Grade 9
Assessment Highlights
Mathematics

Alberta Provincial Achievement Testing

2017–2018

Alberta

This document contains assessment highlights from the 2018 Grade 9 Mathematics Achievement Test. The examination statistics included in this document represent all writers in English. To obtain French-only statistics which may apply to your school, please refer to the French version of this document.

Assessment Highlights provide information about the overall test, the test blueprint, and student performance on the achievement test that was administered in 2018. Also provided is information on student performance at the acceptable standard and the standard of excellence on selected items from the 2018 Grade 9 Mathematics Achievement Test. This information is intended for teachers and is best used in conjunction with multi-year and detailed school reports that are available in schools via the extranet. Assessment Highlights reports for all achievement test subjects and grades are posted on the Alberta Education website every year in the fall.

All released achievement tests, including test blueprints, answer keys with the item difficulty, reporting category, test section, and item description for each test item, are posted on the Alberta Education website (see Achievement Documents).

These materials, along with the program of studies and subject bulletins, provide information that can be used to inform instructional practice.

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The Alberta Education Internet address is education.alberta.ca.

This document was written primarily for:

Students	
Teachers	✓ of Grade 9 Mathematics
Administrators	✓
Parents	
General Audience	
Others	

Contents

The 2018 Grade 9 Mathematics Achievement Test

This report provides teachers, school administrators, and the public with an overview of the performance of those students who wrote the 2018 Grade 9 Mathematics Achievement Test. It complements the detailed school and jurisdiction reports.

How Many Students Wrote the Test?

A total of 41 359 students wrote the 2018 Grade 9 Mathematics Achievement Test. The English form of the test was written by 38 509 students, and the French form was written by 2 850 students.

What Was the Test Like?

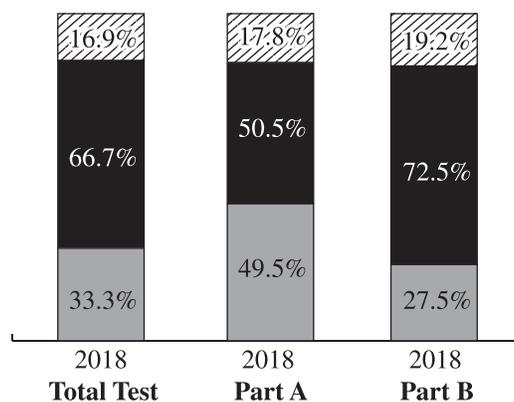The 2018 Grade 9 Mathematics Achievement Test consisted of two parts: Part A and Part B.

Part A consisted of 20 numerical-response questions and represented 20% of the final overall test score. The test assessed 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.

Part B consisted of 32 multiple-choice questions and 8 numerical-response questions and represented 90% of the final overall test score. The test assessed students' ability to recall concepts and principles and to apply reasoning skills to solve problems. The test required students to apply their understanding of one or more mathematical concepts from within and/or across the four strands: Number, Patterns and Relations, Shape and Space, and Statistics and Probability.

How Well Did Students Do?

The percentages of students meeting the acceptable standard and the standard of excellence in 2018 are shown in the graph below. In 2018, 66.7% of students who wrote the Grade 9 Mathematics Achievement Test achieved the acceptable standard, and 16.9% of students who wrote achieved the standard of excellence. Detailed provincial assessment results are provided in school and jurisdiction reports.

Percentage of Students Meeting the Provincial Standards
(French and English combined)

	2018 Total Test	2018 Part A	2018 Part B
Standard of excellence	16.9%	17.8%	19.2%
Acceptable standard	66.7%	50.5%	72.5%
Below acceptable	33.3%	49.5%	27.5%

The percentage of students in the province who met the standard of excellence on the 2018 Grade 9 Mathematics Achievement Test (based on those who wrote)

The percentage of students in the province who met the acceptable standard on the 2018 Grade 9 Mathematics Achievement Test (based on those who wrote). Note: The percentage of students who met the acceptable standard includes the percentage of students who met the standard of excellence.

The percentage of students in the province who were below the acceptable standard on the 2018 Grade 9 Mathematics Achievement Test (based on those who wrote)

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2018 Test Blueprint and Student Achievement

The blueprint below shows how the questions on the test were classified and includes the average raw score in each category for all Grade 9 students who wrote this test. There was a very strong positive correlation between student performance on Part A and performance on Part B. This indicates a strong relation between routine algebraic operations and problem solving. Generally speaking, students who performed well on Part A also performed well on Part B, and vice versa.

