Principles of Mathematics 10: All Domains
Item-Level Response Reports (Provincial Level)

British Columbia **All Schools** **June/2008**

Provincial Principles of Mathematics 10 Item-Level Response Reports include data for all BC students who wrote the exam in June 2008 (about 26,690 students). Both public and independent schools are included. The Principles of Mathematics 10 June 2008 provincial Item-Level Response Report All Domains displays the proportion of students who made errors on each exam item. Separate tables indicate results for Multiple Choice items for each domain: Number, Patterns and Relations, Shape and Space, as well as Numerical Responses.

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1. Question type: MC **Domain: Number**

Form	Item #	Question type	Prescribed Learning Outcomes	Number of Students who Responded to the Item	Percentage of Students who Answered Incorrectly	Specific Curricular Aspect that Needs Attention [>20% selected incorrect response]
A	1	MC	A1	26683	25	*
A	2	MC	A2	26621	58	• Students did not recognize that rational numbers include fractions and some cannot be reduced to integers. • Students did not recognize that when dividing two integers the result is not always an integer.
A	3	MC	A5	26662	32	*
A	4	MC	A5	26654	43	*
A	5	MC	A6	26613	61	• Students correctly applied a fractional exponent to a monomial, but made a sign error. • Students correctly raised the variable in a

						monomial to a power, but multiplied the coefficient with the exponent instead of raising also the coefficient to the power.
A	6	MC	A6	26620	35	• When multiplying two powers with the same base, students multiplied instead of adding the exponents.
A	8	MC	A6	26415	67	• Students correctly divided a binomial by a monomial, but incorrectly simplified the final binomial writing it as a monomial by adding the powers. • When dividing a binomial by a monomial, students incorrectly simplified the binomial writing it as a monomial by adding the powers, and next divided.
A	9	MC	A4	26654	33	*
A	10	MC	A4	26650	18	N/A
A	11	MC	A4	26575	49	• When expanding a binomial squared with radicals, students incorrectly simplified the square roots with the power and subtracted the two terms.
A	12	MC	A4	26578	43	• When simplifying a fraction involving radicals, students recognized the need to rationalize the denominator, but ignored a radical in the denominator.
A	13	MC	A4	26523	44	• When rationalizing a binomial denominator, students correctly multiplied the fraction by the conjugate but made an error when reducing the

						result.
A	14	MC	A4	26392	61	• When asked to calculate the area of a circle circumscribing a square, students found the length of a side of the square and multiplied it by p.

Note:
(1) A description of the misconception is given when more than 20% of students answered the item incorrectly (i.e. selected a distractor).
(2) 'N/A' indicates that fewer than 20% of students answered the item incorrectly. Therefore, no description is provided.
(3) '*' indicates that more than 20% of students answered the item incorrectly, but no single distractor was selected by more than 20% of the students. Therefore, no description is provided.

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2. Question type: MC **Domain: Patterns and Relations**

Form	Item #	Question type	Prescribed Learning Outcomes	Number of Students who Responded to the Item	Percentage of Students who Answered Incorrectly	Specific Curricular Aspect that Needs Attention [>20% selected incorrect response]
A	16	MC	B1	26613	28	*
A	17	MC	B1	26575	26	*
A	18	MC	B2	26599	54	• Students calculated the last term instead of the sum of terms in an arithmetic sequence.
A	19	MC	B12	26609	59	• When adding the values of a function in two points, students gave the sum of the two values of x as result. • When adding the values of a function in two points, students likely added the values of x and

						next used the graph to identify the corresponding value of the function.
A	21	MC	B12	26577	50	• Students made several errors in using the function notation to find the coefficients of a linear function.
A	22	MC	B11	26657	28	*
A	23	MC	B11	26684	34	• Students did not recognize that a relation was a partial variation and they chose a graph showing a direct variation.
A	24	MC	B13	26636	37	*
A	25	MC	B13	26574	57	• Students confused the x-intercept and y-intercept when selecting a linear function.
A	26	MC	B13	26661	49	• Students selected a standard form of a linear equation in which the slope had opposite sign than required.
A	27	MC	B13	26671	49	*
A	28	MC	B15	26677	11	N/A
A	29	MC	B16	26633	13	N/A
A	31	MC	B4	26640	30	*
A	32	MC	B4	26639	26	*
A	34	MC	B5	26675	19	N/A
A	35	MC	B5	26654	37	*
A	36	MC	B6	26501	57	• Students did not recognize the components of a division statement and they thought that the ratio between remainder and divisor was the

