**Math 20-2 Specific Outcomes**

**Strand:** Measurement

**General Outcome:** Develop spatial sense and proportional reasoning.

1. **Rates –** Solve problems that involve the application of rates.
   * + I can recognize how rates are used in the real world.
     + I can determine unit rates.
     + I can isolate a variable to solve a rate.
     + I can describe the relationship between slope and rate of change.
     + I can solve problems using rates.
2. **Scale Diagrams –** Solve problems that involve scale diagrams, using proportional reasoning.
   * + I can recognize how scale diagrams are used in the real world.
     + I can determine scale factor.
     + I can determine whether a scale factor represents an enlargement or a reduction.
     + I can use scale to determine unknown dimensions.
     + I can draw a scale diagram.
     + I can solve problems involving scale diagrams.
3. **Scale Factors of 2D Shapes and 3D Objects –** Demonstrate an understanding of the relationships among scale factors, areas, surface areas and volumes of similar 2-D shapes and 3-D objects.
   * + I can calculate one-, two-, and three-dimensional measures such as perimeter, area, surface area, and volume.
     + I can describe how the scale factor changes when comparing lengths, areas, and volumes of similar objects.
     + I can apply scale factor to solve problems involving length or perimeter.
     + I can apply scale factor to solve problems involving area or surface area.
     + I can apply scale factor to solve problems involving volume.

**Strand:** Geometry

**General Outcome:** Develop spatial sense.

1. **Geometric Proofs –** Derive proofs that involve the properties of angles and triangles.
   * + I can use inductive reasoning to show the angle relationships in polygons.
     + I can use inductive reasoning to show the angle relationships among transversals and parallel lines.
     + I can use deductive reasoning to prove angle relationships in polygons.
     + I can use deductive reasoning to prove angle relationships among transversals and parallel lines.
2. **Angles and Triangles –** Solve problems that involve properties of angles and triangles.
   * + I can determine the measures of angles in a diagram that includes parallel lines, angles, and/or triangles.
     + I can construct parallel lines using a protractor and/or compass.
     + I can determine if lines are parallel.
3. **Sine and Cosine Law –** Solve problems that involve the cosine law and the sine law, excluding the ambiguous case.
   * + I can recognize when to use the Sine Law.
     + I can recognize when to use the Cosine Law.
     + I can solve a problem that requires the use of the Sine Law.
     + I can solve problems that require the use of the Cosine Law.

**Strand:** Number and Logic

**General Outcome:** Develop number sense and logical reasoning.

1. **Inductive and Deductive Reasoning –** Analyze and prove conjectures, using inductive and deductive reasoning, to solve problems.

* I can make conjectures by observing patterns and identifying properties.
* I can explain why inductive reasoning may lead to a false conjecture.
* I can compare inductive and deductive reasoning.
* I can provide and explain a counterexample to disprove a given conjecture.
* I can prove algebraic and number relationships.
* I can prove conjectures, using deductive reasoning.
* I can determine if an argument is valid.
* I can identify errors in a proof.
* I can solve problems that involve inductive or deductive reasoning.

1. **Puzzles and Games –** Analyze puzzles and games that involve spatial reasoning, using problem-solving strategies.

* I can explain a strategy to solve a puzzle or to win a game.
* I can identify errors in a solution to a puzzle or in a strategy for winning a game.
* I can correct errors in a solution to a puzzle or in a strategy for winning a game.
* I can create a variation of a puzzle or a game.

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

* I can order radical expressions.
* I can express an entire radical as a mixed radical.
* I can express a mixed radical as an entire radical.
* I can perform one or more operations to simplify radical expressions with numerical radicands.
* I can perform one or more operations to simplify radical expressions with variable radicands.
* I can rationalize the monomial denominator of a radical expression.
* I can identify values of the variable for which the radical expression is defined.

1. **Radical Equations –** Solve problems that involve radical equations (limited to square roots or cube roots).

* I can determine any restrictions for the variable in a radical equation.
* I can determine the roots of a radical equation.
* I can verify that the values determined in solving a radical equation are the roots.
* I can explain why some roots in a radical equation are extraneous.
* I can solve problems using radical equations.

**Strand:** Statistics

**General Outcome:** Develop statistical reasoning.

1. **Normal Distributions –** Demonstrate an understanding of normal distribution, including: standard deviation and *z*-scores.
   * + I can explain the meaning of measures of central tendency, such as mean, median, and mode.
     + I can calculate measures of central tendency.
     + I can explain the meaning of standard deviation.
     + I can calculate the standard deviation of data sets.
     + I can explain the meaning of *z*-scores.
     + I can calculate *z*-scores.
     + I can explain the properties of a normal distribution and normal curve.
     + I can explain how normal distributions are used in the real world.
     + I can apply the properties of a normal distribution to solve problems.
2. **Interpreting Data –** Interpret statistical data, using: confidence intervals, confidence levels, and margin of error.
   * + I can explain the meaning and significance of confidence intervals.
     + I can explain the meaning and significance of confidence levels.
     + I can explain the meaning and significance of margin of error.
     + I can interpret data using confidence intervals, confidence levels, and margin of error.

**Strand:** Relations and Functions

**General Outcome:** Develop algebraic and graphical reasoning through the study of relations.

1. **Quadratic Functions –** Demonstrate an understanding of the characteristics of quadratic functions, including: vertex, intercepts, domain and range, and axis of symmetry.

* I can use appropriate terminology to describe characteristics of a quadratic function.
* Explain the relationships among the roots of an equation, the zeros of a function, and the *x-*intercepts of the graph of the function.
* I can state the domain and range of a quadratic function.
* I can determine the intercepts, roots, zeros, and/or solutions of a quadratic function graphically.
* I can determine the intercepts, roots, zeros, and/or solutions of a quadratic function algebraically.
* I can determine the coordinates of the vertex graphically.
* I can determine the coordinates of the vertex algebraically.
* I can determine the equation of the axis of symmetry from the vertex.
* I can determine the equation of the axis of symmetry graphically.
* I can determine the equation of the axis of symmetry algebraically.

1. **Quadratic Equations –** Solve problems that involve quadratic equations.

* I can solve a quadratic equation graphically.
* I can solve a quadratic equation algebraically.
* I can use quadratic equations to solve problems.

**Strand:** Mathematics Research Project

**General Outcome:** Develop an appreciation of the role of mathematics in society.

1. **Research –** Research and give a presentation on a historical event or an area of interest that involves mathematics.
   * + I can collect primary and secondary data.
     + I can assess the accuracy, reliability, and relevance of data.
     + I can identify examples of bias and points of view.
     + I can identify and describe data collection methods.
     + I can determine if data is relevant.
     + I can determine if data is consistent with other sources.
     + I can interpret data using statistical methods.
     + I can identify controversial issues, and present multiple sides of the issue with supporting data.
     + I can organize and present information collected.