Part A Test Blueprint

Content Reporting Categories	Number (Percentage) of Questions	Provincial Student Achievement (Average Raw Score and Percentage)
Rational Numbers	10 (50%)	4.58/10 (45.8%)
Powers & Exponent Laws	3 (15%)	1.11/3 (37.0%)
Square Roots of Perfect & Non-perfect Squares	4 (20%)	1.52/4 (38.0%)
Algebraic Expressions, Equations, & Inequalities	3 (15%)	1.11/3 (37.0%)
Number (Percentage) of Questions	(100%)	8.32/20 (41.6%)

Part B Test Blueprint

Program of Study Strands	Level of Complexity*			Provincial Student Achievement (Average Raw Score and Percentage)
	Low	Moderate	High	
Number	4	5	1	5.98/10 (59.8%)
Patterns and Relations	5	12	1	10.20/18 (56.7%)
Shape and Space	3	6	0	4.96/9 (55.1%)
Statistics and Probability	1	2	0	2.19/3 (73.0%)
Provincial Student Achievement (Average Raw Score and Percentage)	7.48/13 (57.5%)	14.82/25 (59.3%)	0.81/2 (40.5%)	Raw Score 23.2/40 (58.0%)

*Each question is categorized according to its level of complexity (low, moderate, or high). Descriptions of the levels of complexity are in the 2018-2019 Mathematics 9 Subject Bulletin.

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Sample Questions from the 2018 Grade 9 Mathematics Achievement Test—Part A

The following ten items illustrate significant performance differences between students who obtained the standard of excellence, those who obtained the acceptable standard, and those below the acceptable standard.

Item #	Key	% of Students with Correct Solution	# of Unique Errors	Reporting Category	Item Description
1	−9	53.3	317	RN	Solve a problem involving the addition and subtraction of integers (Gr.9, N.3; Gr.7, N.6)

Standards Achieved by Students on Part A	% of Students with Correct Solution	# of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence (*n* = 7 381)	94.0	27	11 (115)	−11 (100)	−17 (99)
Students Achieving Acceptable Standard* (*n* = 20 900)	69.5	75	−17 (1 411)	−11 (877)	11 (680)
Students Below Acceptable Standard (*n* = 20 459)	27.7	309	−17 (4 231)	−11 (3 064)	11 (1 403)

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

1. What is the value of $-3 - (-4) + (-10)$?

Common correct response:

$$-3 + 4 + - 10$$
$$1 + -10$$
$$\sim 9$$

Common incorrect responses:

$$-7 + (-10)$$
$$-7 - 10$$
$$-17$$

$$(-4) + (-10) = (-14)$$
$$-3 - (-14) = -11$$

$$-3 + 4 - +10$$
$$\Rightarrow 1 + 10$$
$$\Rightarrow 11$$

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Item #	Key	% of Students with Correct Solution	# of Unique Errors	Reporting Category	Item Description
2	9	52.2	300	PE	Determine the sum of two given powers with integral bases of which one power has an exponent of zero (Gr.9, N.2)

Standards Achieved by Students on Part A	% of Students with Correct Solution	# of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence ($n = 7\,381$)	95.1	22	8 (250)	10 (63)	17 (11)
Students Achieving Acceptable Standard* ($n = 2\,900$)	72.4	70	8 (1 802)	10 (908)	17 (145)
Students Below Acceptable Standard ($n = 20\,459$)	23.2	288	8 (4 796)	10 (3 339)	6 (806)

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

2. What is the value of $2^3 + 2^0$?

Common correct response:

Common incorrect responses:

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Item #	Key	% of Students with Correct Solution	# of Unique Errors	Reporting Category	Item Description
6	49	27.6	661	PE	Evaluate given expressions by applying the exponent laws (Gr.9, N.1)

Standards Achieved by Students on Part A	% of Students with Correct Solution	# of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence ($n = 7\ 381$)	66.8	53	39 (1 205)	18 (1 044)	327 (37)
Students Achieving Acceptable Standard* ($n = 20\ 900$)	30.6	145	39 (4 565)	18 (2 682)	28 (467)
Students Below Acceptable Standard ($n = 20\ 459$)	11.3	632	39 (4 237)	18 (2 046)	28 (1 328)

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

Evaluate the following four expressions.

