

TIPS4Math Grades 7 and 8 Overview

| Grade 7 | Grade 8 |
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| <p>Collect, Organize and Display Data (4+ days)</p> <p>7m73 Collect data by conducting a survey or an experiment to do with themselves, their environment, issues in their school or community, or content from another subject and record observations or measurements</p> <p>7m74 Collect and organize categorical, discrete, or continuous primary data and secondary data and display the data in charts, tables, and graphs (including relative frequency tables and circle graphs) that have appropriate titles, labels, and scales that suit the range and distribution of the data, using a variety of tools</p> <p>7m75 Select an appropriate type of graph to represent a set of data, graph the data using technology, and justify the choice of graph (i.e., from types of graphs already studied)</p> <p>7m76 Distinguish between a census and a sample from a population</p> <p>7m77 Identify bias in data collection methods</p> <p>Data Management and Probability Overall: 7m70</p> | <p>Collect, Organize and Display Data (5+ days)</p> <p>8m68 Collect data by conducting a survey or an experiment to do with themselves, their environment, issues in their school or community, or content from another subject, and record observations or measurements</p> <p>8m69 Organize into intervals a set of data that is spread over a broad range</p> <p>8m70 Collect and organize categorical, discrete, or continuous primary data and secondary data, and display the data in charts, tables, and graphs (including histograms and scatter plots) that have appropriate titles, labels, and scales that suit the range and distribution of the data, using a variety of tools</p> <p>8m71 Select an appropriate type of graph to represent a set of data, graph the data using technology, and justify the choice of graph (i.e., from types of graphs already studied, including histograms and scatter plots); – explain the relationship between a census, a representative sample, sample size, and a population</p> <p>8m75 Demonstrate an understanding of the appropriate uses of bar graphs and histograms by comparing their characteristics</p> <p>Data Management and Probability Overalls: 8m65, 8m66</p> |
| <p>Whole Number Relationships and Operations (5+ days)</p> <p>7m12 Generate multiples and factors, using a variety of tools and strategies</p> <p>7m16 Represent perfect squares and square roots, using a variety of tools</p> <p>7m21 Solve multi-step problems arising from real-life contexts and involving whole numbers and decimals, using a variety of tools and strategies</p> <p>7m22 Use estimation when solving problems involving operations with whole numbers, decimals, and percents, to help judge the reasonableness of a solution</p> <p>7m23 Evaluate expressions that involve whole numbers and decimals, including expressions that contain brackets, using order of operations</p> <p>Number Sense and Numeration Overalls: 7m8, 7m9</p> | <p>Whole Number Relationships and Powers of Ten (5+ days)</p> <p>8m11 Express repeated multiplication using exponential notation</p> <p>8m12 Represent whole numbers in expanded form using powers of ten</p> <p>8m15 Determine common factors and common multiples using the prime factorization of numbers</p> <p>8m24 Multiply and divide decimal numbers by various powers of ten</p> <p>8m25 Estimate, and verify using a calculator, the positive square roots of whole numbers, and distinguish between whole numbers that have whole-number square roots (i.e., perfect square numbers) and those that do not</p> <p>Number Sense and Numeration Overalls: 8m8, 8m9</p> |
| <p>Unknown Quantities (6+ days)</p> <p>7m66 Translate phrases describing simple mathematical relationships into algebraic expressions, using concrete materials</p> <p>7m67 Evaluate algebraic expressions by substituting natural numbers for the variables</p> <p>7m69 Solve linear equations of the form $ax = c$ or $c = ax$ and $ax + b = c$ or variations such as $b + ax = c$ and $c = bx + a$ (where a, b, and c are natural numbers) by modelling with concrete materials, by inspection, or by guess and check, with and without the aid of a calculator</p> <p>Patterning and Algebra Overall: 7m59</p> | <p>Unknown Quantities (5+ days)</p> <p>8m51 Determine, through investigation using concrete materials, the relationship between the numbers of faces, edges, and vertices of a polyhedron (i.e., number of faces + number of vertices = number of edges + 2)</p> <p>8m59 Describe different ways in which algebra can be used in real-life situations</p> <p>8m61 Translate statements describing mathematical relationships into algebraic expressions and equations</p> <p>8m62 Evaluate algebraic expressions with up to three terms, by substituting fractions, decimals, and [positive] integers for the variables</p> <p>8m64 Solve and verify linear equations involving a one-variable term and having solutions that are [positive] integers by using inspection, guess and check, and a “balance model”</p> <p>Geometry and Spatial Sense Overall: 8m41</p> <p>Patterning and Algebra Overall: 8m55</p> |