						remainder.
A	37	MC	B6	26575	64	• Students made numerical mistakes in obtaining the quotient when dividing two polynomials, by incorrectly subtracting the terms.
A	38	MC	B7	26651	30	*
A	39	MC	B7	26545	38	*
A	40	MC	B8	26636	38	*
A	42	MC	B9	26618	58	• When dividing 2 rational expressions, students did not invert the second fraction and also made a sign error. • When dividing 2 rational expressions, students did not invert the second fraction.
A	43	MC	B9	26585	52	• When adding two rational expressions, students correctly found the lowest common denominator but simply added the two numerators as if the original denominators were the same.
A	44	MC	B10	26500	42	*
A	45	MC	B10	26414	49	• Students likely did not know how to solve a word problem involving distance, speed and time or made mistakes in solving an equation with rational expressions.

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3. Question type: MC **Domain: Shape and Space**

Form	Item #	Question type	Prescribed Learning Outcomes	Number of Students who Responded to the Item	Percentage of Students who Answered Incorrectly	Specific Curricular Aspect that Needs Attention [>20% selected incorrect response]
A	46	MC	C1	26613	31	*
A	47	MC	C1	26506	30	*
A	48	MC	C2	26549	34	• Students correctly used the calculator to find an angle with a given sine ratio, but did not notice that all solutions between 0 and 180 were required.
A	50	MC	C3	26601	62	• Students incorrectly used the tan ratio in a non-right triangle.
A	51	MC	C3	26439	48	*
A	52	MC	C4	26582	32	*
A	53	MC	C4	26492	47	• Students correctly obtained the diameter of a circle knowing its endpoints, but used the formula for circumference instead of area.
A	54	MC	C5	26559	27	*
A	56	MC	C7	26638	52	• Students made a sign error in finding the y-intercept of the equation of a line knowing the slope and a point on the line.
A	57	MC	C7	26557	59	• When determining which equation corresponds to a line passing through 2 points, students made an

						arithmetic error and obtained an incorrect constant term in the standard equation.
A	58	MC	C7,C8	26570	57	• When determining the equation of a line, students correctly identified the slope but made a sign error in obtaining the x-intercept. • When determining the equation of a line, students correctly obtained the x-intercept but made a sign error in finding the slope.
A	59	MC	C8	26623	31	*
A	60	MC	C8	26579	52	*

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4. Question type: Numerical Responses

Form	Item #	Domain	Prescribed Learning Outcomes	Number of Students who Responded to the Item	Percentage of Students who Answered Incorrectly	Specific Curricular Aspect that Needs Attention
A	7	Number	A6	23339	39	Students did not know how to write a radical as a power with a fractional exponent and/or did not correctly identify the exponent and/or did not convert it to a decimal value.
A	15		A3	24722	35	Students did not know how to use the calculator to

		Number				evaluate two radicals and/or did not know how to handle the radical of a radical and/or did not give the result with two decimal places.
A	20	Patterns and Relations	B12	24979	31	Students did not know how to use a function notation and/or made a mistake when they substituted the value of x and/or made numerical mistakes with integers.
A	30	Patterns and Relations	B16	25546	28	Students did not know how to compute total weekly earnings involving a base salary and commission for sales and/or did not give the result at the nearest dollar.
A	33	Patterns and Relations	B4	22072	65	Students did not know what a perfect square trinomial is and/or could not find the coefficient of one term using the other terms in the trinomial.
A	41	Patterns and Relations	B8	25415	41	Students did not know the meaning of non-permissible values of a rational expression and/or made a mistake factoring a difference of squares in the denominator and/or did not include all possible values because they cancelled factors.
A	49	Shape and Space	C3	24209	47	Students did not know how to apply the sine law and/or made mistakes in using the calculator to obtain sine ratios and/or made a mistake in solving an equation and/or did not give the result to two decimal places.
A	55	Shape and Space	C6	24825	28	Students did not know how to obtain a slope using the graph of a line and/or did not identify convenient points on the graph to set up the slope ratio and/or made a numerical mistake with integers and/or did not simplify the fraction.