Expression #1	Expression #2	Expression #3	Expression #4
$-(-2)^3$	-2^3	$-(-3)^2$	$-(-3^2)$

6. Which numbered expression shown above has the largest value and what is that value?

Common correct response:

$$\left.\begin{array}{l}(-2)^3 \\ 2\times2=4\times2=8\end{array}\right| = -8$$

$$(-1)(-8)$$
$$= (8)$$

$$3\times3=9$$
$$(-1)(+9)$$
$$= -9$$

$$3\times3=9$$
$$(-1)(+9)$$
$$+9$$

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Common incorrect responses:

$$-(-2 \times 2 \times 2)$$
$$= -8$$

$$(-2) \times (-2) \times (-2)$$
$$= 8$$

$$-(-3) \times (-3)$$
$$= -9$$

$$-(3 \times 3)$$
$$= -9$$

$$-1 \cdot (-2) \cdot (-2) \cdot (-2)$$
$$+8$$

$$-1 \cdot 2 \cdot 2 \cdot 2$$
$$-8$$

$$-1 \cdot (-3) \cdot (-3)$$
$$-9$$

$$-1 \cdot (-3) \cdot (-3)$$
$$-9$$

$$8$$

$$-8$$

$$9$$

$$-9$$

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Item #	Key	% of Students with Correct Solution	# of Unique Errors	Reporting Category	Item Description
7	1/2	24.0	794	SR	Determine the square root of a positive rational number that is a perfect square (Gr.9, N.5)

Standards Achieved by Students on Part A	% of Students with Correct Solution	# of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence ($n = 7\ 381$)	74.4	92	14 (1 116)	24 (229)	25 (91)
Students Achieving Acceptable Standard* ($n = 20\ 900$)	25.2	264	14 (5 688)	24 (908)	15 (603)
Students Below Acceptable Standard ($n = 20\ 459$)	4.8	733	14 (6 950)	15 (1 683)	24 (882)

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

7. What is the value of $\sqrt{\dfrac{5}{20}}$ expressed as a fraction in simplest form?

Common correct response:

Common incorrect responses:

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Item #	Key	% of Students with Correct Solution	# of Unique Errors	Reporting Category	Item Description
8	7.8	60.5	1136	RN	Solve a problem involving the addition of decimal numbers (Gr.9, N.3; Gr.7, N.2)

Standards Achieved by Students on Part A	% of Students with Correct Solution	# of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence (n = 7 381)	93.4	72	8.25 (149)	8.8 (55)	7.7 (41)
Students Achieving Acceptable Standard* (n = 20 900)	78.4	254	8.25 (610)	8.8 (325)	8.2 (184)
Students Below Acceptable Standard (n = 20 459)	36.5	1 106	8.2 (1 090)	8.25 (964)	8.8 (561)

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

8. What is the value of 13.2 + 0.05 – 5.45?

Common correct response:

Common incorrect responses:

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Item #	Key	% of Students with Correct Solution	# of Unique Errors	Reporting Category	Item Description
10	3	34.7	418	AE	Solve a given single variable linear inequality (Gr.9, PR.4)

Standards Achieved by Students on Part A	% of Students with Correct Solution	# of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence ($n = 7\,381$)	76.4	23	6 (517)	1 (300)	7 (263)
Students Achieving Acceptable Standard* ($n = 20\,900$)	38.1	72	6 (1 647)	4 (1 378)	2 (1 359)
Students Below Acceptable Standard ($n = 20\,459$)	17.3	401	2 (3 627)	4 (2 755)	1 (2 066)

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

Consider the inequality $3(x - 2) > 4x - 5$.
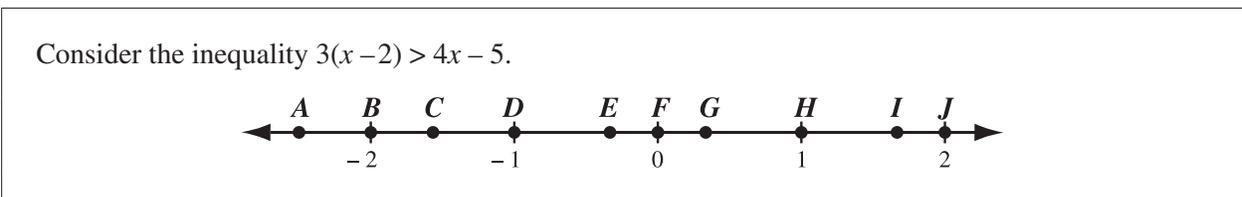
10. How many of the points labelled with a letter on the number line above satisfy the inequality?

Common correct response:

$$3x - 6 > 4x - 5$$
$$-1 > x$$

Common incorrect responses:

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Item #	Key	% of Students with Correct Solution	# of Unique Errors	Reporting Category	Item Description
11	14	49.6	209	SR	Determine the approximate square root of a given rational number that is not a perfect square (Gr.9, N.6)

Standards Achieved by Students on Part A	% of Students with Correct Solution	# of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence (n = 7 381)	92.4	34	14.1 (102)	15 (100)	13 (49)
Students Achieving Acceptable Standard* (n = 20 900)	69.7	89	15 (716)	20 (471)	13 (355)
Students Below Acceptable Standard (n = 20 459)	20.7	206	20 (3 525)	15 (1 409)	100 (1 387)

