Neap

Trial Examination 2023

HSC Year 12 Mathematics Standard 2

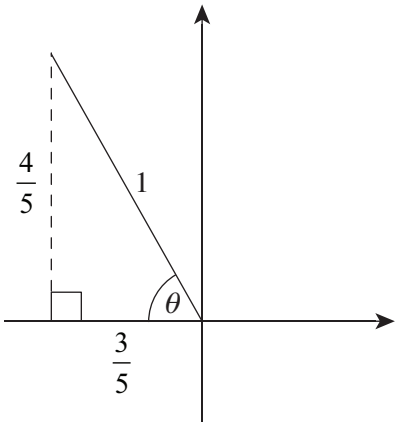
Solutions and Marking Guidelines

SECTION I

Answer and explanation	Syllabus content, outcomes and targeted performance bands
Question 1 **B** 1 microsecond $= 1 \times 10^{-6}$ s $\therefore$ 6 microseconds $= 6 \times 10^{-6}$ s	MS–M1 Applications of Measurement MS11–4 Bands 2–3
Question 2 **C** A path is a walk with no repeated vertices. Therefore, *ACBEC* is not a path.	MS–N2 Network Concepts MS2–12–8 Bands 2–3
Question 3 **D** **D** is correct. Given that there are six values in each data set, the median is found by calculating the mean of the middle two values (45 and 55 in option **D**). $\text{median} = \frac{45+55}{2}$ $= 50$ Finding the mean gives: $\text{mean} = \frac{40+45+45+55+85+90}{6}$ $= \frac{360}{6}$ $= 60$ **A** is incorrect. This dataset has a median of 55 and a mean of 60. **B** is incorrect. This dataset has a median of 50 and a mean of 53.33. **C** is incorrect. This dataset has a median of 50 and a mean of 56.67.	MS–S1 Data Analysis MS11–7 Bands 2–3
Question 4 **B** Substituting $V_0 = 17\,500$, $r = 0.11$ and $n = 5$ into the declining-balance formula gives: $S = V_0(1-r)^n$ $= 17\,500 \times (1-0.11)^5$ $= \$9772.10$	MS–F4 Investments and Loans MS2–12–5 Bands 3–4

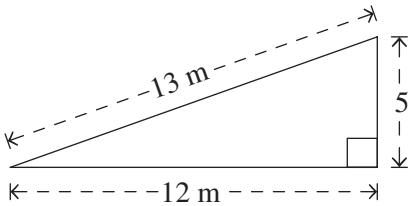
Answer and explanation	Syllabus content, outcomes and targeted performance bands
Question 5 **C** Finding the price per gram for each packet of chips gives: $1\text{ g of Nofrills chips} = \dfrac{1.25}{60}$ $= 0.0208$ $= 2.08\text{ cents}$ $1\text{ g of Smithy chips} = \dfrac{2.40}{135}$ $= 0.0178$ $= 1.78\text{ cents}$ $1\text{ g of Top chips} = \dfrac{4.10}{240}$ $= 0.0171$ $= 1.71\text{ cents}$ $1\text{ g of Cheap chips} = \dfrac{5.20}{300}$ $= 0.0173$ $= 1.73\text{ cents}$ As the packet of Top chips has the lowest cost per gram, it has the best value.	MS–M7 Rates and Ratios MS2–12–10 Bands 4–5
Question 6 **B** $W = \sqrt[3]{\dfrac{2\pi}{6Y}}$ $= \sqrt[3]{\dfrac{2\pi}{6 \times 6.83}}$ $= 0.535$	MS–A1 Formulae and Equations MS11–1 Bands 2–3
Question 7 **A** **A** is not a true statement and is therefore the required response. Positively skewed data would be bunched on the right-hand side of the dot plot. **B** is a true statement and is therefore not the required response. As the data is bunched on the left-hand side of the dot plot, it is negatively skewed. **C** is a true statement and is therefore not the required response. The data has one outlier near 50. **D** is a true statement and is therefore not the required response. The standard deviation cannot be found because the horizontal scale does not include specific scores.	MS–S1 Data Analysis MS11–1 Bands 2–3