TIPS4Math Grades 7 and 8 Overview

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| <p>Represent, Compare and Order Integers (4+ days)</p> <p>7m13 Identify and compare integers found in real-life contexts 7m14 Represent and order integers, using a variety of tools</p> <p>Number Sense and Numeration Overall: 7m8</p> | <p>Represent, Compare and Order Rational Numbers (4+ days)</p> <p>8m13 Represent, compare, and order rational numbers (i.e., positive and negative fractions and decimals to thousandths) 8m14 Translate between equivalent forms of a number (i.e., decimals, fractions, percents)</p> <p>Number Sense and Numeration Overall: 8m8</p> |
| <p>Represent, Compare, Order and Operate Using Decimal Numbers (12+ days)</p> <p>7m11 Represent, compare, and order decimals to hundredths and fractions, using a variety of tools 7m18 Divide whole numbers by simple fractions and by decimal numbers to hundredths, using concrete materials 7m19 Use a variety of mental strategies to solve problems involving the addition and subtraction of fractions and decimals 7m20 Solve problems involving the multiplication and division of decimal numbers to thousandths by one-digit whole numbers, using a variety of tools and strategies 7m21 Solve multi-step problems arising from real-life contexts and involving whole numbers and decimals, using a variety of tools and strategies 7m22 Use estimation when solving problems involving operations with whole numbers, decimals, and percents, to help judge the reasonableness of a solution 7m23 Evaluate expressions that involve whole numbers and decimals, including expressions that contain brackets, using order of operations 7m35 Solve problems that require conversion between metric units of measure</p> <p>Number Sense and Numeration Overalls: 7m8, 7m9 Measurement Overall: 7m32</p> | <p>Multi-Step Problems Involving Whole and Decimal Numbers (4+ days)</p> <p>8m16 Solve multi-step problems arising from real-life contexts and involving whole numbers and decimals, using a variety of tools and strategies 8m18 Use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution</p> <p>Number Sense and Numeration Overall: 8m9</p> |
| <p>Angles and Geometric Properties of 2D Shapes (9+ days)</p> <p>7m46 Construct related lines (i.e., parallel; perpendicular; intersecting at 30°, 45°, and 60°), using angle properties and a variety of tools and strategies 7m47 Sort and classify triangles and quadrilaterals by geometric properties related to symmetry, angles, and sides, through investigation using a variety of tools and strategies 7m48 Construct angle bisectors and perpendicular bisectors, using a variety of tools and strategies, and represent equal angles and equal lengths using mathematical notation 7m50 Identify, through investigation, the minimum side and angle information (i.e., side-side-side; side-angle-side; angle-side-angle) needed to describe a unique triangle</p> <p>Geometry and Spatial Sense Overalls: 7m43, 7m44</p> | <p>Angles and Geometric Properties of 2D Shapes (10+ days)</p> <p>8m43 Sort and classify quadrilaterals by geometric properties, including those based on diagonals, through investigation using a variety of tools 8m45 Determine, through investigation using a variety of tools, relationships among area, perimeter, corresponding side lengths, and corresponding angles of similar shapes 8m47 Determine, through investigation using a variety of tools and strategies, the angle relationships for intersecting lines and for parallel lines and transversals, and the sum of the angles of a triangle 8m48 Solve angle-relationship problems involving triangles, intersecting lines, and parallel lines and transversals 8m49 Determine the Pythagorean relationship, through investigation using a variety of tools and strategies 8m50 Solve problems involving right triangles geometrically, using the Pythagorean relationship</p> <p>Geometry and Spatial Sense Overalls: 8m40, 8m41</p> |

