

## Workplace & Apprenticeship 30 Math Rubrics

**WP 30.1** Analyze puzzles and games that involve logical reasoning using problem-solving strategies.

Beginning (1)	Approaching (2)	Meeting (3)	Exemplary (4)
Outcome integrated throughout the course by using puzzles and games such as Chess, Sudoku, Mastermind, Nim, Reversi.			

**WP30.2** Demonstrate concretely, pictorially and symbolically an understanding of limitations of measuring instruments, including: precision, accuracy, uncertainty and tolerance.

Beginning (1)	Approaching (2)	Meeting (3)	Exemplary (4)
I need more help with becoming consistent with the criteria.	I can explain why a certain degree of precision and/or accuracy is required for the given context. I can compare the degree of accuracy for two or more given instruments used to measure the same attribute. I can relate the degree (margin) of accuracy to the uncertainty of a given measure. I can calculate the maximum and minimum values, given the nominal value and the tolerance,	I can state and justify the degree of precision required by the measuring device, given a situational question, I can calculate the nominal value and the tolerance, given the maximum and minimum values,	I can compare and describe, using examples, the limitations of measuring instruments used in a specific trade or industry, eg, tape measure versus Vernier caliper. I can explain using concrete models and pictorial representations the difference between precision and accuracy. I can explain using specific examples, the importance of applying tolerance in various situations (eg) Machining, Carpentry, Manufacturing.

**WP30.3** Solve problems that involve the Sine Law and Cosine Law, excluding the ambiguous case.

Beginning (1)	Approaching (2)	Meeting (3)	Exemplary (4)
I need more help with becoming consistent with the criteria.	Given all the necessary information, I can apply the Laws of Sine and Cosine to a situational question.	I can solve situational questions using the Laws of Sine and Cosine that require multiple step calculations (with or without diagrams.)	I can identify and describe the use of the Sine and Cosine Laws in construction, industrial, commercial and artistic applications.

**WP30.4** Extend and apply understanding of the properties of triangles, quadrilaterals and regular polygons to solve problems.

Beginning (1)	Approaching (2)	Meeting (3)	Exemplary (4)
I need more help with becoming consistent with the criteria.	I can analyze, generalize, and explain properties of polygons using illustrations, including: triangles, quadrilaterals, and regular polygons.	I can explain, using examples, why a given property does (not) apply to certain polygons. I can solve situational questions that involve the application of the properties of polygons.	I can solve higher level situational questions that involve the application of the properties of polygons. I can identify and explain applications of the properties of polygons in construction, industry, commerce, domestic, and artistic contexts.

## Workplace & Apprenticeship 30 Math Rubrics

**WP30.5** Extend and apply understanding of transformations on 2-D shapes and 3-D objects, including: translations, rotations, reflections, dilations.

<b>Beginning (1)</b>	<b>Approaching (2)</b>	<b>Meeting (3)</b>	<b>Exemplary (4)</b>
I need more help with becoming consistent with the criteria.	I can draw the image of 2-D shapes given a single transformation: translations, rotations, dilation or a reflection and state the new coordination. Given two similar images I can calculate the scale factor used to create the scale diagram. I can calculate the dilation, given an original diagram and scale factor.	I can explain how and why the concept of similarity can be used to determine if an image is a dilation of a given shape, and provide examples. I can determine whether or not given images are dilations of given shapes and explain the reasoning. I can solve contextual problems that involve transformations.	I can solve higher level contextual problems that involve transformations and explain the reasoning. I can analyze and describe designs that involve translations, rotations, and reflections in all four quadrants of a coordinate grid, and explain the reasoning. I can create designs using translations, rotations and reflections in all four quadrants of a coordinate grid.

**WP30.6** Demonstrate understanding of options for acquiring a vehicle including: purchasing without credit, purchasing with credit, leasing and leasing to purchase.

<b>Beginning (1)</b>	<b>Approaching (2)</b>	<b>Meeting (3)</b>	<b>Exemplary (4)</b>
I need more help with becoming consistent with the criteria.	I can calculate the total purchase price of a vehicle including tax. I can determine the principal of a loan given the purchase price and the amount of the down payment. Given the conditions of the lease, I can calculate the cost of lease to pick up the vehicle and the total cost at the end of the lease. When given a lease option, I can calculate the penalty for extra km driven. I can calculate the total lease to purchase price including the residual value.	I can solve, with or without technology, situational questions that involve the purchase of a vehicle and the cost of a lease	I can solve, with or without technology, situational questions that involve a lease to purchase of a vehicle. I can 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.