Answer and explanation	Syllabus content, outcomes and targeted performance bands
Question 8 **A** Using the cosine rule gives: $\cos C = \dfrac{a^2 + b^2 - c^2}{2ab}$ $\cos\theta = \dfrac{10^2 + 36^2 - 30^2}{2 \times 10 \times 36}$ $\theta = 46.4578$ $\approx 46°$	MS–M6 Non-right-angled Trigonometry MS2–12–4 Bands 4–5
Question 9 **C** Given that the distance travelled, d, is x km and the time taken, t, is 2 hours: $\text{speed} = \dfrac{\text{distance}}{\text{time}}$ $y = \dfrac{d}{t}$ $= \dfrac{x}{2}$	MS–A4 Types of Relationships MS2–12–6 Bands 5–6
Question 10 **B** The distance around the running track is given by the circumference of a circle and two straight lengths of 100 m each. Therefore: $\text{perimeter} = \text{circumference of circle} + 200$ $= 2\pi r + 200$ $= 2\pi \times \dfrac{65}{2} + 200$ $= 65\pi + 200 \text{ m}$	MS–M1 Applications of Measurement MS11–4 Bands 3–4

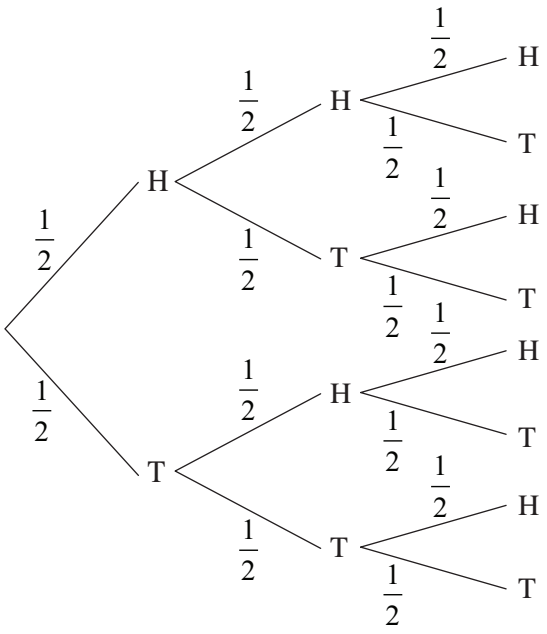
Answer and explanation	Syllabus content, outcomes and targeted performance bands
Question 11 D Finding the hypotenuse gives: $c = \sqrt{a^2 + b^2}$ $= \sqrt{\left(\frac{4}{5}\right)^2 + \left(\frac{3}{5}\right)^2}$ $= 1$  Therefore: $\sin A = \frac{\text{opp}}{\text{hyp}}$ $\sin\theta = \frac{\frac{4}{5}}{1}$ $= \frac{4}{5}$	MS–M6 Non-right-angled Trigonometry MS2–12–4 Bands 4–5
Question 12 A Finding the ratio of fruit to sugar gives: fruit : sugar 10 kg : 8 kg 2.5 kg : 2 kg Multiplying both sides of the ratio to reach 6 kg of sugar gives: $2.5 \times 3 : 2 \times 3$ $7.5 : 6$ Therefore, Jihoon requires 7.5 kg of fruit.	MS–M7 Rates and Ratios MS2–12–10 Bands 4–5