TIPS4Math Grades 7 and 8 Overview

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| <p>Area (7+ days)</p> <p>7m17 Explain the relationship between exponential notation and the measurement of area and volume</p> <p>7m33 Research and report on real-life applications of area measurements</p> <p>7m36 Solve problems that require conversion between metric units of area (i.e., square centimetres, square metres)</p> <p>7m37 Determine, through investigation using a variety of tools and strategies, the relationship for calculating the area of a trapezoid, and generalize to develop the formula [i.e., Area = (sum of lengths of parallel sides x height) ÷ 2]</p> <p>7m38 Solve problems involving the estimation and calculation of the area of a trapezoid</p> <p>7m39 Estimate and calculate the area of composite two-dimensional shapes by decomposing into shapes with known area relationships</p> <p>7m66 Translate phrases describing simple mathematical relationships into algebraic expressions, using concrete materials</p> <p>7m67 Evaluate algebraic expressions by substituting natural numbers for the variables</p> <p>Number Sense and Numeration Overall: 7m8 Measurement Overalls: 7m31, 7m32 Patterning and Algebra Overall: 7m59</p> | <p>Circles (8+ days)</p> <p>8m33 Solve problems that require conversions involving metric units of area, volume, and capacity (i.e., square centimetres and square metres; cubic centimetres and cubic metres; millilitres and cubic centimetres)</p> <p>8m34 Measure the circumference, radius, and diameter of circular objects, using concrete materials</p> <p>8m35 Determine, through investigation using a variety of tools and strategies, the relationships for calculating the circumference and the area of a circle, and generalize to develop the formulas [i.e., Circumference of a circle = π x diameter; Area of a circle = π x (radius)²]</p> <p>8m36 Solve problems involving the estimation and calculation of the circumference and the area of a circle</p> <p>8m44 Construct a circle, given its centre and radius, or its centre and a point on the circle, or three points on the circle</p> <p>Measurement Overall: 8m31 Geometry and Spatial Sense Overall: 8m40</p> |
| <p>Data Analysis and Interpretation (9+ days)</p> <p>7m75 Select an appropriate type of graph to represent a set of data, graph the data using technology, and justify the choice of graph (i.e., from types of graphs already studied)</p> <p>7m76 Distinguish between a census and a sample from a population</p> <p>7m77 Identify bias in data collection methods</p> <p>7m78 Read, interpret, and draw conclusions from primary data and from secondary data presented in charts, tables, and graphs (including relative frequency tables and circle graphs)</p> <p>7m79 Identify, through investigation, graphs that present data in misleading ways</p> <p>7m80 Determine, through investigation, the effect on a measure of central tendency (i.e., mean, median, and mode) of adding or removing a value or values</p> <p>7m81 Identify and describe trends, based on the distribution of the data, presented in tables and graphs, using informal language</p> <p>7m82 Make inferences and convincing arguments that are based on the analysis of charts, tables, and graphs</p> <p>Data Management and Probability Overalls: 7m70, 7m71</p> | <p>Data Analysis and Interpretation (7+ days)</p> <p>8m72 Explain the relationship between a census, a representative sample, sample size, and a population</p> <p>8m73 Read, interpret, and draw conclusions from primary data and from secondary data, presented in charts, tables, and graphs (including frequency tables with intervals, histograms, and scatter plots)</p> <p>8m74 Determine, through investigation, the appropriate measure of central tendency (i.e., mean, median, or mode) needed to compare sets of data</p> <p>8m76 Compare two attributes or characteristics using a scatter plot, and determine whether or not the scatter plot suggests a relationship</p> <p>8m77 Identify and describe trends, based on the rate of change of data from tables and graphs, using informal language</p> <p>8m78 Make inferences and convincing arguments that are based on the analysis of charts, tables, and graphs</p> <p>8m79 Compare two attributes of characteristics, using a variety of data management tools and strategies (i.e., pose a relevant question, then design an experiment or survey, collect and analyse the data, and draw conclusions)</p> <p>Data Management and Probability Overalls: 8m65, 8m66</p> |