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

11. To the nearest whole number, what is the approximate square root of 200?

Common correct responses:

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Common incorrect responses:

$10 \times 10 = 100$

$20 \times 20 = 400$

$\sqrt{200} = 20$

$\sqrt{200} = 100$

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Item #	Key	% of Students with Correct Solution	# of Unique Errors	Reporting Category	Item Description
12	90	64.2	869	RN	Solve a problem involving operations on rational numbers including percentages greater than 100% (Gr.9, N.3; Gr.8, N.3)

Standards Achieved by Students on Part A	% of Students with Correct Solution	# of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence (*n* = 7 381)	96.7	51	9 (60)	900 (26)	150 (19)
Students Achieving Acceptable Standard* (*n* = 20 900)	83.2	265	9 (382)	900 (167)	150 (85)
Students Below Acceptable Standard (*n* = 20 459)	39.7	831	9 (532)	30 (432)	40 (324)

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

12. What is 150% of 60?

Common correct response:

Common incorrect responses:

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Item #	Key	% of Students with Correct Solution	# of Unique Errors	Reporting Category	Item Description
13	11	50.6	1361	RN	Solve a problem by applying the order of operations on rational numbers including the addition and multiplication of fractions (Gr.9, N.4; Gr.8, N.6)

Standards Achieved by Students on Part A	% of Students with Correct Solution	# of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence ($n = 7\ 381$)	96.0	61	12 (42)	44 (22)	5 (20)
Students Achieving Acceptable Standard* ($n = 20\ 900$)	73.4	406	44 (250)	5 (222)	8.75 (191)
Students Below Acceptable Standard ($n = 20\ 459$)	19.1	1 290	8.75 (709)	12 (607)	4 (591)

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

13. In simplest form, what is the value of $4 \times \left(2 + \dfrac{3}{4}\right)$?

Common correct responses:

Common incorrect responses:

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Item #	Key	% of Students with Correct Solution	# of Unique Errors	Reporting Category	Item Description
14	27	32.1	2573	RN	Applying the order of operations to evaluate a given expression with exponents (Gr.9, N.4)

Standards Achieved by Students on Part A	% of Students with Correct Solution	# of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence ($n = 7\ 381$)	87.6	113	81 (223)	9 (183)	243 (66)
Students Achieving Acceptable Standard* ($n = 20\ 900$)	41.7	889	81 (1108)	9 (952)	3 (527)
Students Below Acceptable Standard ($n = 20\ 459$)	5.5	2 262	9 (846)	3 (827)	81 (744)

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

14. Simplify, then evaluate $\dfrac{(3^4)^3 \times 3^2}{3 \times 3^{10}}$.

Common correct response:

$$\frac{3^{12} \times 3^2}{3 \times 3^{10}} \qquad \frac{3^{14}}{3^{11}} = 3^3 = 27$$

Common incorrect responses:

$$3^{4+3+2+1+10}$$
$$3^2$$
$$9$$

$$\frac{-11}{9}$$
$$\frac{}{2}$$

$$\frac{3^9}{3^{10}} = 3^1 = 3$$

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$4 \times 3 = 12$

3^{14}

3^{10}

3^4

$3 + 9.27$
2

27

$\dfrac{3}{81}$

$$\dfrac{3^{14}}{3 \times 3^{10}}$$

$3 \cdot 3^4$

243

Item #	Key	% of Students with Correct Solution	# of Unique Errors	Reporting Category	Item Description
15	17/20	34.7	3094	RN	Solve a problem involving the addition of rational numbers in decimal form (Gr.9, N.3; Gr.7, N.5)

Standards Achieved by Students on Part A	% of Students with Correct Solution	# of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence (*n* = 7 381)	88.2	186	3320 (229)	1320 (70)	720 (54)
Students Achieving Acceptable Standard* (*n* = 20 900)	48.7	1 050	3320 (1 218)	0.85 (208)	1320 (199)
Students Below Acceptable Standard (*n* = 20 459)	6.0	2 851	3320 (797)	0.85 (213)	25 (166)

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

15. What is the value of $-\frac{2}{5} + 0.5 + 0.75$ expressed as a fraction in simplest form?

Common correct response:

$$\frac{-2}{5_{\times 4}} + \frac{1}{2_{\times 10}} + \frac{3}{4_{\times 5}} = \frac{-8}{20} + \frac{10}{20} + \frac{15}{20} = \frac{17}{20}$$

Common incorrect responses:

$$-\frac{2}{5} + \frac{1}{2} + \frac{3}{4}$$
$$-\frac{8}{20} + \frac{10}{20} + \frac{15}{20} = \frac{33}{20}$$

$$-0.4 + 0.5 = 0.1 + 0.75 = 0.85$$

$$\frac{-2}{5} + \frac{1}{2} + \frac{3}{4}$$
$$\frac{8}{20} + \frac{10}{20} + \frac{15}{20}$$
$$= \frac{33}{20} = 1\frac{13}{20}$$

