NSW Education Standards Authority

Mathematics Standard 1

HSC Marking Feedback 2023

General feedback

Students should:

- show relevant mathematical reasoning and/or calculations

- read the question carefully to ensure that they do not miss important components of the question

- have a clear understanding of key words in the question and recognise the intent of the question and its requirements, such as show, solve, evaluate, hence, calculate,

- use the Reference Sheet where appropriate

- ensure the solution is legible and follows a clear sequence

- engage with any stimulus material provided and refer to it in their response when required by the question

- check their solution answers the question

- round off numerical solutions only at the final step of the solution

- construct graphs neatly, with precision and display all relevant information as required by the question

- interpret information presented in graphs across a range of contexts

- understand when to use relevant calculator functions

- carefully note any information in the questions which supplies units of measurement.

Section II

Question 11

In better responses, students were able to:

- multiply correctly to calculate the value of **A**

- add all the numbers in the fx column including the value found of **A** to get the correct value of **B**

- find the mean for the distribution using their value of **B**.

Areas for students to improve include:

- understanding the features of a frequency distribution table

- realising the mean is calculated by dividing the total of the fx column and the total frequency, noting there are five groups of data
- understanding the difference between the mean and median.

Question 12

In better responses, students were able to:

- correctly convert from millimetres to metres
- add dimensions to all parts of the diagram
- correctly calculate the area of the kitchen and the area of a tile
- divide the number of tiles required by 10 and round up to the nearest whole number.

Areas for students to improve include:

- converting between units of length
- reading measurement/dimensions on a floor plan
- calculating area of squares and rectangles.

Question 13

In better responses, students were able to:

- recall the definition of mode and correctly identify it from a graph
- correctly determine the score of one was an outlier
- correctly identify the graph as negatively skewed.

Areas for students to improve include:

- using the language of statistics to describe the shape of a distribution and identify its key components
- developing an understanding of the mathematical features of statistical displays
- understanding the difference between positively and negatively skewed distributions
- understanding the difference between the mean, median and mode.

Question 14

In better responses, students were able to:

- divide the distance travelled by the time taken
- identify a horizontal line segment on a travel graph means the object is stationary
- calculate the distance travelled over a given time period.

Areas for students to improve include:

- reading the scales given on the axes correctly
- realising that speed is a measure of distance travelled in an hour.

Question 15

In better responses, students were able to:

- accurately draw a network diagram and label the paths using the values provided in the table
- calculate the distance from Hobart to Darwin via Sydney by highlighting the path and adding the two distances together.

Areas for students to improve include:

- identifying key components of the question, including labelling all paths
- using working techniques to ensure accuracy, for example, marking off on the table once a path has been drawn or using a highlighter to visualise the path
- calculating the required distances showing all their working.

Question 16

In better responses, students were able to:

- show where the angle of elevation lies and use the tan ratio correctly
- find and correctly solve the ratio equation
- round correctly.

Areas for students to improve include:

- solving equations when the unknown is in the denominator
- knowing which Trigonometric ratio to use in relation to the question.

Question 17

In better responses, students were able to:

- correctly substitute into the given equation
- evaluate the equation from their substitution
- realise that 10N means 10 x N.

Areas for students to improve include:

- showing the substitution into the given equation by writing in the given fraction form
- understanding there is a multiplication sign between a number and a pronumeral.

Question 18

In better responses, students were able to:

- identify and draw the shortest path including the sum of the weights to calculate the value of the shortest path (a)
- use the spanning tree diagram to identify the shortest path (b).

Areas for students to improve include:

- ensuring the path they have selected is the shortest
- including each vertex (node) that is on their path
- understanding the shortest path does not have to include all the vertices (nodes) in the network
- providing numerical support for the paths
- drawing the minimum spanning tree if unable to write the reasons for the answer.

Question 19

In better responses, students were able to:

- use a line of best fit to estimate the answer by substituting 23 correctly
- deduce the correct answer is extrapolated with a precise definition even if they cannot solve the answer in Q19 (a).

Areas for students to improve include:

- predicting equations of lines of best fit with non-integer coefficients
- understanding the meaning of both extrapolation and interpolation.

Question 20

In better responses, students were able to:

- calculate the inter quartile range
- show how to calculate an outlier and use the correct formula from the Reference Sheet
- justify conclusions using mathematical reasoning.

Areas for students to improve include:

- knowing how to find the median and the upper (Q3) and lower (Q1) quartiles from a list of scores
- using the outlier formula provided on the Reference Sheet to show that 58 is not an outlier
- knowing the difference between range and interquartile range
- justifying conclusions using mathematical reasoning with a calculation not a broad statement.

