the problem by applying an appropriate strategy or relevant mathematical knowledge to find a partial solution.
2.5	
3	In the response, the student demonstrates complete mathematical understanding of the problem by applying an appropriate strategy or relevant mathematical knowledge to find a complete and correct solution.

Specific scoring guides for each written-response question will provide detailed descriptions to clarify expectations of student performance at each benchmark score of 0, 1, 2, and 3. A student response that does not meet the performance level of a benchmark score may receive an augmented score of 0.5, 1.5, or 2.5. Descriptions of these augmented scores will be determined with teachers at each marking session and are not an exhaustive list. Each part will be scored separately, and the scores will be combined for a total of 5 marks.

Using Calculators

The *Mathematics 30–1 Diploma Examination* requires the use of an approved graphing calculator. The list of approved graphing calculators, along with the rules, list of prohibited properties, criteria, and keystrokes required to properly clear and configure each approved graphing calculator, is in the *2026–2027 Calculator Information and Rules for Mathematics and Science Diploma Exams* document, which can be found on the Writing diploma exams web page.

Students may bring **one** approved calculator that must be properly cleared and configured before AND after each diploma exam administration by the exam supervisor or teacher. If an approved graphing calculator is not cleared and configured properly, it may have prohibited properties such as symbolic manipulation capabilities, downloaded programs, the ability to provide exact trigonometric values, or the ability to simplify radicals and rationalize denominators. Teachers and students should recognize that the different models of approved graphing calculators have a range of capabilities, and the choice of model to use or purchase will require personal or teacher analysis of the calculator's capabilities and one's individual or school circumstances. Teachers should also be aware of the capabilities that are available when the calculator is not configured for exam purposes as these capabilities may impact classroom instruction and assessment. These capabilities may also be applicable to other high school math and science courses.

Using Scrap Paper

Students are permitted to use scrap paper for rough work; however, all blank and graph scrap paper must be provided to students by examination supervisors. Students are not permitted to bring in blank pieces of paper, including sticky or Post-it® notes, for rough draft work. Alberta Education and Childcare blank and graph scrap paper can be accessed and printed from the "Forms" section on the Administering diploma exams web page.

No marks will be given for work done on scrap paper. All scrap paper must be securely shredded after the administration of the examination.

Mathematics 30–1 Diploma Examination Instructions Page: Digital Format

Mathematics 30–1

Grade 12 Diploma Examination

Description

Time: 3 hours. This closed-book examination was developed to be completed in 3 hours; however, you may take an additional 3 hours, should you need it.

This examination consists of

- 32 machine-scored questions, worth 75% of the total examination mark
- 3 written-response questions, worth 25% of the total examination mark

A formula sheet can be viewed by clicking the Resources icon at the right side of the screen.

A paper version of the formula sheet is also permitted.

All graphs on this examination are computer-generated.

Instructions

- You may use a graphing calculator approved by Alberta Education and Childcare.
- You **must** clear your calculator of all information that is stored in the programmable or parametric memory both before and after the examination.
- You are permitted to use scrap paper for your rough work. **No marks** will be given for work done on scrap paper.
- Consider all numbers used in the examination to be exact numbers and not the result of a measurement.
- If you change an answer, your examination will be automatically updated.
- To submit your **final** answers, click "Submit" on the left side of the screen.

Written-response Instructions

- Write your responses as neatly and as clearly as possible in the designated space provided on the written-response answer sheets.
- For full marks, your responses must address **all** aspects of the question.
- All responses, including descriptions and/or explanations of concepts, must include pertinent ideas, calculations, formulas, and correct units.
- Your responses must be presented in a well-organized manner. For example, you may organize your responses in paragraphs or point form.
- The presiding examiner will collect your written-response answer sheets and send them to Alberta Education and Childcare.
- **Do not include your name anywhere in the written-response answer sheets.**