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Item #	Key	% of Students with Correct Solution	# of Unique Errors	Reporting Category	Item Description
17	2	53.5	517	SR	Determine the point on a given number line that represents the approximate square root that is not a perfect square (Gr.9, N.6)

Standards Achieved by Students on Part A	% of Students with Correct Solution	# of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence ($n = 7\,381$)	93.1	10	1 (330)	3 (100)	4 (69)
Students Achieving Acceptable Standard* ($n = 20\,900$)	67.9	72	1 (2 409)	3 (958)	4 (617)
Students Below Acceptable Standard ($n = 20\,459$)	29.4	507	3 (4 213)	1 (4 003)	4 (2 748)

*Includes those students who achieved the acceptable standard but not the standard of excellence
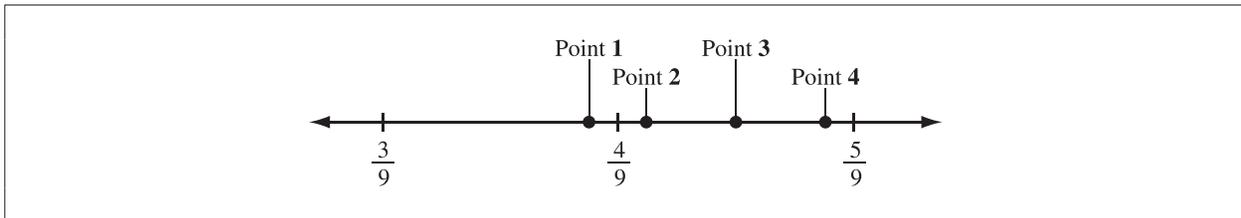
17. Which point best represents the location of $\sqrt{\dfrac{17}{81}}$ on the number line shown above?

Common correct response:

Common incorrect responses:

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Item #	Key	% of Students with Correct Solution	# of Unique Errors	Reporting Category	Item Description
18	1	35.5	1045	PE	Evaluate a given expression by applying the exponent laws (Gr.9, N.2)

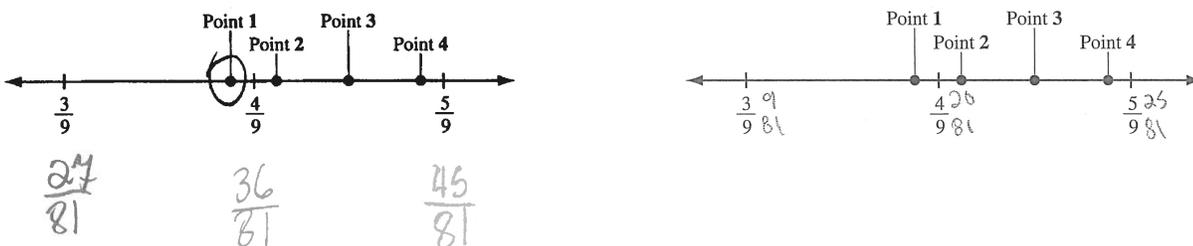| Standards Achieved by Students on Part A	% of Students with Correct Solution	# of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence ($n = 7\ 381$)	76.4	112	−17 (846)	−1 (268)	−23 (104)
Students Achieving Acceptable Standard* ($n = 20\ 900$)	44.0	428	−17 (1 556)	−1 (1 461)	−23 (505)
Students Below Acceptable Standard ($n = 20\ 459$)	15.0	906	−1 (1 933)	0 (1 335)	4 (1 301)

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

18. What is the value of $(2^3 - 3^2)^2$?

Common correct response:

$$(8-9)^2$$
$$(-1)^2 = |x-1| = 1$$

Common incorrect responses:

$$8-9$$
$$-1^2$$
$$-1$$

$$2^6 - 3^4$$
$$\begin{array}{c} 2 \\ 27 \\ \times 3 \\ \hline 81 \end{array} \quad \begin{array}{c} 7 \\ 81 \\ -64 \\ \hline -17 \end{array}$$

$$(8-6)^2$$
$$2^2$$
$$4$$

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Item #	Key	% of Students with Correct Solution	# of Unique Errors	Reporting Category	Item Description
20	2000	24.2	3538	SR	Solve a problem involving the multiplication of rational numbers that are perfect squares (Gr.9, N.5)

