

# Mathematics Standard 1

## HSC marking feedback 2024

### 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:

- recognise 1:50 means that there is 1 unit for every 50 units in real life
- correct multiplication ( $8 \times 50$ )
- correctly convert *cm* to *m*
- recognise how to use a ratio
- make appropriate use of the scale to calculate the actual height of the tree, in metres.

Areas for students to improve include:

- understanding how scale works to calculate the actual height of the tree, in metres
- identifying the 8 *cm* related to the 1 in the scale
- knowing what units to convert to when using a scale
- understanding that scale is in the same units for the 1 and 50.

### Question 12

In better responses, students were able to:

- use two words to describe the bivariate dataset in terms of strength and direction – strong and negative
- identify scatter plot points from left to right in a negative direction
- interpret a strong correlation by the closeness of the points in forming a straight line.

Areas for students to improve include:

- using the word negative rather than decreasing or declining or going down to describe the bivariate dataset in terms of strength and direction.

### Question 13

In better responses, students were able to:

- use the interquartile range (IQR) and outlier formula correctly and make an appropriate comparison
- clearly label or identify the lower quartile (Q1) and the upper quartile (Q3).

Areas for students to improve include:

- knowing the difference between median and mean
- comparing their answer for what constitutes an outlier to their calculation.

### Question 14

In better responses, students were able to:

- link the right-angled triangle with Pythagoras' Theorem (a)
- use trigonometric ratios (tan) to calculate an angle and use this angle to calculate the hypotenuse
- draw a compass at the train station and then draw in the bearing to be calculated (b)
- write the bearing as a compass bearing.

Areas for students to improve include:

- using right-angled triangles with Pythagoras' Theorem, especially when two lengths are given
- reading the question carefully and drawing a compass from the train station
- using trigonometric ratios with calculating angles in right-angled triangles when given lengths.

### Question 15

In better responses, students were able to:

- identify the correct path and its weight
- correctly label a path using letters
- understand the difference between identifying a path and calculating its length
- find the 2 paths and then clearly showed the vertices which related to the shortest path.

Areas for students to improve include:

- following the path they are trying to state and ensuring vertices are not missed
- including the start and end points when labelling a path
- understanding that diagrams are not to scale and a shorter path may appear longer on the network diagram.

### Question 16

In better responses, students were able to:

- correctly convert both the electricity usage and cents to dollars
- round to 2 decimal places.

Areas for students to improve include:

- knowing the correct conversion, for example  $1 \text{ kW} = 1000 \text{ W}$
- converting cents to dollars
- understanding that this question involves two conversions.

### Question 17

In better responses, students were able to:

- recognise even numbers greater than a given value
- identify there are 20 numbers between 0 and 19, inclusive
- use the complementary event to solve the question.

Areas for students to improve include:

- identifying odd and even numbers
- understanding what the term 'not' means in probability
- understanding how to calculate complementary events.

### Question 18

In better responses, students were able to:

- correctly apply the formula for the area of a semicircle
- correctly apply the formula for the area of a triangle
- correctly adds areas for composite shapes.

Areas for students to improve include:

- understanding which sides of a triangle are important when finding area
- calculating the area of the composite shapes separately
- understanding the difference between perimeter, circumference and area.

### Question 19

In better responses, students were able to:

- substitute into the given formula
- show the opposite operation for each step when solving a 2-step equation.

Areas for students to improve include:

- solving 2 step equations
- solving and showing the opposite operations for each step.

## Question 20

In better responses, students were able to:

- draw the correct minimum spanning tree (using a ruler) with weighted edges in their diagram
- calculate the correct weight of their spanning tree
- identify either  $FC$  and  $BC$  in the correct minimum spanning tree as having the same weight.

Areas for students to improve include:

- writing down the weighted edges, for example, weights on each edge of their tree
- identify two edges with the same weight that could be swapped.

## Question 21

In better responses, students were able to:

- elect and use the correct formula with all correct values for  $P$ ,  $r$  and  $n$ .
- interpret that the period needed to be a fraction over 12.

Areas for students to improve include:

- identifying when simple interest or compound interest is required
- being able to convert periods into the correct time frame.