Question 21

In better responses, students were able to:

- realise the percentage given did not need to be divided by four
- realise the need to multiply the years by four to attain the number of time periods
- identify the compound interest formula on the Reference Sheet.

Areas for students to improve include:

- understanding when a percentage is given in a time period other than annually
- knowing n is the time period not the number of years
- using the compound interest formula not the simple interest formula when the question asks for compound interest.

Question 22

In better responses, students were able to:

- correctly calculate the number of hours worked
- apply penalty rates correctly
- add their sums for weekdays, Saturday and Sunday together correctly.

Areas for students to improve include:

- calculating hours worked
- practising efficient methods of working with questions on penalty rates rather than working out each pay rate separately
- converting between decimal values of time into hours and minutes.

Question 23

In better responses, students were able to:

- clearly show each calculation and the total attributed to the individual car requirements
- apply fuel consumption rates
- identify the need to divide by 100 to get the L and kWh per 100km.

Areas for students to improve include:

- converting from km travelled to per 100km
- distinguishing between which values need to be divided (per 100) and which need to be multiplied (fuel consumption x cost of fuel)
- understanding and converting between rates for example 8.6L/100km to L/35000 km.

Question 24

In better responses, students were able to:

- use the compound interest formula on 5000 with $n = 4$ to find ***B*** value
- use the simple interest formula or perform a simple interest calculation for the balance at the end of month three to find ***A*** and then add to find ***B***
- apply the simple interest formula with varying interest rates and periods, matching the interest rate per month to the period in months.

Areas for students to improve include:

- recognising that compound interest tables do not increase/decrease by a regular amount
- understanding the rate r and period n must correspond to the compounding period
- converting percentages into decimal form.

Question 25

In better responses, students were able to:

- correctly substitute into the appreciation/compound interest formula
- calculate the future value of the artwork
- correctly convert 5.3% into a decimal.

Areas for students to improve include:

- knowing the difference between appreciation, simple interest and depreciation
- converting percentages into decimals
- showing the substitution into the correct formula.

Question 26

In better responses, students were able to:

- interpret the question to provide the missing value in the table
- draw a straight-line graph accurately from a table of values
- find the point of intersection from a graph and identify the value from the correct axis
- interpret the question using the graph and mathematical reasoning to determine which provider was the cheaper option and by how much.

Areas for students to improve include:

- plotting points from a table onto a grid and accurately drawing a linear relationship using a ruler
- using a highlighter or underlining to assist in identifying parts of the question that need to be addressed such as 'which provider' and 'by how much'.

Question 27

In better responses, students were able to:

- move between different times correctly
- use am and pm correctly
- clearly label in their working whether they were referring to Town *A* or Town *B*.

Areas for students to improve include:

- calculating time differences

- understanding one hour after 11 am is 12 pm (noon)
- including am and pm when using times in the 12-hour format.

Question 28

In better responses, students were able to:

- identify the quantity and percentage of daily recommended intake, per serving of carbohydrates in the table
- calculate the daily recommended intake of carbohydrates by dividing the quantity per serving by the percentage daily recommended per serving
- solve using the unitary method.

Areas for students to improve include:

- calculations involving percentages
- identifying relevant details from the table needed to answer the question
- calculating 100 % of the value when given a certain percentage = x.

Question 29

In better responses, students were able to:

- transfer the given information correctly to the diagram
- apply Pythagoras theorem correctly to find the side after using the trigonometric ratios
- recognise they could use the rules for right-angled triangles rather than sine or cosine rules
- recognise that the bearing should be between 180 and 270
- find a missing acute angle and using this to find a bearing.

Areas for students to improve include:

- recognising when the use of the trigonometric ratios should apply to solving the question
- identifying and using right angle trigonometry to solve the question
- identifying adjacent, opposite and hypotenuse correctly in a right triangle
- labelling the diagrams with given information
- understanding and using bearings in different configurations.

Question 30

In better responses, students were able to:

- apply both depreciation formulas correctly and interpret the results justifying conclusions using mathematical reasoning.

Areas for students to improve include:

- knowing and understanding how to use the formulas on the Reference Sheet

- understanding what depreciation is and what the formulas calculate

- comparing and calculating two types of depreciation

- copying formulas correctly from the Reference Sheet.

- understanding what salvage value means.

Question 31

In better responses, students were able to:

- recognise three different shapes requiring different formulae to find the area then adding them together using the proper scale and volume depth

- indicate on the diagram the actual length of the shapes

- apply the formula $V = Ah$, and indicating x 0.1 for h

- apply the scale and conversions correctly.

Areas for students to improve include:

- ensuring all measurements are in the same units, for example, metres

- practising problems involving area and volume for solids, not included on the Reference Sheet

- starting with the scale to determine the actual lengths that should be used to determine area before applying the volume measurement.