Standards Achieved by Students on Part A	% of Students with Correct Solution	# of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence ($n = 7\ 381$)	77.1	415	200 (164)	2 (158)	1000 (72)
Students Achieving Acceptable Standard* ($n = 20\ 900$)	24.3	1 710	2 (506)	7 (359)	7000 (299)
Students Below Acceptable Standard ($n = 20\ 459$)	5.0	2 788	7 (468)	49 (418)	7000 (385)

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

20. What is the value of $\sqrt{\dfrac{1}{9}} \times \sqrt{\dfrac{36}{49}} \times \sqrt{49\ 000\ 000}$?

Common correct response:

Common incorrect responses:

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$$\frac{1}{3} \times \frac{6}{7} \times 700$$

$$\frac{6}{21} \times \frac{700}{1} = \frac{4,200}{21} = 200$$

Sample Questions from the 2018 Grade 9 Mathematics Achievement Test—Part B

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

Reporting Categories: Number (N); Patterns & Relations (PR); Shape & Space (SS); Statistics & Probability (SP)

Item #	Key	% of Students with Correct Solution	Strand & Outcome	Item Complexity	Item Description
5	A	43.5	SS.1	Moderate	Solve a problem by applying a circle property involving the perpendicular from the centre of a circle to a chord.

	% of Student Responses				
Standards Achieved by Students on Part B	**A**	**B**	**C**	**D**	**No Response**
Students Achieving Standard of Excellence	86.7	4.9	5.7	2.7	0
Students Achieving Acceptable Standard*	41.9	29.8	12.4	15.4	0.5
Students Below Acceptable Standard	16.4	40.0	14.8	27.7	1.1

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

The diameter of a cylindrical waterslide is 1.5 m. The water running along the bottom of the slide measures 1 m across, as shown in the diagram below.

Side view

Front view

1 m

x

5. To the nearest hundredth of a metre, what is the depth of the water, x, at its deepest point?

A. 0.19 m

B. 0.25 m

C. 0.40 m

D. 0.50 m

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Item #	Key	% of Students with Correct Solution	Strand & Outcome	Item Complexity	Item Description
6	D	80.7	SP.4	Low	Determine a reasonable prediction that can be made given the probability of an event occurring.

Standards Achieved by Students on Part B	% of Student Responses				
	A	B	C	D	No Response
Students Achieving Standard of Excellence	1.4	4.9	0.8	92.9	0
Students Achieving Acceptable Standard*	5.0	5.9	3.0	86.1	0
Students Below Acceptable Standard	14.4	10.2	13.2	61.7	0.5

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

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

6. 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

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Item #	Key	% of Students with Correct Solution	Strand & Outcome	Item Complexity	Item Description
8	A	40.1	N.3	Moderate	Solve a problem involving the square root of a perfect square number (Gr.8, N.1).

	% of Student Responses				
Standards Achieved by Students on Part B	**A**	**B**	**C**	**D**	**No Response**
Students Achieving Standard of Excellence	84.5	1.4	13.6	0.4	0.1
Students Achieving Acceptable Standard*	36.2	8.9	45.0	9.6	0.3
Students Below Acceptable Standard	16.7	19.0	29.9	33.5	0.9

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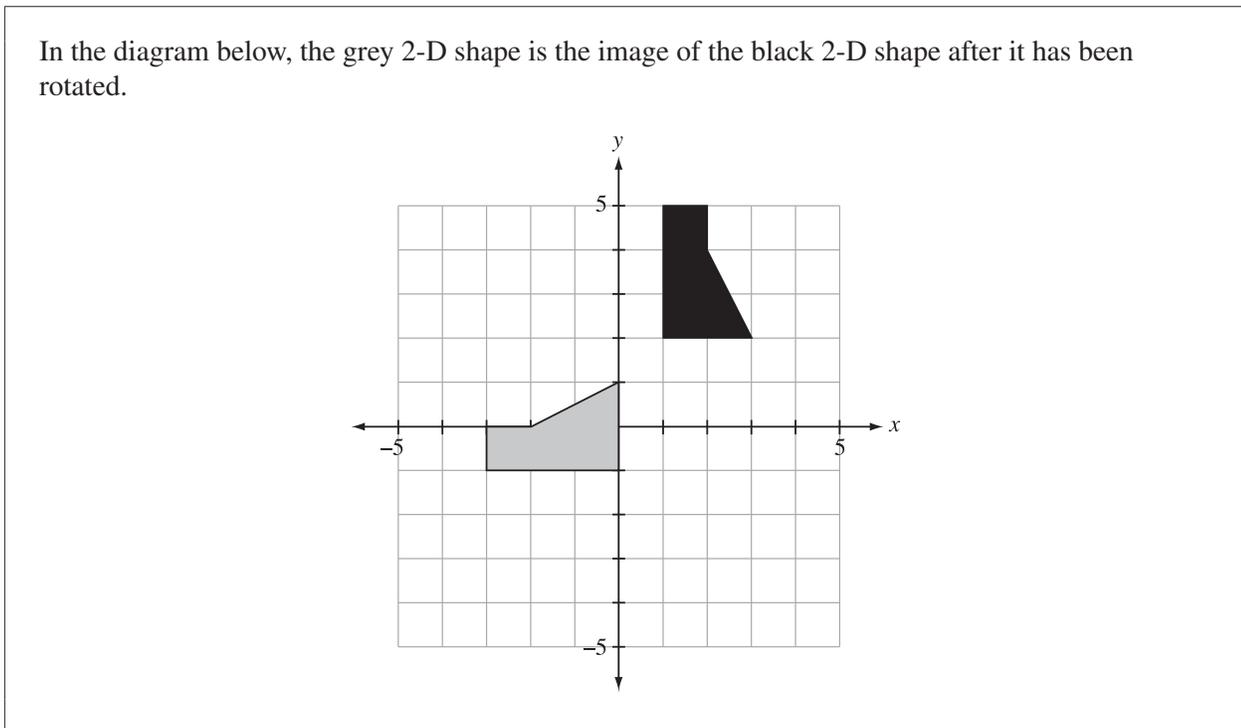