Mathematics 30–1 Formula Sheet

For $ax^2 + bx + c = 0$,

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Relations and Functions

Graphing Calculator Window Format

x: $[x_{\min},\ x_{\max},\ x_{\text{scl}}]$

y: $[y_{\min},\ y_{\max},\ y_{\text{scl}}]$

Laws of Logarithms

$$\log_b\left(M \times N\right) = \log_b M + \log_b N$$

$$\log_b\left(\frac{M}{N}\right) = \log_b M - \log_b N$$

$$\log_b\left(M^n\right) = n \log_b M$$

$$\log_b c = \frac{\log_a c}{\log_a b}$$

Growth/Decay Formula

$$y = ab^{\frac{t}{p}}$$

General Form of a Transformed Function

$$y = af\left[b(x - h)\right] + k$$

Permutations, Combinations, and the Binomial Theorem

$n! = n(n-1)(n-2)\ldots 3 \times 2 \times 1$,
where $n \in N$ and $0! = 1$

$${}_nP_r = \frac{n!}{(n-r)!}$$

$${}_nC_r = \frac{n!}{(n-r)!r!} \qquad {}_nC_r = \binom{n}{r}$$

In the expansion of $(x + y)^n$, written in descending powers of x, the general term is $t_{k+1} = {}_nC_k x^{n-k} y^k$.

Trigonometry

$$\theta = \frac{a}{r}$$

$$\tan\theta = \frac{\sin\theta}{\cos\theta} \qquad \cot\theta = \frac{\cos\theta}{\sin\theta}$$

$$\csc\theta = \frac{1}{\sin\theta} \qquad \sec\theta = \frac{1}{\cos\theta}$$

$$\cot\theta = \frac{1}{\tan\theta}$$

$$\sin^2\theta + \cos^2\theta = 1$$

$$1 + \tan^2\theta = \sec^2\theta$$

$$1 + \cot^2\theta = \csc^2\theta$$

$$\sin(\alpha + \beta) = \sin\alpha\cos\beta + \cos\alpha\sin\beta$$

$$\sin(\alpha - \beta) = \sin\alpha\cos\beta - \cos\alpha\sin\beta$$

$$\cos(\alpha + \beta) = \cos\alpha\cos\beta - \sin\alpha\sin\beta$$

$$\cos(\alpha - \beta) = \cos\alpha\cos\beta + \sin\alpha\sin\beta$$

$$\tan(\alpha + \beta) = \frac{\tan\alpha + \tan\beta}{1 - \tan\alpha\tan\beta}$$

$$\tan(\alpha - \beta) = \frac{\tan\alpha - \tan\beta}{1 + \tan\alpha\tan\beta}$$

$$\sin(2\alpha) = 2\sin\alpha\cos\alpha$$

$$\cos(2\alpha) = \cos^2\alpha - \sin^2\alpha$$

$$\cos(2\alpha) = 2\cos^2\alpha - 1$$

$$\cos(2\alpha) = 1 - 2\sin^2\alpha$$

$$\tan(2\alpha) = \frac{2\tan\alpha}{1 - \tan^2\alpha}$$

$$y = a\sin\left[b(x - c)\right] + d$$

$$y = a\cos\left[b(x - c)\right] + d$$

Commentary on the *Mathematics 30–1 Diploma Examinations*

Students' strengths and areas for improvement

Relations and Functions

- Students continue to perform well on questions regarding the interpretation of transformation equations involving stretches, reflections, and translations to determine the coordinates of a transformed point.
- Students are able to represent translations and reflections using mapping notation, but weaker students still have difficulties using this notation to represent stretches.
- Students are able to determine the number of invariant points associated with reflections, but many continue to have difficulty determining the number of invariant points associated with other transformations.
- Students are able to use product or power laws to simplify a logarithmic expression, but many continue to have difficulty combining multiple logarithm laws to simplify an expression into a single logarithm or to solve a logarithmic equation.
- Students are able to solve exponential equations that can be simplified to a common base.
- Students perform well on questions that require them to solve for a base in an exponential equation.
- Students are able to determine the factors of a polynomial expression and are able to relate the factored form of a polynomial function to the characteristics of the graph.
- Students continue to have difficulty determining the domain and range of a rational function that contains a point of discontinuity.
- Students are able to complete operations on functions for specific values of the variable.

