Mathematics 3200
June 2018 Public Exam Outcome Report

This examination follows the specifications, conventions and standards set out in the:

Mathematics Public Examination Standards

Chapters:

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

PART I: Selected Response—Total Value: 50%

Item	Curriculum Guide Page(s)	Outcome	Cognitive Level	Outcome Description
1	22	RF11	L2M	Identify a polynomial function.
2	36	RF11	L2M	Given a graph, identify its function in factored form.
3	30	RF10	L2M	Given a polynomial function in factored form, determine the zeros of the function.
4	28	RF10	L2A	Determine the remainder when a polynomial expression is divided by a linear binomial.
5	34	RF11	L2A	Given a polynomial function in factored form, determine the intervals where the function lies below the x-axis.
6	28	RF10	L2A	Determine a factor of a given polynomial.
7	56	RF3	L2M	Given a piecewise linear graph, identify the graph of $y = af\left(b\left(x-h\right)\right)+k$.
8	64	RF5	L2M	Identify graphs which are inverses of each other.
9	58	RF3	L2A	Given the domain of $y = f(x)$, determine the domain of $y = af\left(b\left(x-h\right)\right)+k$.
10	60	RF5	L2A	Given the graph of a radical function, determine the domain and range of its inverse.
11	56	RF3	L2A	Identify the vertical and horizontal translations of a given transformed function.
12	66	RF5	L2A	Given the equation of a linear function, determine the equation of its inverse.
13	76	RF12	L2M	Given the graph of $y = f(x)$, identify the graph of $y = \sqrt{f(x)}$.

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14	78	RF12	L2A	Identify the domain of a function in the form $y=\sqrt{ax^2+bx+c}$.
15	76	RF12	L2A	Given $y=f(x)$, identify the invariant points of $y=f(x)$ and $y=\sqrt{f(x)}$.
16	86	T1	L2M	Given the graph of an angle, identify the measure of the angle in radians.
17	90	T2	L2M	Given a point on the terminal arm of an angle in standard position, determine the measure of the angle.
18	88	T1	L2A	Determine the radius of a circle given the length of an arc that subtends a given central angle.
19	98	T5	L2A	Solve a trigonometric equation for a given domain in radian measure.
20	92	T3	L2A	Determine the exact value of a trigonometric expression.
21	96	T3	L2A	Given the value of a trigonometric ratio in a specific quadrant, determine the value of another trigonometric ratio in the same quadrant.
22	108	T4	L2M	Determine the maximum value of a sinusoidal function, given its equation.
23	108	T4	L2M	Determine the period of a sinusoidal function, given its equation.
24	110	T4	L2A	Given the graph of a sinusoidal function, determine its equation in the form $y=a\sin b(x-h)+k$.
25	114	T5	L2A	Given the general solution to a trigonometric equation with argument θ, determine the solution to a trigonometric equation with θ being replaced with a more complex argument.
26	108	T4	L2A	Determine the amplitude of a trigonometric function given its range.
27	122	T6	L2M	Determine the non-permissible values for a trigonometric equation.
28	126	T6	L2M	Simplify a trigonometric expression using trigonometric identities.
29	128	T6	L2M	Simplify a trigonometric expression that involves the use of the difference formula.
30	128	T6	L2A	Given the value of a trigonometric ratio in a specific quadrant, determine the value of a trigonometric expression using a double angle formula.
31	134	T5	L2A	Solve a trigonometric equation within a given domain.
32	130	T6	L2A	Using the sum, difference, or double angle formulae, determine the exact value of a trigonometric ratio.
33	136, 162	T5, RF6	L3	Solve a logarithmic equation in which the argument is a trigonometric expression.
34	152	RF9	L2M	Determine the exponential function which models the depreciation of an item.
35	146	RF8	L2M	Determine the range of an exponential function.

Item	Curriculum Guide Page(s)	Outcome	Cognitive Level	Outcome Description
36	146	RF8	L2A	Identify the horizontal translation of an exponential function.
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	152	RF9	L2A	Given an annual interest rate, determine the final value of an investment that involves compound interest.
39	166	RF8	L2M	Determine the vertical asymptote of a logarithmic function.
40	166	RF8	L2M	Identify the graph of a logarithmic function.
41	162	RF6	L2A	Simplify a logarithmic expression.
42	172	RF7	L2A	Rewrite a logarithmic expression using the laws of logarithms.
43	174	RF9	L2A	Determine the exact solution of an exponential equation which involves the use of the laws of logarithms.
44	188	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	194	PCBT2	L2M	Identify an expression that represents the number of ways a group can be formed.
46	204	PCBT3	L2M	Solve a combination problem that involves a selection of individuals from two different groups.
47	198	PCBT2	L2A	Determine the number of distinct arrangements of letters in a word with repeated letters.
48	200	PCBT2	L2A	Determine an expression for the number of ways objects can be arranged with the criteria that certain objects must be next to each other.
49	192	PCBT2	L2A	Simplify an algebraic fraction containing factorials in the numerator and the denominator.
50	208	PCBT4	L3	Given the number of terms in a binomial expansion and the exponent of the binomial being a linear expression, determine the value of the variable in the linear expression.

PART II: Constructed Response—Total Value: 50%

Item	Curriculum Guide Page(s)	Outcome	Cognitive Level	Value	Outcome Description
51a	30	RF10	L2A	4	Given a polynomial function, algebraically determine all intercepts and sketch its graph.
51b	28	RF10	L3	2	Given a polynomial function with one unknown numerical coefficient, a linear divisor, and a linear expression for the remainder, determine the unknown numerical coefficient.
52a	58	RF4	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 $y = af\left(b(x-h)\right)+k$.
52b	60	RF5	L3	2	Given the domain and range of $y = f(x)$, determine the domain of the inverse of $y = af\left(b(x-h)\right)+k$.
53a	78	RF12	L2A	2	Graphically solve an equation involving a radical function and a linear function.
53b	76, 98	RF12, T5	L3	2	Determine the coordinates of the invariant points for a trigonometric function and its corresponding radical function.
54a	92	T3	L2A	3	Algebraically determine the exact value, in simplest form, of a trigonometric expression.
54b	98	T5	L2A	3	Algebraically determine the solutions to a trigonometric equation for a given domain.
55a	110	T4	L3	3	Determine the equation of a sinusoidal function that models a given situation and use it to determine a dependent value for a specified independent value.
55b	114	T5	L2A	3	Algebraically determine all solutions to a trigonometric equation.
56a	128	T6	L2A	2	Determine the exact value of a trigonometric ratio in simplest form using the sum, difference or double angle identities.
56b	132	T6	L3	3	Prove 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.
57b(i)	152	RF9	L3	3	Determine how long it will take a substance to decay to a specific fraction of its original amount given $A = A_0\left(\frac{1}{2}\right)^{\frac{t}{h}}$ and its half-life.

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57b(ii)	152	RF9	L3	1	Determine the percentage of a substance remaining after a specific number of years given $A = A_0\left(\frac{1}{2}\right)^{\frac{t}{h}}$ and its half-life.
58a	174	RF9	L2A	3	Solve a logarithmic equation using the laws of logarithms.
58b	178	RF9	L2A	3	Write an exponential equation for a scenario that involves an investment with compound interest and use logarithms to solve the equation.
59a	196	PCBT2	L2A	2	Given a numerical value for *k* and a numerical value for *r*, ${}_nP_r = k$, solve for *n*.
59b	200	PCBT3	L3	2	Solve a combination word problem.
59c	208	PCBT4	L2A	2	Determine two specific terms of a binomial expansion.