Mathematics at Work 12

Outcomes

2022

Mathematics at Work Grade 12 Outcomes

G01 Students will be expected to solve problems by using the sine law and cosine law, excluding the ambiguous case.

Performance Indicators:
G01.01   Identify and describe the use of the sine law and cosine law in construction, industrial, commercial, and artistic applications.

G01.02   Solve a problem using the sine law or cosine law when a diagram is given.

G02 Students will be expected to solve problems that involve triangles, quadrilaterals, and regular polygons.

Performance Indicators:
G02.01   Describe and illustrate properties of triangles, including isosceles and equilateral.

G02.02   Describe and illustrate properties of quadrilaterals in terms of angle measures, side lengths, diagonal lengths, and angles of intersection.

G02.03   Describe and illustrate properties of regular polygons.

G02.04   Explain, using examples, why a given property does or does not apply to certain polygons.

G02.05   Identify and explain an application of the properties of polygons in construction, industrial, commercial, domestic, and artistic contexts.

G02.06   Solve a contextual problem that involves the application of the properties of polygons.

G03 Students will be expected to demonstrate an understanding of transformations on a 2-D shape or a 3-D object, including translations, rotations, reflections, and dilations.

Performance Indicators:
G03.01   Identify a single transformation that was performed, given the original 2-D shape or 3-D object and its image.

G03.02   Draw the image of a 2-D shape that results from a given single transformation.

G03.03   Draw the image of a 2-D shape that results from a given combination of successive transformations.

G03.04   Create, analyze, and describe designs, using translations, rotations, and reflections in all four quadrants of a coordinate grid.

G03.05   Identify and describe applications of transformations in construction, industrial, commercial, domestic, and artistic contexts.

G03.06   Explain the relationship between reflections and lines or planes of symmetry.

G03.07   Determine and explain whether a given image is a dilation of another given shape, using the concept of similarity.

G03.08   Draw, with or without technology, a dilation image for a given 2-D shape or 3-D object, and explain how the original 2-D shape or 3-D object and its image are proportional.

G03.09   Solve a contextual problem that involves transformations.

N01 Students will be expected to analyze puzzles and games that involve logical reasoning, using problem-solving strategies.

Performance Indicators:

N01.01   Determine, explain, and verify a strategy to solve a puzzle or to win a game; for example,

- guess and check
- look for a pattern
- make a systematic list
- draw or model
- eliminate possibilities
- simplify the original problem
- work backwards
- develop alternative approaches

N01.02   Identify and correct errors in a solution to a puzzle or in a strategy for winning a game.

N01.03   Create a variation on a puzzle or a game, and describe a strategy for solving the puzzle or winning the game.

N02 Students will be expected to solve problems that involve the acquisition of a vehicle by buying, leasing, or leasing to buy.

Performance Indicators:

N02.01   Describe and explain various options for buying, leasing, and leasing to buy a vehicle.

N02.02   Solve, with or without technology, problems that involve the purchase, lease, or lease to purchase a vehicle.

N02.03   Justify a decision related to buying, leasing, or leasing to buy a vehicle, based on factors such as personal finances, intended use, maintenance, warranties, mileage, and insurance.

A01 Students will be expected to demonstrate an understanding of linear relations by
- recognizing patterns and trends
- graphing
- creating tables of values
- writing equations
- interpolating and extrapolating
- solving problems

Performance Indicators:

A01.01   Identify and describe the characteristics of a linear relation represented in a graph, table of values, number pattern, or equation.

A01.02   Sort a set of graphs, tables of values, number patterns, and/or equations into linear and non-linear relations.

A01.03   Write an equation for a given context, including direct or partial variation.

A01.04   Create a table of values for a given equation of a linear relation.

A01.05   Sketch the graph for a given table of values.

A01.06   Explain why the points should or should not be connected on the graph for a context.

A01.07   Create, with or without technology, a graph to represent a data set, including scatterplots.

A01.08   Describe the trends in the graph of a data set, including scatterplots.

A01.09   Sort a set of scatterplots according to the trends represented (linear, non-linear, or no trend).

A01.10   Solve a contextual problem that requires interpolation or extrapolation of information.

A01.11   Relate slope and rate of change to linear relations.

A01.12   Match given contexts with their corresponding graphs, and explain the reasoning.

A01.13   Solve a contextual problem that involves the application of a formula for a linear relation.

S01 Students will be expected to solve problems that involve measures of central tendency, including mean, median, and mode

Performance Indicators:

S01.01   Explain, using examples, the advantages and disadvantages of each measure of central tendency.

S01.02   Determine the mean, median, and mode for a set of data.

S01.03   Identify and correct errors in a calculation of a measure of central tendency.

S01.04   Identify the outlier(s) in a set of data.

S01.05   Explain the effect of outliers on mean, median, and mode.

S01.09   Explain, using examples from print and other media, how measures of central tendency and outliers are used to provide different interpretations of data.

S01.10   Solve a contextual problem that involves measures of central tendency.

P01 Students will be expected to analyze and interpret problems that involve probability.

Performance Indicators:

P01.01   Describe and explain the applications of probability (e.g., medication, warranties, insurance, lotteries, weather prediction, 100-year flood, failure of a design, failure of a product, vehicle recalls, approximation of area).
P01.02   Calculate the probability of an event based on data.
P01.03   Express a given probability as a fraction, decimal, and percent and in a statement.
P01.04   Explain the difference between odds and probability.
P01.05   Determine the probability of an event, given the odds for or against.
P01.06   Explain, using examples, how decisions may be based on a combination of theoretical probability calculations, experimental results, and subjective judgements.
P01.07   Solve a contextual problem that involves a given probability.