

Detailed Marking Instructions for each question

Question		Expected Answer(s) Give one mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
1.		Ans: No, supported by working <ul style="list-style-type: none"> •¹ Process: calculate fraction of •² Communication: state conclusion 	2	<ul style="list-style-type: none"> •¹ $3/8 \times 280 = 105$ •² $105 < 110$

Notes:

- Correct method with incorrect answer → 'correct' conclusion award 1/2
- Use of 'km' in conclusion instead of 'miles' award 2/2
- Incorrect fraction used eg: $4/9 \times 280 = 124(.444..)$ → 'enough fuel' award 1/2
- $3/9 \times 280 = 93(.333..)$ → 'not enough fuel' award 1/2
- Correct conclusion with no working shown award 1/2
- $\frac{1}{2} \times 280 = 140$ → enough fuel (working significantly eased) award 0/2

2.		Ans: 0310/3·10am <ul style="list-style-type: none"> •¹ Strategy: knows how to deal with time zone, flight time and security clearance •² Process/communication: state time 	2	<ul style="list-style-type: none"> •¹ Evidence of adding all three times in the question on to 1845 •² 0310
----	--	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---	-----------------------------------------------------------------------------------------------------------------------------------------------------------

Notes:

- If any two out of the three times are added correctly award 1/2
- An answer of 'pick up from 0310 to 0315' award 2/2

Special case:

Candidate subtracts 4 hour time difference instead of adding → pick Usain up at 1910
award 1/2

3.		Ans: <table border="1" style="border-collapse: collapse; width: 100px;"> <tr><td>A, D or F</td></tr> <tr><td>B, G, F or D</td></tr> <tr><td>C, E</td></tr> <tr><td>H, K</td></tr> <tr><td>I, J, L</td></tr> </table> <ul style="list-style-type: none"> •¹ Strategy: attempt to re-arrange existing packages and add new packages •² Communication: arrange boxes on shelves 	A, D or F	B, G, F or D	C, E	H, K	I, J, L	2	<ul style="list-style-type: none"> •¹ Rearrange old stock onto 3 shelves •² Arrange new stock onto remaining 2 shelves
A, D or F									
B, G, F or D									
C, E									
H, K									
I, J, L									

Notes:

- If new and old stock are mixed on the same shelf and all shelves hold $\leq 10m$ award 1/2
- Common incorrect answer: award 1/2

Shelf 1	A J
Shelf 2	B I
Shelf 3	C D L
Shelf 4	E H
Shelf 5	G F K

Question		Expected Answer(s) Give one mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
4.		<p>Ans: No, supported by working</p> <ul style="list-style-type: none"> •¹ Strategy: know to use upper/lower limits •² Process: calculate % within tolerance •³ Communication: state conclusion 	3	<ul style="list-style-type: none"> •¹ Evidence of 2.35 and 2.45 (may be implied in ²) •² $17/20 = 85\%$ •³ No, as $85\% < 88\%$
		<p>Alternative Strategy 1:</p> <ul style="list-style-type: none"> •¹ Strategy: know to use upper/lower limits •² Process: calculate % outwith tolerance •³ Communication: state conclusion 		<ul style="list-style-type: none"> •¹ Evidence of 2.35 and 2.45 (may be implied in ²) •² $3/20 = 15\%$ •³ No, as $15\% > 12\%$
		<p>Alternative Strategy 2:</p> <ul style="list-style-type: none"> •¹ Strategy: know to use upper/lower limits •² Process: calculate minimum number needed for batch to be accepted •³ Communication: state conclusion 		<ul style="list-style-type: none"> •¹ Evidence of 2.35 and 2.45 (may be implied in ²) •² $88\% \text{ of } 20 = 17.6$, ie need 18 •³ No, as only 17 in tolerance, so batch fails

Notes:

- Limits need not be stated explicitly if the 3 washers out of tolerance are clearly shown
- If incorrect limits are stated, follow through to possibility of 2/3
- If limits are stated as 1.9 and 2.9 (± 0.5) \rightarrow 100% within tolerance so batch accepted
award 1/3
- Numerical comparison is not needed for 3rd mark