Answer and explanation	Syllabus content, outcomes and targeted performance bands
Question 13 **C** Finding the area of triangle ABC gives: $\text{area of } \Delta ABC = \frac{1}{2} \times 3 \times 4 \times \sin A$ $= \frac{1}{2} \times 12 \times \sin A$ Finding the area of triangle ADE gives: $\text{area of } \Delta ADE = \frac{1}{2} \times 7 \times 10 \times \sin A$ $= \frac{1}{2} \times 70 \times \sin A$ Finding the ratio gives: $\frac{1}{2} \times 12 \times \sin A : \frac{1}{2} \times 70 \times \sin A$ $12 : 70$ $6 : 35$	MS–M7 Rates and Ratios MS2–12–3 Bands 4–5
Question 14 **C** Finding the height of the cylinder gives: $h = 3 \times 2r$ $= 6r$ Therefore: $\text{volume of cylinder} = \pi r^2 h$ $= \pi r^2 \times 6r$ $= 6\pi r^3$ $\text{volume of tennis balls} = 3 \times \frac{4}{3} \pi r^3$ $= 4\pi r^3$ Thus, finding the fraction of the volume of the cylinder that is occupied by the tennis balls gives: $\frac{\text{volume of tennis balls}}{\text{volume of cylinder}} = \frac{4\pi r^3}{6\pi r^3}$ $= \frac{4}{6}$ $= \frac{2}{3}$	MS–M1 Applications of Measurement MS11–4 Bands 5–6
Question 15 **C** The mode gives the most frequent value in a dataset; thus, it will be most useful to the owner as it will indicate which size is sold most often.	MS–S1 Data Analysis MS11–2 Bands 3–4

SECTION II

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 16	
(a) Using Pythagoras' theorem to find the third side length of the triangle gives: $a^2 + b^2 = c^2$ $a^2 = c^2 - b^2$ $a^2 = 13^2 - 12^2$ $a^2 = 25$ $a = 5$ m  Therefore: $h = 11 + 5$ $= 16$ m	MS–M1 Applications of Measurement MS11–3 Bands 2–3 • Provides the correct solution 1
(b) area of triangle $= \frac{1}{2} \times 12 \times 5$ $= 30$ m^2 area of rectangle $= 11 \times 12$ $= 132$ m^2 Therefore: total area $= 132 + 30$ $= 162$ m^2	MS–M1 Applications of Measurement MS11–3 Bands 2–3 • Provides the correct solution . . . . . 2 • Calculates the area of the triangle OR rectangle. 1
Question 17	
The mean of class A is less than the mean of class B. The standard deviation of class A is less than the standard deviation of class B.	MS–S1 Data Analysis MS11–7 Bands 3–4 • Compares the means AND standard deviations. . . . . 2 • Compares the means OR standard deviations 1

