**MATHEMATICS 20-2**

**INDICATORS**

**STRAND I: Geometry**

You should be able to:

1. Derive proofs that involve the properties of angles and triangles.

by:

1.1 Generalize, using inductive reasoning, the relationships between pairs of angles formed by transversals and parallel lines, with or without technology. (Page 85 #1)

1.2 Prove, using deductive reasoning, properties of angles formed by transversals and parallel lines, including the sum of the angles in a triangle. (Page 85 #5)

1.3 Generalize, using inductive reasoning, a rule for the relationship between the sum of the interior angles and the number of sides (*n*) in a polygon, with or without technology. (Page 119 #10)

1.4 Identify and correct errors in a given proof of a property that involves angles. (Page 120 #18)

1.5 Verify, with examples, that if lines are not parallel, the angle properties do not apply. (Page 72 #5)

1.6 Prove, using deductive reasoning, that two triangles are congruent. (Page 120 #12)

You should be able to:

2. Solve problems that involve properties of angles and triangles.

By:

2.1 Determine the measures of angles in a diagram that includes parallel lines, angles and triangles, and justify the reasoning. (Page 79 #4)

2.2 Identify and correct errors in a given solution to a problem that involves the measures of angles. (Page 80 #10)

2.3 Solve a contextual problem that involves angles or triangles. (Page 81 #15, 20)

2.4 Construct parallel lines, given a compass or a protractor, and explain the strategy used. (N/A)

2.5 Determine if lines are parallel, given the measure of an angle at each intersection formed by the lines and a transversal. (Page 78 #2)

You should be able to:

3. Solve problems that involve the cosine law and the sine law, excluding the ambiguous case.

By:

3.1 Draw a diagram to represent a problem that involves the cosine law or the sine law. (Page 143 #4)

3.2 Explain the steps in a given proof of the sine law or cosine law. (N/A)

3.3 Solve a contextual problem that requires the use of the sine law or cosine law, and explain the reasoning. (Page 168 #5, 7, 9)

3.4 Solve a contextual problem that involves more than one triangle. (page 168 #10, 11)

**STRAND II: Number and Logic**

You should be able to:

1. Analyze and prove conjectures, using inductive and deductive reasoning, to solve problems.

By:

1.1 Make conjectures by observing patterns and identifying properties, and justify the reasoning. (Page 13, #8, 10)

1.2 Explain why inductive reasoning may lead to a false conjecture. (NA)

1.3 Compare, using examples, inductive and deductive reasoning. (Page 35 #8)

1.4 Provide and explain a counterexample to disprove a given conjecture.

1.5 Prove algebraic and number relationships such as divisibility rules, number properties, mental mathematics strategies or algebraic number tricks. (Page 12 #2)

1.6 Prove a conjecture, using deductive reasoning (not limited to two column proofs). (Page 32 #7)

1.7 Determine if a given argument is valid, and justify the reasoning. (Page 42 #3)

1.8 Identify errors in a given proof; e.g., a proof that ends with 2 = 1. (Page 43 #5)

1.9 Solve a contextual problem that involves inductive or deductive reasoning. (Page 49 #6)

You should be able to:

2. Analyze puzzles and games that involve spatial reasoning, using problem-solving strategies.

By:

* 1. Determine, explain and verify a strategy to solve a puzzle or to win a game; e.g.,
* guess and check, look for a pattern, make a systematic list, draw or model, eliminate possibilities, simplify the original problem work backward, develop alternative approaches.

2.2 Identify and correct errors in a solution to a puzzle or in a strategy for winning a game.

2.3 Create a variation on a puzzle or a game, and describe a strategy for solving the puzzle or winning the game.

You should be able to:

3. Solve problems that involve operations on radicals and radical expressions with numerical and variable radicands (limited to square roots).

By:

3.1 Compare and order radical expressions with numerical radicands. (Page 182 #2, 12)

3.2 Express an entire radical with a numerical radicand as a mixed radical. (Page 182 4, 5)

3.3 Express a mixed radical with a numerical radicand as an entire radical. (Page 183 #11)

3.4 Perform one or more operations to simplify radical expressions with numerical or variable radicands. (Page 203 #8, 10, 11)

3.5 Rationalize the monomial denominator of a radical expression. (Page 199 #13, 16)

3.6 Identify values of the variable for which the radical expression is defined. (Page 23 #11)

You should be able to:

4. Solve problems that involve radical equations (limited to square roots or cube roots).

By:

4.1 Determine any restrictions on values for the variable in a radical equation. (Page 222 #1)

4.2 Determine, algebraically, the roots of a radical equation, and explain the process used to solve the equation. (Page 222 #2)

4.3 Verify, by substitution, that the values determined in solving a radical equation are roots of the equation. (Page 222 #5, verify your solution)

4.4 Explain why some roots determined in solving a radical equation are extraneous. (Page 222 #3)

4.5 Solve problems by modeling a situation with a radical equation and solving the equation. (Page 223 #12, 13)

**STRAND III: Statistics**

You should be able to:

1. Demonstrate an understanding of normal distribution, including:

* standard deviation
* *z*-scores.