A square design is painted on a wall that has a length of 24 m and a height of 18 m. The design covers 75% of the area of the wall.

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8. What is the perimeter of the design?

   A.   72 m
   B.   96 m
   C.   324 m
   D.   432 m

Item #	Key	% of Students with Correct Solution	Strand & Outcome	Item Complexity	Item Description
11	D	47.0	SS.5	Moderate	Determine the centre of rotation of a given transformation.

	% of Student Responses				
Standards Achieved by Students on Part B	**A**	**B**	**C**	**D**	**No Response**
Students Achieving Standard of Excellence	4.5	1.4	11.7	82.4	0
Students Achieving Acceptable Standard*	19.1	8.4	25.8	46.4	0.3
Students Below Acceptable Standard	27.1	20.5	28.1	23.3	1.0

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

In the diagram below, the grey 2-D shape is the image of the black 2-D shape after it has been rotated.

11. Which of the following ordered pairs represents the centre of rotation of the transformation shown above?

A. (0, 1)

B. (1, 0)

C. (0, 2)

D. (2, 0)

Item #	Key	% of Students with Correct Solution	Strand & Outcome	Item Complexity	Item Description
13	A	62.1	PR.1	Moderate	Determine which linear equation represents a pattern in a given table of values.

Standards Achieved by Students on Part B	% of Student Responses				
	A	B	C	D	No Response
Students Achieving Standard of Excellence	94.3	0.4	4.8	0.4	0.1
Students Achieving Acceptable Standard*	69.3	3.3	21.2	6.0	0.2
Students Below Acceptable Standard	25.8	15.3	39.5	18.5	0.9

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

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

13. 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. $c = 45.50n + 9.5$

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Item #	Key	% of Students with Correct Solution	Strand & Outcome	Item Complexity	Item Description
15	C	41.0	PR.3	Moderate	Given a pictorial model of a linear equation, solve for the single unknown variable and represent the solution in symbolic form.

	% of Student Responses				
Standards Achieved by Students on Part B	**A**	**B**	**C**	**D**	**No Response**
Students Achieving Standard of Excellence	1.8	17.0	80.1	1.1	0
Students Achieving Acceptable Standard*	6.7	49.0	39.7	4.6	0
Students Below Acceptable Standard	13.8	50.2	16.2	19.0	0.8

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

Legend

■ = 1   ▮ = x ■ = x^2

□ = −1   ▯ = $-x$ □ = $-x^2$

The model shown below represents an equation.

15. The solution to the equation represented above is

A. $x = -1$

B. $x = 0$

C. $x = 1$

D. $x = 2$

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Item #	Key	% of Students with Correct Solution	# of Unique Errors	Strand & Outcome	Item Complexity	Item Description
NR5	17	45.0	882	PR.3	Moderate	Create and solve an equation representing the perimeter of a triangle to determine the length of one side of the triangle (Gr.6, SS.3).