TIPS4Math Grades 7 and 8 Overview

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| <p>Represent, Compare, Order and Operate Using Fractions (12+ days)</p> <p>7m11 Represent, compare, and order decimals to hundredths and fractions, using a variety of tools</p> <p>7m18 Divide whole numbers by simple fractions and by decimal numbers to hundredths, using concrete materials</p> <p>7m19 Use a variety of mental strategies to solve problems involving the addition and subtraction of fractions and decimals</p> <p>7m24 Add and subtract fractions with simple like and unlike denominators, using a variety of tools and algorithms</p> <p>7m25 Demonstrate, using concrete materials, the relationship between the repeated addition of fractions and the multiplication of that fraction by a whole number</p> <p>Number Sense and Numeration Overalls: 7m8, 7m9</p> | <p>Operations Involving Fractions (7+ days)</p> <p>8m18 Use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution</p> <p>8m19 Represent the multiplication and division of fractions, using a variety of tools and strategies</p> <p>8m20 Solve problems involving addition, subtraction, multiplication, and division with simple fractions</p> <p>8m62 Evaluate algebraic expressions with up to three terms, by substituting fractions, decimals, and integers for the variables</p> <p>Number Sense and Numeration Overall: 8m9</p> <p>Patterning and Algebra Overall: 8m55</p> |
| <p>Location and Transformations (10+ days)</p> <p>7m51 Determine, through investigation using a variety of tools, relationships among area, perimeter, corresponding side lengths, and corresponding angles of congruent shapes</p> <p>7m52 Demonstrate an understanding that enlarging or reducing two-dimensional shapes creates similar shapes</p> <p>7m53 Distinguish between and compare similar shapes and congruent shapes, using a variety of tools and strategies</p> <p>7m54 Plot points using all four quadrants of the Cartesian coordinate plane</p> <p>7m55 Identify, perform, and describe dilatations (i.e., enlargements and reductions), through investigation using a variety of tools</p> <p>7m56 Create and analyse designs involving translations, reflections, dilatations, and/or simple rotations of two-dimensional shapes, using a variety of tools and strategies</p> <p>7m57 Determine, through investigation using a variety of tools, polygons or combinations of polygons that tile a plane, and describe the transformation(s) involved</p> <p>Geometry and Spatial Sense Overalls: 7m44, 7m45</p> | <p>Location and Movement (6+ days)</p> <p>8m52 Graph the image of a point, or set of points, on the Cartesian coordinate plane after applying a transformation to the original point(s) (i.e., translation; reflection in the x-axis, the y-axis, or the angle bisector of the axes that passes through the first and third quadrants; rotation of 90°, 180°, or 270° about the origin)</p> <p>8m53 Identify, through investigation, real-world movements that are translations, reflections, and rotations</p> <p>Geometry and Spatial Sense Overall: 8m42</p> |

