

Mathematics 3200

June 2017 Public Exam Outcome Report

This examination follows the specifications, conventions and standards set out in the:
Mathematics Public Examination Standards

Chapters:	1 Polynomial Functions	6 Trigonometric Identities
	2 Function Transformations	7 Exponential Functions
	3 Radical Functions	8 Logarithmic Functions
	4 Trigonometry and the Unit Circle	9 Permutations, Combinations and the Binomial Theorem
	5 Trigonometric Functions and Graphs	

PART I: Selected Response—Total Value: 50%

Item	Curriculum Guide Page	Outcome	Cognitive Level	Outcome Description
1	22, 24	RF11	L2M	Identify a polynomial function.
2	22, 24	RF10, RF11	L2M	Given the graph of a polynomial, identify its characteristics.
3	28	RF10	L2M	Given a polynomial function in factored form, determine the zeros of the function.
4	30	RF10	L2A	Completely factor a polynomial expression.
5	28	RF10	L2A	Determine the remainder when a polynomial expression is divided by a linear binomial.
6	36	RF11	L2A	Identify the polynomial equation that models the volume of a prism with given dimensions.
7	56	RF3	L2M	Identify the mapping rule of a function written in the form $\frac{1}{a}(y - k) = f[b(x - h)]$.
8	62	RF5	L2M	Given the graph of a function, identify the graph of its inverse.
9	46, 50	RF2, RF4	L2A	Identify the mapping rule that transforms the graph of $f(x)$ to $g(x)$.
10	42, 56	RF1, RF3	L2A	Identify the horizontal and vertical translations of a given transformed function.
11	58	RF3	L2A	Given the domain of a function, identify the domain of a transformation of the function.
12	66	RF5	L2A	Given a function in the form $y = a(x - h)^2 + k$, identify its inverse.
13	76	RF12	L2M	Given the graph of $y = f(x)$, identify the domain of $y = \sqrt{f(x)}$.

Item	Curriculum Guide Page	Outcome	Cognitive Level	Outcome Description
14	76	RF12	L2A	Given $y = f(x)$, identify the invariant points of $y = f(x)$ and $y = \sqrt{f(x)}$.
15	76	RF12	L2A	Given the graph of $y = \sqrt{f(x)}$, identify the equation of $y = f(x)$ in factored form.
16	92	T3	L2M	Determine the exact value of a trigonometric expression.
17	90	T2	L2M	Identify the equation of a circle with a given radius (expressed as variables) centered at the origin.
18	88	T1	L2A	Given a diagram showing a central angle of a circle and the radius, determine the length of the arc that subtends the central angle.
19	94	T3	L2A	Solve a trigonometric equation for a given domain in radian measure.
20	94	T3	L2A	Given the value of a trigonometric ratio with a defined quadrant, determine the measure of the angle in radians.
21	94	T3	L2A	Given a point on the terminal arm of an angle in standard position, determine the value of a reciprocal trigonometric ratio.
22	108	T4	L2M	Determine the period of a sinusoidal function, given its equation.
23	112	T4	L2M	Determine the domain of a sinusoidal function, given its equation.
24	110	T4	L2A	Given the graph of a sinusoidal function, determine its equation in the form $y = a \cos b(x - c) + d$.
25	108	T4	L2A	Determine the range of a sinusoidal function, given its equation.
26	114, 115	T5	L2A	Given the graph of a sinusoidal function and a constant function, identify the general solution of a trigonometric equation.
27	126	T6	L2M	Simplify a trigonometric expression using trigonometric identities.
28	122	T6	L2M	Determine the restrictions of a trigonometric expression.
29	130, 132	T6	L2M	Identify a trigonometric equation that is true.
30	126	T6	L2A	Using trigonometric identities, simplify a trigonometric expression that involves subtraction of fractions.
31	128	T6	L2A	Using the sum, difference, or double angle formulae, determine the value of a trigonometric ratio.
32	128	T6	L2A	Given a trigonometric ratio with a defined quadrant, determine, using a double angle formula, the exact value of a trigonometric ratio.
33	136	T5	L3	Identify the error in a solution of a trigonometric equation.
34	142	RF8	L2M	Determine the range of an exponential function.
35	142	RF8	L2M	Identify the horizontal asymptote of an exponential function