Question		Expected Answer(s) Give one mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
5.		<p>Ans: £2(·00)/200p per litre</p> <ul style="list-style-type: none"> •¹ Strategy: know to use proportion •² Process: price per litre 	2	<ul style="list-style-type: none"> •¹ $\frac{66}{330} \times 1000$ •² 200p = £2(·00)
		<p>Alternative Strategy:</p> <ul style="list-style-type: none"> •¹ Strategy: know to use proportion •² Process: price per litre 		<ul style="list-style-type: none"> •¹ $3 \times 330\text{ml} + 10\text{ml} \rightarrow 3 \times 66\text{p} + ?, \text{ where } ? < 66\text{p}$ •² 198p + 2p = 200p = £2(·00)
Notes:				
<ul style="list-style-type: none"> • $3 \times 330\text{ml} = 1 \text{ litre} \rightarrow £1.98$ (working significantly eased) • Correct answer with no working 				award 0/2 award 2/2
6.		<p>Ans: £163·75</p> <ul style="list-style-type: none"> •¹ Process: calculate selling price of the shares •² Process: calculate 2½% of selling price •³ Process: calculate amount she receives •⁴ Process: calculate loss 	4	<ul style="list-style-type: none"> •¹ $200 \times £2.75 = £550$ •² 2½% of £550 = £13·75 •³ £550 - £13·75 = £536·25 •⁴ £700 - £536·25 = £163·75
		<p>Alternative Strategy: single share basis:</p> <ul style="list-style-type: none"> •¹ Process: calculate price per shares •² Process: calculate loss •³ Process: calculate fee •⁴ Process: calculate loss 		<ul style="list-style-type: none"> •¹ $£700 \div 200 = £3.50$ •² $200 \times £0.75 = £150$ •³ 2·5% of (£700 - £150) = £13·75 •⁴ Calculate total loss: £150 + £13·75 = £163·75
Notes:				
<ul style="list-style-type: none"> • For: £700 - (£550 + £13·75) = £136·25 • For: £700 - £550 = £150 				award 3/4 award 2/4
<p>Some common answers for Alternative Strategy:</p> <ul style="list-style-type: none"> • Candidate calculates 2·5% of £150 = £3·75 $\rightarrow £150 + £3·75 = £153·75$ award 3/4 • Candidate calculates the fee per share to be £0·06875 then rounds to £0·07 leading to a loss of £164 (premature rounding penalised) award 3/4 				

Question		Expected Answer(s) Give one mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
7.		<p>Ans: Yes, since $3\cdot5m > 320\text{cm}$</p> <ul style="list-style-type: none"> •¹ Strategy: Know to use correct form of Pythagoras' Theorem •² Process: Calculate half of third side of scarf •³ Process: Calculate perimeter •⁴ Communication: Yes with justification 	4	<ul style="list-style-type: none"> •¹ $c^2 = 100^2 - 80^2$ or $c^2 + 80^2 = 100^2$ •² $\sqrt{3600} = 60$ •³ $100 + 100 + 2 \times 60 = 320$ •⁴ Yes, since $3\cdot5m > 320\text{cm}$ Or she will have 30cm extra

Notes:

- If candidate finds $100^2 + 80^2 \rightarrow$ an answer of 456cm, so not enough ribbon, award 3/4
- Minimum working for 3rd mark: Correct answer to $100 + 100 + (2 \times \text{their 'length' of half the base})$
- For: $3 \times 100 = 300\text{cm} \rightarrow$ enough ribbon as $300\text{cm} < 3\cdot5\text{m}$ award 1/4
- For a conclusion of, eg, 'enough ribbon as $3\cdot5m > 3\cdot2\text{m}$, so she has 3m extra', disregard the subsequent incorrect calculation of extra length of ribbon