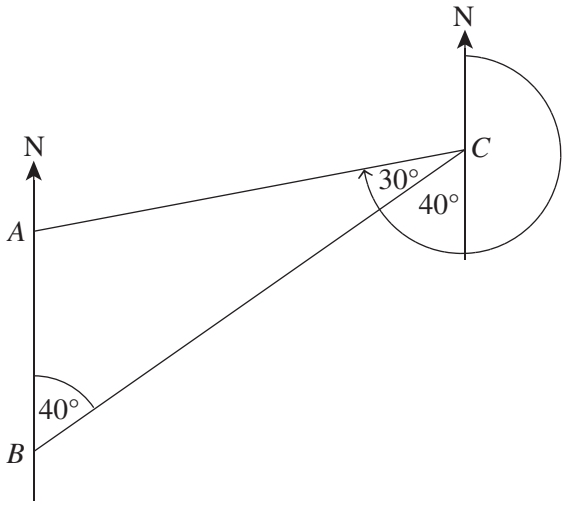
Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 18	
Finding the distance that each car travelled gives: $\text{speed} = \dfrac{\text{distance}}{\text{time}}$ $\text{distance} = \text{speed} \times \text{time}$ $= 90 \times 5$ $= 450 \text{ km}$ Finding the time it took car B to complete the journey gives: $\text{time} = \dfrac{\text{distance}}{\text{speed}}$ $= \dfrac{450}{80}$ $= 5.625 \text{ hours}$ $= 5 \text{ hours } 38 \text{ minutes}$	MS–M7 Rates and Ratios MS2–12–3 Bands 2–3 • Provides the correct solution . . . . . 2 • Calculates the distance travelled during the journey 1
Question 19	
Given that $S = 180$, $D = 220$ and $n = 4$: $S = V_0 - Dn$ $180 = V_0 - 220 \times 4$ $V_0 = 180 + 880$ $= \$1060$	MS–F1 Money Matters MS11–5 Bands 2–3 • Provides the correct solution . . . . . 2 • Finds the total amount of depreciation 1
Question 20	
$\text{longitude difference} = 75 + 150$ $= 225°$ Given that 15° = 1 hour: $\text{time difference} = \dfrac{225}{15}$ $= 15 \text{ hours}$ Therefore, New York is 15 hours behind Sydney, so the event was broadcast at 11:00 pm on Tuesday.	MS–M2 Working with Time MS11–3 Bands 2–4 • Provides the correct solution . . . . . 3 • Calculates the longitude difference AND time difference . . . . . 2 • Calculates the longitude difference 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 21	
(a) *First toss* *Second toss* *Third toss*  *Note: Accept diagrams that show the probabilities as decimals.*	MS–S2 Relative Frequency and Probability MS11–2 Bands 3–5 • Draws a tree diagram that shows all the possible outcomes AND probabilities . . . . . 2 • Draws a tree diagram that shows all the possible outcomes with no probabilities OR some correct probabilities 1
(b) $P(\text{exactly one tail})$ $= P(\text{THH or HTH or HHT})$ $= \frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}+\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}+\frac{1}{2}\times\frac{1}{2}\times\frac{1}{2}$ $= \frac{1}{8}+\frac{1}{8}+\frac{1}{8}$ $= \frac{3}{8}$ **OR** Reading from the tree diagram: $P(\text{exactly one tail}) = P(\text{THH, HTH or HHT})$ from (HHH, HHT, HTH, HTT, THH, THT, TTH, TTT) $= \frac{3}{8}$	MS–S2 Relative Frequency and Probability MS11–8 Bands 3–5 • Provides the correct solution . . . . . 2 • Calculates at least ONE of the three probabilities 1

	Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
(c)	$P(\text{all heads}) = P(\text{HHH})$ $= \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$ $= \frac{1}{8}$ **OR** Reading from the tree diagram: $P(\text{all heads}) = (\text{HHH})$ from (HHH, HHT, HTH, HTT, THH, THT, TTH, TTT) $= \frac{1}{8}$	MS–S2 Relative Frequency and Probability MS11–8 Bands 3–5 • Provides the correct solution 1
Question 22		
(a)	taxable income $= 108\,000 - 342 - 674$ $= \$106\,984$ Medicare levy $= 0.02 \times 106\,984$ $= \$2140$	MS–F1 Money Matters MS11–10 Bands 4–5 • Calculates the taxable income AND Medicare levy. . . . . 2 • Calculates the taxable income 1
(b)	income tax payable $= 5902 +$ $0.325 \times (106\,984 - 45\,000)$ $= 5902 + 0.325 \times 61\,984$ $= 5902 + 20\,144.80$ $= \$26\,046.80$ tax payable = income tax payable + Medicare levy $= 26\,046.80 + 2140$ $= \$28\,187$ *Note: Consequential on answer to **Question 22(a)**.*	MS–F1 Money Matters MS11–10 Bands 4–5 • Calculates the tax payable . . . . . 2 • Calculates the income tax payable. 1
(c)	Cameron will owe money to the Australian Taxation Office because his tax payable of \$28 187 is greater than his PAYG tax of \$26 200.	MS–F1 Money Matters MS11–5 Bands 3–4 • Provides the correct solution 1