Trigonometry

- Students continue to perform well on problems involving coterminal angles, angles drawn in standard position, and arc length.
- Students are able to determine the measure of an angle drawn in standard position given one coordinate of a point on the unit circle.
- Students continue to perform well on questions that require them to relate the parameters in the equation of a sinusoidal function to the characteristics of the corresponding graph of the function.
- Students are able to solve first-degree and second-degree trigonometric equations in a variety of domains, but many students have difficulty solving equations when an identity substitution is required.
- Students are able to determine the exact value of a trigonometric expression when verifying a trigonometric identity, but weaker students have difficulties verifying identities that involve conjugates, double angle identities, and the use of rational operations.

Permutations, Combinations, and Binomial Theorem

- Students are able to solve permutation problems that involve one or two constraints, but many students have difficulty solving problems with three or more constraints or multiple cases.
- Students are able to solve problems involving repeated elements.
- Stronger students are able to identify the correct statements about the expansion of a binomial with linear terms; however, many students have difficulty determining specific terms in the expansion of a binomial with non-linear terms.

Observations from the written-response component

- Markers noted that many students need to read each written-response question more carefully to ensure that they are addressing all components of the question.
- Students should be reminded that they must be familiar with the specific meaning of the directing words. For example, markers noted that many students did not demonstrate that they know that the directing word **algebraically** requires students to demonstrate a complete algebraic process or procedure when solving the problem and that the directing word **compare** requires an explicit statement of how two concepts or objects are similar and different, along with the appropriate supporting evidence. Students are expected to include all steps in their work when the directing word **determine** is used.
- Markers noted that many students do not appear to understand the differences between some key algebraic processes. For example, many students did not demonstrate that they understand the difference between simplifying or factoring an expression and solving an equation or the difference between verifying and proving a trigonometric identity.
- Markers noted that some students are able to clearly illustrate the steps of their work, but many need to focus on organizing their work in a logical way.
- Many students need to focus on the details within their written work. Markers noted that students often omit the correct units in their final answer, forget to include the angle argument when writing trigonometric expressions, do not include all of the necessary brackets, and write expressions in place of equations. Additionally, students should be reminded to set factors equal to zero when solving equations, and relate their solution to the context of the problem.
- Students are expected to use appropriate math terminology and notation when communicating their understanding of math concepts. Markers noted that many students did not demonstrate that they know the correct vocabulary to use when describing transformations applied to the graph of a function. Using abbreviations in written explanations is inappropriate and not acceptable. Additionally, students are expected to use proper notation when writing domain, range and mapping notation.
- Students should be reminded that an acceptable sketch of the graph of a function must have clearly drawn and appropriately scaled axes and must include all key characteristics. Key characteristics may include vertices, endpoints, maximum and minimum points, intercepts, and asymptote lines. It is also important to ensure that students provide sketches that illustrate the correct graph shape and correct end behaviour.

Mathematics Directing Words

In Provincial Assessment use, mathematics directing words have the following definitions, which students are required to know. These words will be bolded in the written-response questions.

Algebraically	Using mathematical procedures that involve variables or symbols to represent values
Analyze	Make a mathematical examination of parts to determine the nature, proportion, function, interrelationships, and characteristics of the whole
Classify	Arrange items or concepts in categories according to shared qualities or characteristics
Compare	Examine the character or qualities of two things by providing characteristics of both that point out their mutual similarities and differences
Conclude	Make a logical statement based on reasoning and/or evidence
Describe	Give a written account of a concept
Determine	Find a solution, to a specified degree of accuracy, to a problem by showing appropriate formulas, procedures, and/or calculations
Evaluate	Find a numerical value or equivalent for an equation, formula, or function
Explain	Make clear what is not immediately obvious or entirely known; give the cause of or reason for; make known in detail
Illustrate	Make clear by giving an example. The form of the example will be specified in the question: e.g., a word description, sketch, or diagram
Interpret	Provide a meaning of something; present information in a new form that adds meaning to the original data
Justify	Indicate why a conclusion has been stated by providing supporting reasons and/or evidence that form a mathematical argument
Model	Represent a concept or situation in a concrete or symbolic way
Prove	Establish the truth or validity of a statement by giving factual evidence or logical argument
Sketch	Provide a drawing that represents the key features or characteristics of an object or graph
Solve	Give a solution to a problem
Verify	Establish, by substitution for a particular case or by geometric comparison, the truth of a statement