Standards Achieved by Students on Part B	% of Students with Correct Solution	# of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence (*n* = 7 925)	92.4	87	5 (150)	15 (68)	19 (48)
Students Achieving Acceptable Standard* (*n* = 29 989)	48.4	544	5 (1 009)	20 (710)	15 (671)
Students Below Acceptable Standard (*n* = 11 370)	5.4	692	9 (1 087)	20 (1 023)	15 (632)

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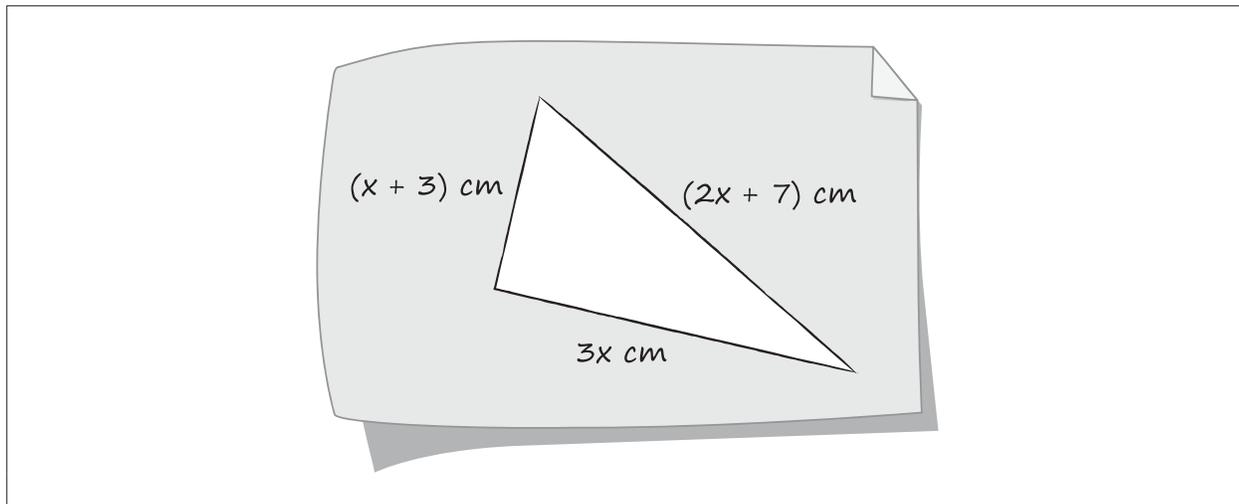
Numerical Response

5. If the perimeter of the triangle shown above is 40 cm, what is the length of the longest side of the triangle?

Answer: _____ cm

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

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Item #	Key	% of Students with Correct Solution	# of Unique Errors	Strand & Outcome	Item Complexity	Item Description
NR7	75	36.9	793	N.3	High	Solve a problem involving arithmetic operations on rational numbers.

Standards Achieved by Students on Part B	% of Students with Correct Solution	# of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence (n = 7 925)	76.6	73	60 (602)	65 (586)	45 (94)
Students Achieving Acceptable Standard* (n = 29 989)	38.4	401	60 (4 213)	45 (1 409)	65 (1 406)
Students Below Acceptable Standard (n = 11 370)	6.2	727	30 (2 301)	45 (2 017)	60 (1 937)

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

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

7. What is the total cost of the order?

Answer: $_____.00

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

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Item #	Key	% of Students with Correct Solution	# of Unique Errors	Strand & Outcome	Item Complexity	Item Description
NR8	87.5	63.0	869	SS.4	Moderate	Determine the actual height of a 2-D shape given a scaled drawing of the shape and the scale factor used to create the drawing.

Standards Achieved by Students on Part B	% of Students with Correct Solution	# of Unique Errors	Three Most Common Errors (Number of Students)		
Students Achieving Standard of Excellence (n = 7 925)	94.6	66	0.14 (138)	14 (37)	875 (18)
Students Achieving Acceptable Standard* (n = 29 989)	70.0	429	0.14 (1 826)	14 (852)	8.75 (168)
Students Below Acceptable Standard (n = 11 370)	27.4	470	0.14 (1 430)	3.5 (984)	14 (795)

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

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
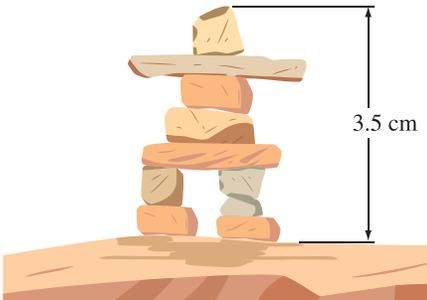
Numerical Response

8. The height of the actual inukshuk is _____ cm.

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

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Provincial Achievement Testing Program Support Documents

The Alberta Education website contains several documents that provide valuable information about various aspects of the Provincial Achievement Test program. To access these documents, go to the Alberta Education website. Click on one of the specific links to access the following documents.

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

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

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

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

Parent Guides
Each school year, versions of the *Alberta Provincial Achievement Testing Parent Guide* for grades 6 and 9 are posted on the Alberta Education website. Each guide answers frequently asked questions about the Provincial Achievement Test program and provides descriptions of and sample questions for each Provincial Achievement Test subject.

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