

1) (a)

(b)

Activity	Early	Late
A	0	[1]
B	1	1.5
C	1	4.5
D	1.5	7.5
E	7.5	9.5
F	4	7.5
G	9.5	11.5
H	7	11.5
I	11.5	16.5
J	16.5	17.5
K	16.5	17.5
L	17.5	18.5

M1	Sca	
A1	2	All correct
M1		Sca
A1		Forward pass all correct
A1f		Back pass all correct ft
	3	
<b>Total</b>	<b>5</b>	

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2)

(a)	$C = \sum_{k=1}^m \frac{A_k}{(1+i)^k}$ $150 = \frac{A}{1.25} + \frac{A}{1.25^2}$ $150 \times 1.25^2 = 1.25A + A = 2.25A$ $A = \frac{150 \times 1.25^2}{2.25} = 104.17$	M1	Allow
		M1	$150 = \frac{A_1}{1+i} + \frac{A_2}{(1+i)^2}$
		A1	
(b)	$150 = \frac{200}{(1+i)^2}$ $(1+i)^2 = \frac{200}{150}$ $1+i = 1.1547$ $i = 0.1547$	M1	
		M1	$\left(\frac{200}{150} \text{ correct}\right)$
		M1	Square root of their $\frac{200}{150}$
		A1	SC2 for 15%
<b>TOTAL</b>		<b>7</b>	

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3)

	Midpoints used correctly	M1	At least 4 correct
a	$(232 \times 1) + (236 \times 6) + (240 \times 23)$ $+ (244 \times 17) + (248 \times 3)$ or $232 + 1416 + 5520 + 4148 + 744$ or 12 060 their 12 060 + 50 241.2	M1	Attempt at $\sum fx$ with values of x on or between class limits
		M1	
		A1	

b

	Yes as the average is more than this or seems reasonable as the average of the small sample is 240 to 2sf or Yes as the middle of the modal class is 240	B1	oe
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TOTAL: 47

4)	(a)		M1		Attempt at network diagram
			A2	3	A1 for 1 independent error
	(b)		M1		Forward pass, D, E, F correct AND G or H correct from their A, B, C
			A1	2	All correct
	(c)		M1		Back pass, correct at L, N from their O
			A2	3	A1F for correct at L, N, K and H from their O

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5)	1.24 or 124% or $\frac{124}{100}$ or $\frac{100}{124}$ seen	B1	
	$6014 \div 1.24$	M1	oe $6014 \div 124 \times 100$
	4850	A1	

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6)	1 gallon = 4.5 litres stated or implied	B1	eg their $144 \div 4.5$
	$40 \times 40 \times 90$ or 144 000	M1	
	their $144\ 000 \div 1000$ or 144	M1dep	
	32	A1	

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7)	Ordered data:	110 115 230 370 370 425 445 450 455 480 550 550 575 585 590		
	(a)	Range = $590 - 110 = 480$	B1	CAO
		Two modes/more than one mode/no single mode/no unique mode	B1	OE
			2	
	(b)	A sensible attempt at ordering the data	M1	Can be implied
		Median = <u>450</u>	A1	CAO; (8 <sup>th</sup> value)
		IQR = $550 - 370 = 180$	A1	CAO; (12 <sup>th</sup> value - 4 <sup>th</sup> value)
			3	
	Notes	1 Answers of 455 and 180 with no method $\Rightarrow$ M1 A1 A1 2 An answer of 450 or/and 180 with incorrect method(s) $\Rightarrow$ M1 A1 A0 or M1 A0 A1 or M0 A0 A0 3 Unordered data $\Rightarrow$ median = 480 and IQR = $370 - 590 = \pm 220 \Rightarrow$ M0 A0 A0		
	(c)	Mean = <u>420</u>	B1	CAO $\sum x = 6300$
		Sd(n) = <u>153</u>	B1	AWRT (152.872)
	or	Sd(n-1) = <u>158</u>		AWRT $\sum x^2 = 2996550$ (158.238)
			2	
	Note	1 If, and only if, B0 B0 scored, then award M1 for seen attempt at $(6200 \text{ to } 6400) \div 15$		
		Total	7	

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8) a) Assumptions: Lift dimensions between 1m x 1m to 2m x 2m  
Space needed for a person: to 20cm x 35cm to 50cm x 70cm

Calculations: Max no of people:  $2 \times 2 = 4\text{m}^2$  (area of lift) ✓  
 $0.2 \times 0.35 = 0.07\text{m}^2$  (area per person) ✓  
 $4 \div 0.07 = 57$  people ✓  
 Min no of people:  $1 \times 1 = 1\text{m}^2$  (area of lift)  
 $0.5 \times 0.7 = 0.35\text{m}^2$  (area per person)  
 $1 \div 0.35 = 2$  to 3 people ✓  
 Answer should be between 3 and 57 ✓

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b) If answer is low should refer to possibility of squeezing more in, if answer is high should refer to whether it is comfortable or if it would be possible for lift to carry that much weight ✓

c) bigger lift/smaller space for people = more people or smaller lift/more space for people = less people ✓