Website Links

Alberta Education and Childcare

Curriculum and Programs of study

General Information Bulletin
contains specific directives, guidelines, and procedures of diploma examinations

Diploma exams

Writing diploma exams
contains Guides for Students, exemplars, and other support documents

Digital Assessment Platform
contains practice questions and questions from previous diploma examinations

Help page
contains guides to help users of digital assessments access and administer secured tests and exams

Teacher participation in provincial assessments
contains information about marking, field testing, item development, and examination validation

Contacts 2026–2027

Provincial Assessment

Provincial Assessment,
Alberta Education and Childcare
44 Capital Boulevard
10044 108 Street NW
Edmonton AB T5J 5E6

Alberta Education and Childcare website: alberta.ca/education-and-childcare

Provincial Assessment

Diploma exam security, diploma exam rules, scheduling, and policy issues
780-427-1857
Email: exam.admin@gov.ab.ca

Results statements and rescores
780-427-1857
Email: exam.admin@gov.ab.ca

Special cases, accommodations, and exemptions
780-415-9242
780-427-4215
780-427-9795
Email: special.cases@gov.ab.ca

Field testing
Email: field.test@gov.ab.ca

Diploma exam format, content, confirming standards, marking, and results reporting
Email: diploma.exams@gov.ab.ca

Digital Assessment
780-641-8987
780-415-0824
Email: online.assessment@gov.ab.ca

***myPass* Access**
Alberta Education and Childcare Help Desk
780-427-5318
Email: AE.helpdesk@gov.ab.ca

Inquiries about transcripts, credentials, detailed academic reports, and rewrite fees
780-427-5732
Email: studentrecords@gov.ab.ca

Inquiries about student enrollment and marks and mature student status
780-422-9337
Email: studentrecords@gov.ab.ca

For a toll-free call to any Alberta government office, dial 310-0000 followed by the 10-digit phone number of the office that you would like to reach.

When contacting Alberta Education and Childcare, please include your name, title, school name, school code, and, if referring to a student, include the student's Alberta Student Number.

Contacts 2026–2027

Diploma Programs

*NEW **Corey Baker, Director**
Diploma Programs and Canadian Adult Education Credential
780-422-3256
Email: Corey.Baker@gov.ab.ca

Diploma Exam Leads

Nathalie Langstaedtler,
Senior Manager of Humanities
Diploma Programs
780-422-4631
Email: Nathalie.Langstaedtler@gov.ab.ca

Philip Taranger
English Language Arts 30–1
780-422-4478
Email: Philip.Taranger@gov.ab.ca

*NEW **Andrew Olasker**
English Language Arts 30–2
780-422-4411
Email: Andrew.Olasker@gov.ab.ca

Frédéric Sévigny
Français 30–1, French Language Arts 30–1
780-422-5140
Email: Frederic.Sevigny@gov.ab.ca

Charla Jo Guillaume
Social Studies 30–1
780-422-5241
Email: Charlajo.Guillaume@gov.ab.ca

Lisa Lemoine
Social Studies 30–2
780-422-4327
Email: Lisa.Lemoine@gov.ab.ca

Joy Wicks-Oyedele,
Senior Manager of Math and Sciences
Diploma Programs
780-643-6716
Email: Joy.Wicks@gov.ab.ca

Shannon Mitchell
Biology 30
780-415-6122
Email: Shannon.Mitchell@gov.ab.ca

Brenda Elder
Chemistry 30
780-427-1573
Email: Brenda.Elder@gov.ab.ca

Delcy Rolheiser
Mathematics 30–1
780-415-6181
Email: Delcy.Rolheiser@gov.ab.ca

Jenny Kim
Mathematics 30–2
780-415-6127
Email: Jenny.Kim@gov.ab.ca

Marc Kozak
Physics 30
780-422-5465
Email: Marc.Kozak@gov.ab.ca

Stan Bissell
Science 30
780-422-5730
Email: Stan.Bissell@gov.ab.ca