By:

1.1 Explain, using examples, the meaning of standard deviation. (Page 261 #5)

1.2 Calculate, using technology, the population standard deviation of a data set. (Page 262 #6, 9)

1.3 Explain, using examples, the properties of a normal curve, including the mean, median, mode, standard deviation, symmetry and area under the curve. (Know page 278 “Need to Know”)

1.4 Determine if a data set approximates a normal distribution, and explain the reasoning. (Page 280 #9)

1.5 Compare the properties of two or more normally distributed data sets. (Page 279 #3)

1.6 Explain, using examples representing multiple perspectives, the application of standard deviation for making decisions in situations such as warranties, insurance or opinion polls. (Page 280 #6)

1.7 Solve a contextual problem that involves the interpretation of standard deviation. (Page 309 #7)

1.8 Determine, with or without technology, and explain the *z*-score for a given value in a normally distributed data set. (Page 292 #10)

1.9 Solve a contextual problem that involves normal distribution. (Page 293 #15, 16)

You should be able to:

Interpret statistical data, using:

* confidence intervals
* confidence levels
* margin of error.

By:

2. Interpret statistical data, using:

2.1 Explain, using examples, how confidence levels, margin of error and confidence intervals may vary depending on the size of the random sample. (Page 304 #11)

2.2 Explain, using examples, the significance of a confidence interval, margin of error or confidence level. (Page 302 #3)

2.3 Make inferences about a population from sample data, using given confidence intervals, and explain the reasoning. (Page 302 #4)

2.4 Provide examples from print or electronic media in which confidence intervals and confidence levels are used to support a particular position. (NA)

2.5 Interpret and explain confidence intervals and margin of error, using examples found in print or electronic media. (NA)

2.6 Support a position by analyzing statistical data presented in the media. (NA)

**STRAND IV: Relations and Functions**

You should be able to determine the:

* vertex
* intercepts
* domain and range
* axis of symmetry.

By:

1. Demonstrate an understanding of the characteristics of quadratic functions, including:

1.1 Determine, with or without technology, the coordinates of the vertex of the graph of a quadratic function. (Page 333 #4, 11)

1.2 Determine the equation of the axis of symmetry of the graph of a quadratic function, given the *x*-intercepts of the graph. (Page 334 #10)

1.3 Determine the coordinates of the vertex of the graph of a quadratic function, given the equation of the function and the axis of symmetry, and determine if the *y*-coordinate of the vertex is a maximum or a minimum. (Page 386 #4)

1.4 Determine the domain and range of a quadratic function. (Page 386 #4)

1.5 Sketch the graph of a quadratic function. (Page 386 #1)

1.6 Solve a contextual problem that involves the characteristics of a quadratic function. (Page 386 #5)

2. Solve problems that involve quadratic equations.

2.1 Determine, with or without technology, the intercepts of the graph of a quadratic function. (Page 436 #1)

2.2 Determine, by factoring, the roots of a quadratic equation, and verify by substitution. (Page 436 #3)

2.3 Determine, using the quadratic formula, the roots of a quadratic equation. (Page 436 #4)

2.4 Explain the relationships among the roots of an equation, the zeros of the corresponding function and the *x*-intercepts of the graph of the function. (Ans: they all mean the same thing)

2.5 Explain, using examples, why the graph of a quadratic function may have zero, one or two *x*-intercepts. (How many times does it cross the *x* – axis?)

2.6 Express a quadratic equation in factored form, given the zeros of the corresponding quadratic function or the *x*-intercepts of the graph of the function. (Page 387 #13)

2.7 Solve a contextual problem by modelling a situation with a quadratic equation and solving the equation. (Page 431 #7)

**STRAND V: Measurement**

You should be able to:

1. Solve problems that involve the application of rates.

2. Solve problems that involve scale diagrams, using proportional reasoning.

3. Demonstrate an understanding of the relationships among scale factors, areas, surface areas.

By:

1. Solve problems that involve the application of rates. (Page 451 #4 – 8; page 459 #3, 4, 5)

2. Solve problems that involve scale diagrams, using proportional reasoning. (Page 472 #8, 9, 11)

3. Demonstrate an understanding of the relationships among scale factors, areas, surface areas and volumes of similar 2-D shapes and 3-D objects. (Page 508 #9, page 500 #1)