## Question 22

In better responses, students were able to:

- calculate the time difference between Towns A and B
- calculate the length of the flight taking into consideration time differences
- use time diagrams to set out their work.

Areas for students to improve include:

- converting 24-hour time to 12-hour time
- understanding when to add or subtract time differences
- using the degrees, minutes and seconds button on a calculator to calculate time difference.

### Question 23

In better responses, students were able to:

- use a table of values to plot points and draw a straight line with a ruler
- identify the difference between cost and revenue and break-even
- work out the revenue, the cost and show a subtraction of these values to find the profit made.

Areas for students to improve include:

- using a ruler to draw a straight-line graph
- reading a graph for a point of intersection
- knowing break-even point is the point of intersection.

### Question 24

In better responses, students were able to:

- recognise that the Class A scores were negatively skewed and the scores from Class B were positively skewed
- compare skewness, median and spread (range or IQR) correctly in Class A and Class B
- display their answers in a table.

Areas for students to improve include:

- having a better understanding of the key terms used in data, especially skewness
- identifying what is required for skewness, measures of location and spread.

### Question 25

In better responses, students were able to:

- identify the correct trigonometric ratio
- apply the ratio correctly to find the denominator.

Areas for students to improve include:

- recognising which trigonometric ratio to use
- labelling the sides of the triangle based on the position of an angle.

## Question 26

In better responses, students were able to:

- recognise that the question requires the student to find the future value using the compound interest formula and then subtracting the original \$600 from the solution to calculate the interest charged.

Areas for students to improve include:

- understanding the difference between simple and compound interest
- subtracting \$600 to correctly calculate interest.

## Question 27

In better responses, students were able to:

- calculate the time-and-a-half rate of \$67.50
- understand that overtime hours are different to equivalent normal hours
- calculate the amount paid for overtime
- total earnings for the week.

Areas for students to improve include:

- understanding the difference between overtime rates and normal hourly rates.

## Question 28

In better responses, students were able to:

- know the difference between simple interest and compound interest
- compare Alex and Jun's future values or compare their interest values from the simple interest and compound interest calculations
- write a concluding statement
- recognise that they were calculating different values for each person and then make the appropriate adjustment.

Areas for students to improve include:

- converting the rate and periods into the compounding periods stated in the question, particularly for interest compounding quarterly
- understanding that interest or future values should be compared to see the difference in interest earned for questions with two different interest type questions
- identifying the compound interest formula gives the future value, not the interest
- identifying the simple interest formula gives the interest not the future value.

### Question 29

In better responses, students were able to:

- convert between millimetres and metres rather than between units of area
- find the area of the composite shape in square metres using either subtraction or addition
- find the number of boxes by dividing area by 15 and then rounding this number before multiplying by 100 to find the total cost.

Areas for students to improve include:

- converting between units of length before calculating area
- identifying simple shapes and calculate their areas
- breaking down questions into smaller manageable steps.

### Question 30

In better responses, students were able to:

- calculate the salvage value for the straight-line depreciation component
- substitute the salvage value from the straight-line method at the end of the 4 years into the declining-balance formula as the initial value
- subtract the final salvage value from the original value to calculate the total depreciation.

Areas for students to improve include:

- knowing the difference between straight line and declining balance depreciation
- selecting the correct formula from the reference sheet and using it correctly
- understanding the salvage value at the end of the 4 years is the initial value of the next part of the calculation
- understanding that 'depreciation' is the loss in value.

### Question 31

In better responses, students were able to:

- convert between different units
- recognise that units need to be the same to calculate time
- apply the unitary method with correct conversions.

Areas for students to improve include:

- understanding the relationship between speed, distance and time and knowing the formula correctly
- making sure that the units for distance, speed and time are connected, for example, distance in *km*, speed in *km/h* and time in *h*, or distance in *m*, speed in *m/s* and time in *s*.



### Question 32

In better responses, students were able to:

- apply the speed, distance, time formula to calculate the correct distance
- correctly convert between units
- write a scale in the form 1:a
- apply their scale to find the real distance of another side.

Areas for students to improve include:

- correctly using the speed, distance, time formula converting from *km* to *m* to *cm*
- converting from minutes to hours
- knowing a scale must be in the same units.