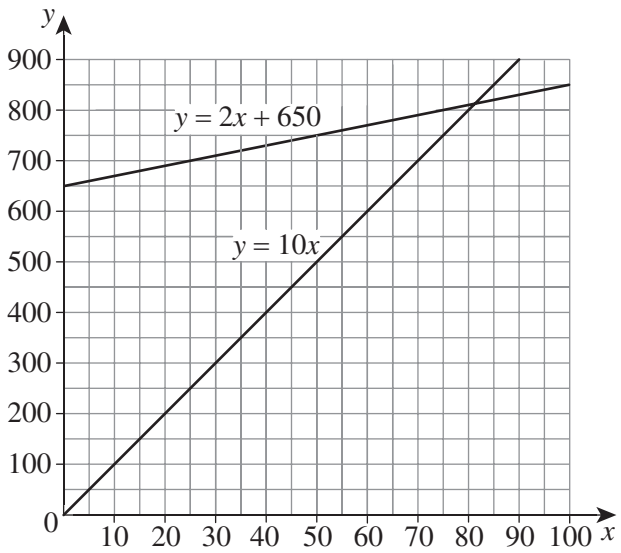
Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 23	
(a) City *D* is most frequently used. It is the vertex with the highest degree (5), so it has the largest number of direct connections to other cities.	MS–N2 Network Concepts MS2–12–8 Bands 2–3 • States the correct city. AND • Justifies the answer by identifying that city *D* has the highest degree . . . . . 2 • States the correct city. 1
(b)  $\text{total travel time} = 2 + 9 + 1$ $= 12 \text{ hours}$ *Note: Students do not need to include flight times in their paths to obtain full marks.*	MS–N2 Network Concepts MS2–12–8 Bands 2–3 • Draws the path AND determines the total travel time . . . . . 2 • Draws the path OR determines the total travel time 1
Question 24	
(a) The third second is the interval between $t = 2$ and $t = 3$ seconds. Substituting $t = 2$ into the equation gives: $h = 20 \times 2 - 2^2$ $= 40 - 4$ $= 36 \text{ m}$ Substituting $t = 3$ into the equation gives: $h = 20 \times 3 - 3^2$ $= 60 - 9$ $= 51 \text{ m}$ Therefore, the ball travels a vertical distance of 51 – 36 = 15 m in the third second.	MS–A4 Types of Relationships MS2–12–1 Bands 4–5 • Provides the correct solution . . . . . 2 • Calculates the vertical distance at $t = 3$ 1
(b) $\text{average speed} = \dfrac{\text{distance travelled from } t = 2 \text{ to } t = 3}{\text{time between } t = 2 \text{ and } t = 3}$ $= \dfrac{15}{1}$ $= 15 \text{ m/s}$ *Note: Consequential on answer to* ***Question 24(a)****.*	MS–A4 Types of Relationships MS2–12–1 Bands 4–5 • Provides the correct solution . . . . . 2 • Provides some relevant working . . . 1

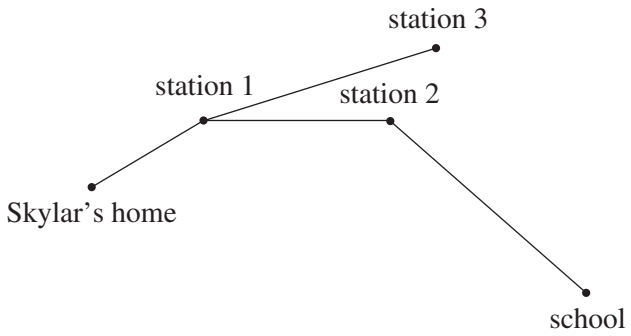
Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 25	
The absolute error of a measurement is half of the amount it is rounded by. Therefore, the absolute error of the loaf of bread is 5 g. Finding the percentage error gives: $\text{percentage error} = \dfrac{\text{absolute error}}{\text{measurement}} \times 100$ $= \dfrac{5}{700} \times 100$ $= 0.714\%$	MS–M1 Applications of Measurement MS11–3 Bands 2–3 • Provides the correct solution . . . . . 2 • Provides some relevant working . . . 1
Question 26	
(a) Finding the total value of Charlotte's investment after six years gives: $FV = PV(1+r)^n$ $= 7000 \times (1+0.045)^6$ $= \$9115.82$ Thus, the compound interest earned is: $9115.82 - 7000 = \$2115.82$	MS–F4 Investments and Loans MS2–12–5 Bands 3–4 • Provides the correct solution . . . . . 2 • Finds the total value of the investment 1
(b) Substituting the compound interest found in part (a) into the simple interest formula gives: $I = Prn$ $2115.82 = 7000 \times r \times 6$ $r = \dfrac{2115.82}{42\,000}$ $= 0.050376$ $= 5.04\%$ *Note: Consequential on answer to* ***Question 26(a)***.	MS–F4 Investments and Loans MS2–12–5 Bands 4–5 • Provides the correct solution . . . . . 2 • Uses the simple interest formula with ONE error 1