8.		<p>Ans: Rule 1: Yes as 640 is upper limit of tolerance</p> <p>Ans: Rule 2: No as $17/30 > \frac{1}{2}$</p> <ul style="list-style-type: none"> •¹ Strategy: know to check both rules •² Process: find $2 \times \text{riser} + \text{tread}$ •³ Communication: within tolerance, so passes rule 1 •⁴ Process: calculate gradient •⁵ Communication: shows that gradient $> \frac{1}{2}$, so fails rule 2 	5	<ul style="list-style-type: none"> •¹ evidence •² $2 \times 170 + 300 = 640$ •³ 625 ± 15; range $610 - 640$; 640 is within this range •⁴ $170/300$ or equivalent •⁵ $170/300 > \frac{1}{2}$, so fails rule 2
----	--	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Notes:

- For 3rd mark, limits do not need to be stated explicitly
- For 3rd mark, do not penalise error in calculation of lower limit
- G = V/H or equivalent is not sufficient to show that rule 2 has been considered

Special case: When candidate only considers one of the rules.

- A: If candidate has correctly found the gradient and correctly used equivalent fractions to compare it with $\frac{1}{2}$.
In this case if the conclusion states:
'Fails rule 2 so **both** rules not met'
'Fails rule 2.' (no mention of both rules)
- award 5/5
award 2/5
- B: If candidate only considers $2 \times \text{tread} + \text{height}$, but miscalculates so that the answer is outwith tolerance.
In this case if conclusion states:
'Fails rule 1, so **both** rules not met'
'Fails rule 1' (no mention of both rules)
- award 4/5
award 1/5

Question		Expected Answer(s) Give one mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
9.	(a)	Ans: £360 • ¹ Process: correct total	1	• ¹ Total = £360

Notes:

	(b)	Ans: £165·50 • ¹ Strategy: knows how to calculate finance package • ² Process: calculate deposit • ³ Process: find total finance package • ⁴ Communicate: state extra cost	4	• ¹ Evidence of attempt to find deposit and attempt to find total finance package • ² 10% of (40 + 120 + 180 + 10 + 105) = £45·50 • ³ £45·50 + 12 × £40 = £525·50 • ⁴ £525·50 - £360 = £165·50
--	-----	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Notes:

- If candidate finds 10% of answer to (a), instead of 10% of £455 then a maximum of 3/4 is available
Eg $12 \times £40 + 10\% \text{ of } £360 = £516$
 $£516 - £360 = £156$

10.	(a)	Ans: 237·12m ² • ¹ Strategy: find radius of semi-circle • ² Process: calculate area of semi-circle • ³ Process: calculate remaining area • ⁴ Process: calculate total area	4	• ¹ r = 4 • ² A = $\frac{1}{2} \times 3·14 \times 4^2 = 25·12$ • ³ A = $18 \times 12 - 2 \times 2 = 212$ • ⁴ A = 212 + 25·12 = 237·12
-----	-----	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Notes:

•¹ may be implied by •²

A common incorrect response:

If radius taken as 3m → A = $\frac{1}{2} \times 3·14 \times 3^2 = 14·13 \rightarrow 212 + 14·13 = 226·13\text{m}^2$ award 3/4

	(b)	Ans: £4077 • ¹ Strategy: find minimum number of packs • ² Process: calculate cost	2	• ¹ $237·12 \div 4 = 59·28$ Therefore 60 packs required • ² $60 \times £67·95 = £4077$
--	-----	---------------------------------------------------------------------------------------------------------------	---	--------------------------------------------------------------------------------------------------------------------

Notes:

- If answer to (a) is a multiple of 4, the 1st mark is not available
- If answer to (a) is 226·13m², correct follow through would be $57 \times £67·95 = £3873·15$

[END OF MARKING INSTRUCTIONS]