**WP30.7** Explore and critique the viability of small business options with respect to: expenses, sales, profit or loss.

<b>Beginning (1)</b>	<b>Approaching (2)</b>	<b>Meeting (3)</b>	<b>Exemplary (4)</b>
I need more help with becoming consistent with the criteria.	I can analyze a small business to generate options that might improve its profitability including start up and operating costs. I can identify variable & fixed income and expenses.	I can determine the break-even point for small businesses and explain the reasoning. Using the compound interest formula, I can calculate start up loans with various interest rates and terms to determine the total cost of the loan and monthly payments.	I can analyze small businesses such as a hot dog stand to identify and describe expenses, and explain factors, such as seasonal variations and hours of operations that might impact their profitability. I can justify my choice of loan options.

## Workplace & Apprenticeship 30 Math Rubrics

**WP30.8** Extend and apply understanding of linear relations including: patterns and trends, graphs, tables of values, equations, interpolation and extrapolation, and problem solving.

<b>Beginning (1)</b>	<b>Approaching (2)</b>	<b>Meeting (3)</b>	<b>Exemplary (4)</b>
I need more help with becoming consistent with the criteria.	I can determine the characteristics of a linear relation using various forms (using equations, table of values or graphs). I can analyze graphs (scatterplots) describing and naming the type of trends represented (linear, nonlinear or no trend). I can explain the linear relation in a given context and match it with its corresponding graph. I can create a graph to represent a data set, including scatterplots. Given data, I can calculate slope.	I can relate slope and rate of change to linear relations. I can solve situational questions and write an equation of a line given a table of values or a graph. I can explain why the points on a graph should or should not be connected.	I can solve situational questions that may require interpolation or extrapolation of information. Given situational questions I must create my own table of values, equation of a line and graph to solve. I can critique statements such as, "Trends allow us to predict exactly what will happen in the near future?"

**WP30.9** Extend and apply understanding of measures of central tendency to solve problems including: mean, median, mode, weighted mean, trimmed mean.

<b>Beginning (1)</b>	<b>Approaching (2)</b>	<b>Meeting (3)</b>	<b>Exemplary (4)</b>
I need more help with becoming consistent with the criteria.	I can determine the mean, median and mode for sets of data and explain the reasoning. I can analyze calculations of measures of central tendency to identify and correct errors if necessary.	I can calculate the trimmed mean for sets of data, and justify the removal of the outliers. I can calculate the mean of a set of numbers after allowing the data to have different weightings (weighted mean) and explain the reasoning. I can manipulate the mean formula to calculate an unknown data entry for a given mean.	I can identify the outlier(s) in a set of data, explain why they are outliers and explain their effect on the mean, median, and mode of that data set. I can explain, using examples from print and other media, how and why measures of central tendency and outliers are used to provide different interpretations of data.

**WP30.10** Demonstrate understanding of percentiles.

<b>Beginning (1)</b>	<b>Approaching (2)</b>	<b>Meeting (3)</b>	<b>Exemplary (4)</b>
I need more help with becoming consistent with the criteria.	I can calculate the percentile rank in situational questions given the data.	I can solve situational questions that involve percentiles and percentile charts.	I can explain, using examples, percentile ranks in a context. I can compare, using examples, percent and percentile rank. I can explain how and why decisions can be made based on a percentile rank. I can compare, using examples, percent & percentile rank.

## Workplace & Apprenticeship 30 Math Rubrics

### WP30.11 Extend and apply understanding of probability.

<b>Beginning (1)</b>	<b>Approaching (2)</b>	<b>Meeting (3)</b>	<b>Exemplary (4)</b>
I need more help with becoming consistent with the criteria.	I can calculate the probability of an event based on a data set. I can express given probabilities as fractions, decimals, percentages, and words. I can calculate the probability of an event occurring given a data set (eg) number of defective light bulbs. I can calculate the odds in favour or against a particular outcome.	I can analyze, generalize, and compare odds and probability including part-whole and part-part relationships. I can determine the probability of an event, given the odds for and against. I can solve situational questions that involve probability.	I can explain, using examples, how decisions may be based on a combination of theoretical probability calculations, results of experimental probability, and subjective judgments. I can critique statements such as, "It is not possible to express odds as fractions." I can solve higher level situational questions that involve probability.