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36	152	RF9	L2A	Given a half-life problem, determine the time required for an element to decay to a given amount.
37	148	RF9	L2A	Determine the solution of an exponential equation for which both sides of the equation can be written as rational powers of the same base.
38	146	RF8	L2A	Given the characteristics of an exponential function, expressed using variables, identify its graph.
39	160	RF7	L2M	Given a logarithmic equation expressed in variables, determine the exponential form (involving rational exponents).
40	164	RF8	L2M	Determine the vertical asymptote of a logarithmic equation.
41	170	RF7	L2A	Simplify a logarithmic expression using the laws of logarithms.
42	170	RF7	L2A	Using the laws of logarithms, rewrite a logarithmic equation in exponential form.
43	170	RF7	L2A	Determine the solution of an exponential equation using laws of logarithms.
44	186	PCBT1	L2M	Given multiple distinct elements in each of three categories, determine the total number of choices possible if one element is selected from each category.
45	188	PCBT2	L2M	Simplify an algebraic fraction containing factorials in the numerator and in the denominator.
46	204	PCBT4	L2M	Determine the value of the coefficient of a term in an expansion using Pascal's triangle.
47	194	PCBT2	L2A	Determine the number of distinct arrangements of a set of items, when some of the items are repeated.
48	196	PCBT2	L2A	Solve a counting problem involving permutations with constraints.
49	192	PCBT2	L2A	Solve a permutation equation.
50	198	PCBT3	L3	Solve a problem requiring a combination equation.

PART II: Constructed Response—Total Value: 50%

Item	Curriculum Guide Page	Outcome	Cognitive Level	Value	Outcome Description
51a	28, 30	RF10	L2A	4	Given a polynomial function, algebraically determine all intercepts and sketch its graph.
51b	26, 28	RF10	L3	2	Given a polynomial function, a linear divisor, and the remainder, solve for the unknown variable in the remainder.
52a	58	RF3	L2A	3	Given the graph of $y = f(x)$ and its transformed graph $y = g(x)$, determine the equation of $y = g(x)$ in the form $y = af(b(x-h)) + k$.
52b	56, 60, 62	RF3, RF5	L3	2	Given the graph of $y = f(x)$ and the equation of $y = g(x)$, where $g(x)$ is a transformation of $f(x)$, graph the inverse of $g(x)$ and state its domain.
53a	78	RF12	L2A	2	Graphically solve an equation involving a radical function and a linear function.
53b	76	RF12	L3	2	Graph $y = f(x)$ and $y = \sqrt{f(x)}$, where variables are used to describe the characteristics of $y = f(x)$. Also label the x and y intercepts of both graphs.
54	96	T3	L2A	3	Algebraically determine the exact value, in simplest form, of a trigonometric expression.
55a	114	T5	L2A	4	Algebraically determine the solutions to a trigonometric equation for a given domain.
55b	110	T4	L3	3	Solve a population growth problem that is modelled by a trigonometric equation.
56a	134	T5	L2A	4	Algebraically solve a trigonometric equation that involves the use of a trigonometric identity.
56b	124, 128, 132	T6	L3	3	Prove, algebraically, that a trigonometric identity is valid.
57a	148	RF9	L2A	2	Algebraically determine the solution of an exponential equation for which both sides can be written as rational powers of the same base.

Item	Curriculum Guide Page	Outcome	Cognitive Level	Value	Outcome Description
57b	148	RF9	L3	4	Given information regarding two populations, set up an equation for each population and determine how long it will take for the populations to be equal.
58a	172	RF9	L2A	3	Solve a logarithmic equation using the laws of logarithms.
58b	176	RF9	L2A	3	Solve a problem that involves the application of exponential equations to an investment with compound interest.
59a	200	PCBT3	L2A	2	Given the value of k and r , solve ${}_{n+1}C_r = k$ for n .
59b	198	PCBT3	L3	2	Solve a problem which involves both a permutation and a combination.
59c	204	PCBT4	L2A	2	Determine two specific terms of a binomial expansion.