Detailed Marking Instructions for each question

Question		Expected Answer(s) Give one mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
1.	(a)	<p>Ans: Logo is 24·5/28(cm) base/height</p> <ul style="list-style-type: none"> •¹ Strategy: interprets ratio and attempts to find dimensions of the logo •² Process: calculate both dimensions of the logo 	2	<ul style="list-style-type: none"> •¹ Evidence eg $8 \times 7 \div 2$ •² 24·5cm by 28cm
Notes:				
<ul style="list-style-type: none"> • Where candidates have used Pythagoras' Theorem to find the height, the correct scaled dimensions are 24·5cm and 25·2cm • Correct answer without working • If the ratio is correctly applied to the dimensions of the rectangle, giving an answer of 77cm by 56cm • Ratio calculation must include multiply and divide for award of mark 2 • When candidate calculates $8 \div 7 \times 2 = 2\cdot28\dots$ and $7 \div 7 \times 2 = 2$ 				award 2/2 award 1/2 award 1/2

Question		Expected Answer(s) Give one mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
	(b)	<p>When 8cm is taken as the height of the triangle.</p> <p>Ans: No, supported by working</p> <ul style="list-style-type: none"> •¹ Strategy: attempt to express area of logo as a percentage of area of rectangle •² Process: calculate areas of rectangle and triangle •³ Process: calculation of percentage •⁴ Communication: conclusion consistent with working 	4	<ul style="list-style-type: none"> •¹ Evidence •² $22 \times 16 = 352$ $\frac{1}{2} \times 7 \times 8 = 28$ •³ $28 \div 352 \times 100 = 7.9545\dots$ •⁴ No, logo is 8% which is less than the necessary 9%
		<p>When 8cm is taken as the sloping side of triangle</p> <p>Ans: No, supported by working</p> <ul style="list-style-type: none"> •¹ Strategy: attempt to express area of logo as a percentage of area of rectangle •² Process: calculate areas of rectangle and triangle •³ Process: calculation of percentage •⁴ Communication: conclusion consistent with working 		<ul style="list-style-type: none"> •¹ Evidence •² $22 \times 16 = 352$, $\text{Height} = \sqrt{(8^2 - 3.5^2)} = 7.19\dots$ $\frac{1}{2} \times 7 \times 7.2 = 25.2$ •³ $25.2 \div 352 \times 100 = 7.159\dots$ •⁴ No, logo is 7% which is less than the necessary 9%
		<p>Alternative Strategy 1: Dimensions of poster are used instead of the flier:</p> <ul style="list-style-type: none"> •¹ Strategy: attempt to express area of logo as a percentage of area of rectangle •² Process: calculate areas of rectangle and triangle •³ Process: calculation of percentage •⁴ Communication: conclusion consistent with working 		<ul style="list-style-type: none"> •¹ Evidence •² $77 \times 56 = 4312$ $\frac{1}{2} \times 24.5 \times 28 = 343$ •³ $343 \div 4312 \times 100 = 7.9545\dots$ •⁴ No, logo is 8% which is less than the necessary 9%

Question		Expected Answer(s) Give one mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
		Alternative Strategy 2: Comparing areas on flier: <ul style="list-style-type: none"> •¹ Strategy: attempt to compare area of logo with required limits •² Process: calculate areas of rectangle and triangle •³ Process: calculation of percentage •⁴ Communication: conclusion consistent with working 		<ul style="list-style-type: none"> •¹ Evidence •² $22 \times 16 = 352$ $\frac{1}{2} \times 7 \times 8 = 28$ •³ 12% of 352 = 42.24 9% of 352 = 31.68 •⁴ No, as area is 28cm², which is less than 9% of the total area.
		Alternative Strategy 3: Comparing areas on poster: <ul style="list-style-type: none"> •¹ Strategy: attempt to compare area of logos with required limits •² Process: calculate areas of rectangle and triangle •³ Process: calculation of percentage •⁴ Communication: consistent conclusion 		<ul style="list-style-type: none"> •¹ Evidence •² $77 \times 56 = 4312$ $\frac{1}{2} \times 24.5 \times 28 = 343$ •³ 12% of 4312 = 517.44 9% of 4312 = 388.08 •⁴ No, as area is 343cm², which is less than 9% of the total area.
Notes:		<ul style="list-style-type: none"> • In alternative strategies 2 & 3, the value of 12% of the area need not be stated explicitly 		