| Grade 7 | Grade 8 |
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| <p>Linear Growing Patterns (16+ days)</p> <p>7m60 Represent linear growing patterns, using a variety of tools and strategies</p> <p>7m61 Make predictions about linear growing patterns, through investigation with concrete materials</p> <p>7m62 Develop and represent the general term of a linear growing pattern, using algebraic expressions involving one operation</p> <p>7m63 Compare pattern rules that generate a pattern by adding or subtracting a constant, or multiplying or dividing by a constant, to get the next term with pattern rules that use the term number to describe the general term</p> <p>7m64 Model real-life relationships involving constant rates where the initial condition starts at 0, through investigation using tables of values and graphs</p> <p>7m65 Model real-life relationships involving constant rates, using algebraic equations with variables to represent the changing quantities in the relationship</p> <p>7m66 Translate phrases describing simple mathematical relationships into algebraic expressions, using concrete materials</p> <p>7m67 Evaluate algebraic expressions by substituting natural numbers for the variables</p> <p>7m68 Make connections between evaluating algebraic expressions and determining the term in a pattern using the general term</p> <p>7m69 Solve linear equations of the form $ax = c$ or $c = ax$ and $ax + b = c$ or variations such as $b + ax = c$ and $c = bx + a$ (where a, b, and c are natural numbers) by modelling with concrete materials, by inspection, or by guess and check, with and without the aid of a calculator</p> <p>Patterning and Algebra Overalls: 7m58, 7m59</p> | <p>Linear Relationships (9+ days)</p> <p>8m56 Represent, through investigation with concrete materials, the general term of a linear pattern, using one or more algebraic expressions</p> <p>8m57 Represent linear patterns graphically (i.e., make a table of values that shows the term number and the term, and plot the coordinates on a graph), using a variety of tools</p> <p>8m58 Determine a term, given its term number, in a linear pattern that is represented by a graph or an algebraic equation</p> <p>8m60 Model linear relationships using tables of values, graphs, and equations, through investigation using a variety of tools</p> <p>8m63 Make connections between solving equations and determining the term number in a pattern, using the general term</p> <p>Patterning and Algebra Overalls: 8m54, 8m55</p> |
| <p>Measurement, Surface Area, Volume (9+ days)</p> <p>7m17 Explain the relationship between exponential notation and the measurement of area and volume</p> <p>7m21 Solve multi-step problems arising from real-life contexts and involving whole numbers and decimals, using a variety of tools and strategies</p> <p>7m34 Sketch different polygonal prisms that share the same volume</p> <p>7m35 Solve problems that require conversion between metric units of measure</p> <p>7m40 Determine, through investigation using a variety of tools and strategies, the relationship between the height, the area of the base, and the volume of right prisms with simple polygonal bases, and generalize to develop the formula (i.e., Volume = area of base x height)</p> <p>7m41 Determine, through investigation using a variety of tools, the surface area of right prisms</p> <p>7m42 Solve problems that involve the surface area and volume of right prisms and that require conversion between metric measures of capacity and volume (i.e., millilitres and cubic centimetres)</p> <p>7m49 Investigate, using concrete materials, the angles between the faces of a prism, and identify right prisms</p> <p>7m66 Translate phrases describing simple mathematical relationships into algebraic expressions, using concrete materials</p> <p>7m67 Evaluate algebraic expressions by substituting natural numbers for the variables</p> <p>7m69 Solve linear equations of the form $ax = c$ or $c = ax$ and $ax + b = c$ or variations such as $b + ax = c$ and $c = bx + a$ (where a, b, and c are natural numbers) by modelling with concrete materials, by inspection, or by guess and check, with and without the aid of a calculator</p> <p>Number Sense and Numeration Overalls: 7m8, 7m9</p> <p>Measurement Overall: 7m32</p> <p>Geometry and Spatial Sense Overall: 7m43</p> <p>Patterning and Algebra Overall: 7m59</p> | <p>Cylinders (6+ days)</p> <p>8m32 Research, describe, and report on applications of volume and capacity measurement</p> <p>8m33 Solve problems that require conversions involving metric units of area, volume, and capacity (i.e., square centimetres and square metres; cubic centimetres and cubic metres; millilitres and cubic centimetres)</p> <p>8m37 Determine, through investigation using a variety of tools and strategies, the relationship between the area of the base and height and the volume of a cylinder, and generalize to develop the formula (i.e., Volume = area of base x height)</p> <p>8m38 Determine, through investigation using concrete materials, the surface area of a cylinder</p> <p>8m39 Solve problems involving the surface area and the volume of cylinders, using a variety of strategies</p> <p>Measurement Overalls: 8m30, 8m31</p> |