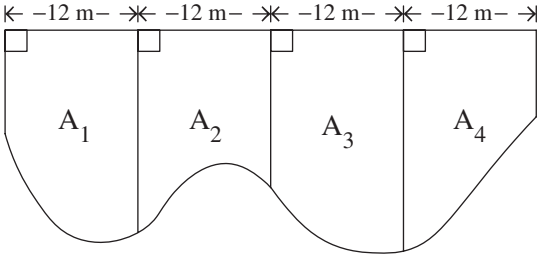
Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 27	
(a) Using interior angles gives:  Therefore, the bearing of point A from point C is: $180 + 70 = 250°$	MS–M6 Non-right-angled Trigonometry MS2–12–4 Bands 3–4 • Provides the correct solution . . . . . 2 • Uses interior angles to find the angle of 70° 1
(b) Using the sine rule gives: $\frac{12}{\sin(40)} = \frac{AB}{\sin(30)}$ $AB = \frac{12\sin(30)}{\sin(40)}$ $= \frac{12 \times \frac{1}{2}}{\sin(40)}$ $= \frac{6}{\sin(40)}$ $= 9.3343$ km ≈ 9 km	MS–M6 Non-right-angled Trigonometry MS2–12–4 Bands 4–5 • Provides the correct solution . . . . . 2 • Uses the sine rule with ONE error. . 1
Question 28	
(a) Using a calculator to find Pearson's correlation coefficient gives: $r = 0.8047$	MS–S4 Bivariate Data Analysis MS2–12–7 Bands 2–3 • Provides the correct solution 1
(b) It is a strong positive correlation, since $0.75 < r < 1$. *Note: Consequential on answer to* ***Question 28(a)****.*	MS–S4 Bivariate Data Analysis MS2–12–7 Bands 2–3 • Describes the correlation with reference to the Pearson's correlation coefficient 1
(c) As engine size increases, fuel economy becomes worse/fuel economy becomes poorer.	MS–S4 Bivariate Data Analysis MS2–12–7 Bands 2–3 • States the relationship between engine size and fuel economy 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 29	
$\frac{3x}{2}-\frac{x}{4}=5+x$ $4\times\frac{3x}{2}-\frac{x}{4}=4\times(5+x)$ $6x-x=20+4x$ $5x=20+4x$ $5x-4x=20$ $x=20$	MS–A1 Formulae and Equations MS11–1 Bands 3–4 • Provides the correct solution . . . . . 3 • Calculates the value of x with ONE error . . . . . 2 • Provides some relevant working . . . 1
Question 30	
$\text{dividend yield}=\frac{\text{dividend per share}}{\text{market price per share}}\times 100$ $=\frac{0.76}{8.50}\times 100$ $=\$8.94$	MS–F4 Investments and Loans MS2–12–5 Bands 3–4 • Provides the correct solution . . . . . 2 • Calculates the dividend yield with ONE error OR incorrect rounding 1
Question 31	
$12\%\text{ per annum}=\frac{12}{12}$ $=0.01$ $=1\%\text{ per month}$ Therefore, $r=0.0100$. $N=12\times 5$ $=60$ Using the table to find Natalia's monthly repayment, a, gives: $10\,000=a\times 30.9766$ $a=\frac{10\,000}{30.9766}$ $=\$322.82$	MS–F4 Investments and Loans MS2–12–5 Bands 4–5 • Provides the correct solution . . . . . 3 • Calculates the monthly repayment with ONE error . . . . . 2 • Provides some relevant working . . . 1

	Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 32		
(a)	positive correlation	MS–S4 Bivariate Data Analysis MS2–12–2 Bands 2–3 • Identifies the correct correlation . . . 1
(b)	Using two points on the line of best fit – (16, 22) and (15, 21) – to find the gradient gives: $m = \frac{y_2 - y_1}{x_2 - x_1}$ $= \frac{22 - 21}{16 - 15}$ $= \frac{1}{1}$ $= 1$ Substituting $m = 1$ into the general equation of a line gives: $y = 1 \times x + c$ $y = x + c$ Substituting the point (16, 22) into $y = x + c$ gives: $22 = 16 + c$ $c = 22 - 16$ $= 6$ Therefore, the equation of the line of best fit is $y = x + 6$.	MS–S4 Bivariate Data Analysis MS2–12–2 Bands 4–5 • Finds the gradient AND the equation of the line of best fit . . . . . 2 • Finds the gradient 1
(c)	Substituting $x = 10$ gives: $y = 10 + 6$ $= 16$ cm *Note: Consequential on answer to* ***Question 32(b)***.	MS–S4 Bivariate Data Analysis MS2–12–2 Bands 3–4 • Provides the correct solution 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 33	
(a) $y = 2x + 650$	MS–A4 Types of Relationships MS2–12–6 Bands 3–4 • Provides the correct solution . . . . . 2 • Provides the correct gradient OR y-intercept 1
(b)  *Note: Consequential on answer to **Question 33(a)**.*	MS–A4 Types of Relationships MS2–12–6 Bands 3–4 • Sketches the graphs of $y = 10x$ AND $y = 2x + 650$ . . . . . 2 • Sketches the graph of $y = 10x$ OR $y = 2x + 650$ 1
(c) Equating the two equations to find the x value of the point of intersection gives: $10x = 2x + 650$ $8x = 650$ $x = 81.25$ Therefore, the manufacturer must produce 82 pairs of shorts to generate a profit. *Note: Consequential on answer to **Question 33(a)** and **Question 33(b)**.*	MS–A4 Types of Relationships MS2–12–6 Bands 4–5 • Provides the correct solution . . . . . 2 • Provides some relevant working . . . 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 34	
energy used in 2.5 hours $= 800 \times 2.5$ $= 2000$ Wh Converting the energy used each day into kWh gives: $\frac{2000 \text{ Wh}}{1000 \text{ kWh}} = 2 \text{ kWh}$ Finding the cost of using the drill for one year gives: cost $= 2 \times 365 \times 0.2866$ $= 730 \times 0.2866$ $= \$209.22$	MS–A4 Types of Relationships MS2–12–6 Bands 4–5 • Provides the correct solution . . . . . 3 • Calculates the cost for one year with ONE error . . . . . 2 • Provides some relevant working . . . 1
Question 35	
(a) The shortest path is: • home to station 1 = 8 minutes • station 1 to station 2 = 7 minutes • station 2 to school = 14 minutes Therefore, the time it takes for Skylar to travel to school is 8 + 7 + 14 = 29 minutes.	MS–N3 Critical Path Analysis MS2–12–8 Bands 4–5 • Provides the correct solution . . . . . 2 • Finds the time of the shortest path with ONE error 1
(b) 	MS–N3 Critical Path Analysis MS2–12–8 Bands 3–4 • Draws the minimum spanning tree 1
(c) It would be faster for Skylar to wait for the train to station 2 and then walk to school from station 2 (5-minute wait + 7-minute train ride + 14-minute walk = 26 minutes).	MS–N3 Critical Path Analysis MS2–12–8 Bands 3–4 • States the faster path 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 36	