Question		Expected Answer(s) Give one mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
2.	(a)	<p>Ans: Answer consistent with working eg add 4 (psi) or lose 5kg in weight or add more air so it reads 109psi</p> <ul style="list-style-type: none"> •¹ Communication: reading from gauge •² Communication: identify correct psi from graph •³ Communication: state conclusion 	3	<ul style="list-style-type: none"> •¹ 105 •² 109 •³ Add 4 or add more air so it reads 109(psi)
		<p>Alternative strategy:</p> <ul style="list-style-type: none"> •¹ Communication: reading from gauge •² Communication: identify weight for 105psi from graph •³ Communication: state conclusion 		<ul style="list-style-type: none"> •¹ 105 •² 68kg •³ Lose 5kg weight
<p>Notes:</p> <ul style="list-style-type: none"> • For 2nd mark, accept any reading from 106psi to 112psi • For 3rd mark, air added must be consistent with reading given in 2nd mark • Accept a clear line drawn onto the graph as indication of required pressure <p>Alternative strategy:</p> <ul style="list-style-type: none"> • For 2nd mark accept any reading from 66kg to 71kg • For 3rd mark, weight loss must be consistent with reading given in 2nd mark 				

Question		Expected Answer(s) Give one mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
(b)		<p>Ans: 2099 (mm)</p> <ul style="list-style-type: none"> •¹ Strategy/process: calculate the diameter •² Process: calculate circumference •³ Communication: round to nearest millimetre 	3	<ul style="list-style-type: none"> •¹ $23 + 622 + 23 = 668$ •² $C = \pi \times 668 = 2098.58\dots$ •³ 2099
Notes:				
<ul style="list-style-type: none"> • Accept legitimate variations for value of π • Unrounded answer need not be stated • 2099mm with no working • 2098mm with no working • 2097mm with no working 				award 3/3 award 2/3 award 2/3
Some common answers: (incorrect diameter used)				
Working must be shown				
<ul style="list-style-type: none"> • $d = 645$ (only one tyre width added) $\rightarrow C = 2026\text{mm}$ • $d = 622$ (no tyre width added) $\rightarrow C = 1954\text{mm}$ • $d = 334$ (radius of wheel plus tyre) $\rightarrow C = 1049\text{mm}$ • $d = 311$ (radius of wheel only) $\rightarrow C = 977\text{mm}$ 				award 2/3 award 2/3 award 2/3 award 1/3

Question		Expected Answer(s) Give one mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •										
3.	(a)	<p>Ans: £1100</p> <ul style="list-style-type: none"> •^{1,2} Strategy/Process: extract information and calculate cost of slates (Award 1/2 if there is 1 missing or incorrect step) •³ Communication: round to nearest £100 	3	<ul style="list-style-type: none"> •^{1,2} $(5 \times 3) \times 2 \times 2 \times 16 \times 1.15 \times 0.97 = 1070.88$ •³ 1100 										
Notes:														
		<ul style="list-style-type: none"> • Correct answer with no working • Unrounded answer need not be shown 		award 0/3										
	(b)	<p>Ans: £836</p> <ul style="list-style-type: none"> •¹ Strategy: know how to calculate total •² Process: calculate labour costs 	2	<ul style="list-style-type: none"> •¹ $(8 \times 22) + (15 \times 2 \times 22)$ •² 836 										
Notes:														
		<ul style="list-style-type: none"> • 2nd mark is only available if there is clear evidence that 'strip and clean' and 'replace slates' have been considered • $8 \times 22 = £176$ • $8 \times 22 + 1 \times 22 = 198$ (only 1 hour to replace the tiles) 		<ul style="list-style-type: none"> award 0/2 award 0/2 										
	(c)	<p>Ans: Yes, supported by working</p> <ul style="list-style-type: none"> •¹ Process: complete estimate •² Communication: yes, supported by working 	2	<ul style="list-style-type: none"> •¹ <table border="1"> <tr> <td>Slates</td> <td>1100</td> </tr> <tr> <td>Labour</td> <td>836</td> </tr> <tr> <td>Sub-total</td> <td>1936</td> </tr> <tr> <td>VAT</td> <td>387.20</td> </tr> <tr> <td>Total</td> <td>2323.20</td> </tr> </table> •² Yes, supported by working 	Slates	1100	Labour	836	Sub-total	1936	VAT	387.20	Total	2323.20
Slates	1100													
Labour	836													
Sub-total	1936													
VAT	387.20													
Total	2323.20													
Notes:														