TIPS4Math Grades 7 and 8 Overview

| Grade 7 | Grade 8 |
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| <p>Operations Involving Integers (9+ days)</p> <p>7m14 Represent and order integers, using a variety of tools 7m26 Add and subtract integers, using a variety of tools</p> <p>Number Sense and Numeration Overalls: 7m8, 7m9</p> | <p>Operations Involving Integers (10+ days)</p> <p>8m13 Represent, compare, and order rational numbers (i.e., positive and negative [integers] fractions and decimals to thousandths) 8m18 Use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution 8m21 Represent the multiplication and division of integers, using a variety of tools 8m22 Solve problems involving operations with integers, using a variety of tools 8m23 Evaluate expressions that involve integers, including expressions that contain brackets and exponents, using order of operations 8m62 Evaluate algebraic expressions with up to three terms, by substituting fractions, decimals, and integers for the variables 8m64 Solve and verify linear equations involving a one-variable term and having solutions that are integers, by using inspection guess and check and a “balance” model</p> <p>Number Sense and Numeration Overalls: 8m8, 8m9 Patterning and Algebra Overall: 8m55</p> |
| <p>Fractions, Decimals, Percents, Ratios (14+ days)</p> <p>7m15 Select and justify the most appropriate representation of a quantity (i.e., fraction, decimal, percent) for a given context 7m22 Use estimation when solving problems involving operations with whole numbers, decimals, and percents, to help judge the reasonableness of a solution 7m27 Determine, through investigation, the relationships among fractions, decimals, percents, and ratios 7m28 Solve problems that involve determining whole number percents, using a variety of tools 7m29 Demonstrate an understanding of rate as a comparison, or ratio, of two measurements with different units 7m30 Solve problems involving the calculation of unit rates 7m74 Collect and organize categorical, discrete, or continuous primary data and secondary data and display the data in charts, tables, and graphs (including relative frequency tables and circle graphs) that have appropriate titles, labels, and scales that suit the range and distribution of the data, using a variety of tools</p> <p>Number Sense and Numeration Overalls: 7m8, 7m9, 7m10 Data Management and Probability Overall: 7m70</p> | <p>Solve Problems Involving Proportions (12+ days)</p> <p>8m14 Translate between equivalent forms of a number (i.e., decimals, fractions, percents) 8m17 Solve problems involving percents expressed to one decimal place and whole-number percents greater than 100 8m18 Use estimation when solving problems involving operations with whole numbers, decimals, percents, integers, and fractions, to help judge the reasonableness of a solution 8m26 Identify and describe real-life situations involving two quantities that are directly proportional 8m27 Solve problems involving proportions, using concrete materials, drawings, and variables 8m28 Solve problems involving percent that arise from real-life contexts 8m29 Solve problems involving rates 8m46 Determine, through investigation using a variety of tools, relationships among area, perimeter, corresponding side lengths, and corresponding angles of similar shapes 8m76 Compare two attributes or characteristics, using a scatter plot, and determine whether or not the scatter plot suggests a relationship 8m79 Compare two attributes or characteristics, using a variety of data management tools and strategies (i.e., pose a relevant question, then design an experiment or survey, collect and analyse the data, and draw conclusions)</p> <p>Number Sense and Numeration Overalls: 8m9, 8m10 Geometry and Spatial Sense Overall: 8m41 Data Management and Probability Overall: 8m66</p> |

Grade 7

Probability (9+ days)

- 7m73** Collect data by conducting a survey or an experiment to do with themselves, their environment, issues in their school or community, or content from another subject and record observations or measurements
- 7m74** Collect and organize categorical, discrete, or continuous primary data and secondary data and display the data in charts, tables, and graphs (including relative frequency tables and circle graphs) that have appropriate titles, labels and scales that suit the range and distribution of the data, using a variety of tools
- 7m78** Read, interpret, and draw conclusions from primary data and from secondary data presented in charts, tables, and graphs (including relative frequency tables and circle graphs)
- 7m83** Research and report on real-world applications of probabilities expressed in fraction, decimal, and percent form
- 7m84** Make predictions about a population when given a probability
- 7m85** Represent in a variety of ways all the possible outcomes of a probability experiment involving two independent events (i.e., one event does not affect the other event), and determine the theoretical probability of a specific outcome involving two independent events
- 7m86** Perform a simple probability experiment involving two independent events, and compare the experimental probability with the theoretical probability of a specific outcome

Data Management and Probability Overalls: 7m70, 7m71, 7m72

Grade 8

Probability (5+ days)

- 8m68** Collect data by conducting a survey or an experiment to do with themselves, their environment, issues in their school or community, or content from another subject and record observations or measurements
- 8m70** Collect and organize categorical, discrete, or continuous primary data and secondary data and display the data in charts, tables, and graphs (including histograms and scatter plots) that have appropriate titles, labels, and scales that suit the range and distribution of data, using a variety of tools
- 8m73** Read, interpret, and draw conclusions from primary data and from secondary data, presented in charts, tables, and graphs (including frequency tables with intervals, histograms and scatter plots)
- 8m80** Compare, through investigation, the theoretical probability of an event (i.e., the ratio of the number of ways a favourable outcome can occur compared to the total number of possible outcomes) with experimental probability, and explain why they might differ
- 8m81** Determine, through investigation, the tendency of experimental probability to approach theoretical probability as the number of trials in an experiment increases, using class-generated data and technology-based simulation models
- 8m82** Identify the complementary event for a given event, and calculate the theoretical probability that a given event will not occur

Data Management and Probability Overalls: 8m65, 8m66, 8m67