(a) Dividing the wall into the four sections gives:  $A = \frac{h}{2}(d_f + d_l)$ $A_1 = \frac{12}{2} \times (15 + 25)$ $= 6 \times 40$ $= 240 \text{ m}^2$ $A_2 = \frac{12}{2} \times (25 + 20)$ $= 6 \times 45$ $= 270 \text{ m}^2$ $A_3 = \frac{12}{2} \times (20 + 26)$ $= 6 \times 46$ $= 276 \text{ m}^2$ $A_4 = \frac{12}{2} \times (26 + 14)$ $= 6 \times 40$ $= 240 \text{ m}^2$ total area $= 240 + 270 + 276 + 240$ $= 1026 \text{ m}^2$	MS–M7 Rates and Ratios MS2–12–4 Bands 4–5 • Provides the correct solution . . . . . 3 • Calculates the area of the wall with ONE error . . . . . 2 • Provides some relevant working . . . 1
(b) $V = \text{area} \times \text{width of dam}$ $= 1026 \times 28$ $= 28\,728 \text{ m}^3$ *Note: Consequential on answer to* ***Question 36(a)***.	MS–M1 Applications of Measurement MS11–4 Bands 2–3 • Provides the correct solution . . . . . 2 • Provides some relevant working . . . 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 37	
Calculating the z-score for Kenna's first exam gives: $z = \dfrac{73-78}{4}$ $= -1.25$ Calculating the z-score for Kenna's second exam gives: $z = \dfrac{70-84}{8}$ $= -1.75$ As the first exam has a better z-score, Kenna achieved a better result in the first exam.	MS–S5 The Normal Distribution MS2–12–7 Bands 5–6 • Provides the correct solution . . . . . 3 • Finds the z-scores with ONE error . . . . . 2 • Provides some relevant working . . . 1
Question 38	
N = number of standard drinks $= 5 \times 1.1$ $= 5.5$ standard drinks H = hours spent drinking $= 4.5$ hours M = mass of the person $= 110$ kg $\text{BAC}_{\text{male}} = \dfrac{10N - 7.5H}{6.8M}$ $= \dfrac{10 \times 5.5 - 7.5 \times 4.5}{6.8 \times 110}$ $= 0.0284$	MS–A1 Formulae and Equations MS11–1 Bands 3–5 • Provides the correct solution . . . . . 2 • Calculates the BAC with ONE error 1
Question 39	
dosage in mg $= 100 \times 18$ $= 1800$ mg dosage in mL $= \dfrac{1800}{40}$ $= 45$ mL	MS–A1 Formulae and Equations MS11–1 Bands 3–5 • Provides the correct solution . . . . . 3 • Calculates the dosage with ONE error . . . . . 2 • Provides some relevant working . . . 1

	Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 40		
(a)	As the account compounds biannually for five years, the period is 10. The interest rate is $\frac{12}{2} = 6\%$ for each period of six months. Therefore, in five years Jamari will have saved $13.1808 \times 2000 = \$26\ 361.60$	MS–S5 The Normal Distribution MS2–12–7 Bands 5–6 • Provides the correct solution . . . . . 2 • Calculates the amount with ONE error 1
(b)	Finding the time it would take Cara to save \$26 361.60 gives: $26\ 361.60 = 1600 \times x$ $x = \frac{26\ 361.60}{1600}$ $= 16.476$ Referring to the table, $x = 16.476$ corresponds most closely to the future value of 16.8699, which results from an interest rate of 6% over 12 periods. Therefore, Cara will be able to contribute more to the deposit after $\frac{12}{2} = 6$ years. *Note: Consequential on answer to **Question 40(a)**.*	MS–S5 The Normal Distribution MS2–12–7 Bands 5–6 • Provides the correct solution . . . . . 2 • Calculates the number of years with ONE error 1