Question		Expected Answer(s) Give one mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
4.	(a)	<p>Ans: Route correctly drawn</p> <ul style="list-style-type: none"> •¹ Process: calculate distance for legs •² Process: calculate scale distance •³ Process/communication: correct bearing measured & correct length drawn •⁴ Process/communication: 2nd bearing and length correctly drawn 	4	<ul style="list-style-type: none"> •¹ $170 \times 0.6 = 102$ $170 \times 1.2 = 204$ •² $102 \div 20$ rep by 5.1 cm $204 \div 20$ rep by 10.2 cm •³ Bearing of $050^0 (\pm 2^0)$ measured correctly and 51(± 2)mm line drawn •⁴ Bearing of $190^0 (\pm 2^0)$ measured correctly and 102(± 2) mm line drawn
		<p>Alternative award of marks</p> <ul style="list-style-type: none"> •¹ Process: calculate distance and scaled distance for first leg •² Process: calculate distance and scaled distance for second leg •³ Process/communication: both bearings drawn correctly •⁴ Process/communication: 2nd bearing and length correctly drawn 		<ul style="list-style-type: none"> •¹ $170 \times 0.6 = 102 \rightarrow 102 \div 20$ rep by 5.1 cm •² $170 \times 1.2 = 204 \rightarrow 204 \div 20$ rep by 10.2 cm •³ Both bearings of $050^0 (\pm 2^0)$ and $190^0 (\pm 2^0)$ measured correctly •⁴ Both distances of 51(± 2) mm and 102(± 2)mm drawn correctly
Notes:				
		<ul style="list-style-type: none"> • The third leg of the journey need not be actually drawn 		
	(b)	<p>Ans: 342^0, 142 miles</p> <ul style="list-style-type: none"> •¹ Process: correct bearing •² Process: correct distance in miles 	2	<ul style="list-style-type: none"> •¹ 342^0 •² 142 miles
Notes:				
		<ul style="list-style-type: none"> • It must be clear from the diagram which line represents the third leg of the journey 		

Question		Expected Answer(s) Give one mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
	(c)	<p>Ans: £172·03</p> <ul style="list-style-type: none"> •¹ Process: calculates total distance •² Process: calculates total time taken as a decimal •³ Strategy: knows how to find total cost of fuel used •⁴ Process: calculates fuel cost 	4	<ul style="list-style-type: none"> •¹ $102 + 204 + 142 = 448$ miles •² $448 \div 170 = 2.6352\ldots$ hours •³ evidence of time $\times 32 \times £2.04$ •⁴ $2.6352\ldots \times 32 \times 2.04 = 172.03$
		<p>Alternative Strategy:</p> <ul style="list-style-type: none"> •¹ Process: calculates time for final leg •² Process: calculates total time taken as a decimal •³ Strategy: knows how to find total cost of fuel used •⁴ Process: calculates fuel cost 		<ul style="list-style-type: none"> •¹ $142 \div 170 = 0.8352\ldots$ hours •² $0.6 + 1.2 + 0.8235\ldots = 2.6352\ldots$ hours •³ evidence of time $\times 32 \times £2.04$ •⁴ $2.6352\ldots \times 32 \times 2.04 = 172.03$
Notes:				<ul style="list-style-type: none"> • Where a candidate rounds their time to fewer than 2 decimal places, the final mark is not available • Special case: Where the candidate's answer to (b) leads to a decimal time that is exact to 1 decimal place, all 4 marks are still available

Question		Expected Answer(s) Give one mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
5.	(a) (i)	Ans: $Q_2 = (\text{£})17.50$ $Q_1 = (\text{£})9.50, Q_3 = (\text{£})21$ <ul style="list-style-type: none"> •¹ Communication: correct median •² Communication: upper and lower quartiles 	2	<ul style="list-style-type: none"> •¹ $Q_2 = 17.50$ •² $Q_1 = 9.50, Q_3 = 21$
	(ii)	Ans: Boxplot drawn correctly showing 5-fig summary <ul style="list-style-type: none"> •¹ Communication: correct end points •² Communication: correct box 	2	<ul style="list-style-type: none"> •¹ end points at 5 and 34 •² box showing Q_1, Q_2, Q_3
Notes: <ul style="list-style-type: none"> • The box plot must be drawn to a consistent scale 				
	(b) (i)	Ans: $\bar{x} = (\text{£})20$ <ul style="list-style-type: none"> •¹ Process: calculate mean 	1	<ul style="list-style-type: none"> •¹ $\bar{x} = 20$
	(ii)	Ans: $s = (\text{£})3.16$ <ul style="list-style-type: none"> •¹ Process: calculate $(x - \bar{x})^2$ •² Process: substitute into formula •³ Process: calculate standard deviation 	3	<ul style="list-style-type: none"> •¹ 4,16,25,1,4,0 •² $\sqrt{\frac{50}{5}}$ •³ 3.16
		Use of alternative formula: <ul style="list-style-type: none"> •¹ Process: calculate Σx and Σx^2 •² Process: substitute into formula •³ Process: calculate standard deviation 		<ul style="list-style-type: none"> •¹ 120 and 2450 •² $\sqrt{\frac{2450 - \frac{(120)^2}{6}}{5}}$ •³ 3.16
Notes <ul style="list-style-type: none"> • For correct answer without working 				
				award 0/3

Question		Expected Answer(s) Give one mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
	(c)	<p>Ans: 2 valid comments</p> <ul style="list-style-type: none"> •¹ Communication: comment regarding the mean •² Communication: comment regarding the s.d. 	2	<ul style="list-style-type: none"> •¹ On average there is more profit being made this year •² There is more variation in profit this year
Notes				
	(d)	<p>Ans: No, as 23% < 25%</p> <ul style="list-style-type: none"> •¹ Process: calculate percentage change •² Communication: state increase 	2	<ul style="list-style-type: none"> •¹ $20 - 16.25 = 3.75$ $\frac{3.75}{16.25} \times 100 = 23\%$ •² No, as 23% < 25%
		<p>Alternative Strategy: Ans: No, as £20·31 > £20</p> <ul style="list-style-type: none"> •¹ Process: calculate 25% increase in mean •² Communication: conclusion 		<ul style="list-style-type: none"> •¹ $16.25 \times 1.25 = 20.31$ •² No, as 20·31 > 20
Notes				
<ul style="list-style-type: none"> • If the candidate incorrectly finds that the mean has increased by more than 25% and makes the conclusion 'no as it is more than 25% increase' award 1/2 				

Question		Expected Answer(s) Give one mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
6.	(a)	<p>Ans: It is higher ($16.8 > 16.5$)</p> <ul style="list-style-type: none"> •¹ Strategy: selects correct row and discards highest and lowest scores •² Process: calculate mean •³ Process: calculate final score •⁴ Communication: compare 	4	<ul style="list-style-type: none"> •¹ Evidence •² $43 \div 5 = 8.6$ •³ $8.6 \times 3/5 \times 3.2 = 16.5$ •⁴ $16.8 > 16.5$
Notes:				
		<ul style="list-style-type: none"> • If candidate uses the scores in the bottom row of the table ‘correctly’ and concludes that both divers have equal final scores 		award 3/4
	(b) (i)	<p>Ans: 3.3</p> <ul style="list-style-type: none"> •¹ Strategy: know to divide by 8.6 •² Strategy: know to divide by $3/5$ •³ Communication: state level of difficulty 	3	<ul style="list-style-type: none"> •¹ $16.9 \div 8.6$ •² $\div 3/5$ •³ 3.3
		<p>Alternative Strategy: Trial and improvement:</p> <ul style="list-style-type: none"> •¹ Strategy: consider at least 2 possible values •² Process: consider at least 2 more possible values •³ Communication: state level of difficulty 		<ul style="list-style-type: none"> •¹ evidence of any 2 attempts to find difficulty •² evidence of at least 2 further attempts to find difficulty which are better than the first 2 •³ Find correct difficulty of 3.3
Notes:				
		<ul style="list-style-type: none"> • For final answer of 3.27 or 3.275 • When a trial and improvement method has been used and the candidate finds the correct answer at the first attempt eg $8.6 \times 3/5 \times 3.3 = 17.028$ leading to 3.3 with no further ‘trials’ 		award 3/3 award 3/3

Question		Expected Answer(s) Give one mark for each •	Max Mark	Illustrations of evidence for awarding a mark at each •
	(ii)	<p>Ans: $8 \cdot 3$</p> <ul style="list-style-type: none"> •¹ Strategy: know order of calculations •² Process: calculate score before difficulty factor •³ Process: find the mean score 	3	<ul style="list-style-type: none"> •¹ evidence of $\div 3 \cdot 4 \times 5/3$ •² $16 \cdot 9 \div 3 \cdot 4 = 4 \cdot 97 \dots$ •³ $4 \cdot 97 \times 5/3 = 8 \cdot 3$
		<p>Alternative Strategy: Trial and improvement:</p> <ul style="list-style-type: none"> •¹ Strategy: consider at least 2 possible values •² Process: consider at least 2 more possible values •³ Communication: state level of difficulty 		<ul style="list-style-type: none"> •¹ evidence of any 2 attempts to find mean •² evidence of at least 2 further attempts to find difficulty which are better than the first 2 •³ Find correct mean of $8 \cdot 3$
Notes:				
		<ul style="list-style-type: none"> • When a trial and improvement method has been used and the candidate finds the correct answer at the first attempt eg $8 \cdot 3 \times 3/5 \times 3 \cdot 4 = 16 \cdot 932$ leading to $8 \cdot 3$ with no further ‘trials’ award 3/3 • If candidate chooses any mean from $8 \cdot 3$ to 10 inclusive and demonstrates that this would give Cheryl a winning score eg $3 \div 5 \times 8 \cdot 5 \times 3 \cdot 4 = 17 \cdot 34$, so $8 \cdot 5$ is enough award 3/3 		
	(c)	<p>Ans: Yes as $7 > 6 \cdot 75$</p> <ul style="list-style-type: none"> •¹ Strategy: attempt to calculate the volume of a prism •² Process: set up calculation •³ Process: calculate volume •⁴ Communication: state conclusion 	4	<ul style="list-style-type: none"> •¹ evidence of cuboid + prism or Ah •² $3 \times 6 \times 0 \cdot 25 + \frac{1}{2} \times 6 \times 0 \cdot 25 \times 3$ or $(\frac{1}{2} \times 6 \times 0 \cdot 25 + 6 \times 0 \cdot 25) \times 3$ •³ $6 \cdot 75 \text{m}^3$ •⁴ Yes as $7 > 6 \cdot 75$
Notes:				
		<ul style="list-style-type: none"> • If total surface area is calculated: 2nd mark can be awarded for correct areas of any 4 faces 3rd mark can be awarded for the correct areas of the remaining 2 faces and the total ($42 \cdot 78 \text{m}^2$) 4th mark can be awarded for valid comparison of the calculated area and 7m^2 		

[END OF MARKING INSTRUCTIONS]