

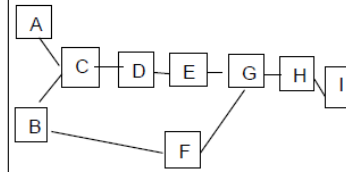
Homework 15B – Solutions

1)

(a)	$1 - (0.135 + 0.271 + 0.271 + 0.143)$	M1														
	0.18	A1														
(b)	$E(X) = 1 \times 0.135 + 2 \times 0.271 + 3 \times 0.271 + 4 \times 0.180 + 5 \times 0.143$ $(= 0.135 + 0.542 + 0.813 + 0.72 + 0.715)$ $= 2.925$	M1 A1	Evidence of at least two of the five products added OE AFWF 2.92 to 2.93													
(c)	$1 \times E(X) - 0.5 \times (5 - E(X))$ $= \text{£}1.89$	M1 A1	Candidate's $E(X)$ AWRT Condone omission of '£'													
	or profit/loss table															
	<table border="1"> <tr> <td>Profit</td> <td>-1</td> <td>0.5</td> <td>2</td> <td>3.5</td> <td>5</td> </tr> <tr> <td>$P(X=x)$</td> <td>0.135</td> <td>0.271</td> <td>0.271</td> <td>0.180</td> <td>0.143</td> </tr> </table>	Profit	-1	0.5	2	3.5	5	$P(X=x)$	0.135	0.271	0.271	0.180	0.143	(M1)		
Profit	-1	0.5	2	3.5	5											
$P(X=x)$	0.135	0.271	0.271	0.180	0.143											
	$E(\text{Profit}) = -0.135 + 0.135 + 0.542 + 0.630 + 0.715 = \text{£}1.89$	(A1)	AWRT Condone omission of '£'													
			2													

3)

(a)

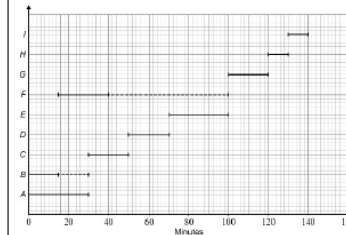


(b)

Activity	Early	Late
A	0	30
B	0	30
C	30	50
D	50	70
E	70	100
F	15	100
G	100	120
H	120	130
I	130	140

(c) B 15 (mins)
F 60 (mins)

(d)



(e) 2

(f) One worker completes all critical activities, 2nd worker completes B and F, and has (100 mins) 'float' so can start second room before first is complete

M1

A1

2

SCA, at least 8 activities shown and connected

All correct

B1

B1F

2

Forward pass all correct

Back pass all correct, allow ft from incorrect final value at I

B1

B1

2

CAO

CAO

M1

B1

A1

3

SCA, at least 8 activities shown with 'progression' clearly visible

Floats at B and F correct

All correct

B1

E1

1

1

oe

Total

11

2)

stion	Solution	Mark	Total	Comment
(a)	Annual income is $12 \times \text{£}4629$		3	Accept working for (a) or (b) in wrong part
	$= \text{£}55\,548$	B1		
	Taxable income $= \text{their } \text{£}55\,548 - 10\,600$	M1ft		
	$= \text{£}44\,948$	A1ft		Must have been $12 \times$ something
(b)	Tax at 20% is $\text{£}37,500 \times \frac{20}{100}$	M1	5	Their (a) – 31 785
	$= 7,500$	A1		
	Amount taxed at 40% is $\text{£}44\,948 - \text{£}37,500$	M1		
	$= \text{£}7,448$			
	Tax paid at 40% is $\text{£}2,979.20$	A1		
	Tax paid is $\text{£}10,479.20$	A1		Full ft from a
				Do not accept $\text{£}11\,622.2$
	Total		8	

4)

Alternative method 1

$288 \div 0.4$ or 720
or $288 \div 1.2$ or 240

M1

oe

Their $720 \div 1.2$
or their $240 \div 0.4$

M1

oe

600

A1

3

5)	$\frac{7}{11}$ on Pink for bag A or $\frac{5}{8}$ on top Pink for bag B	B1	oe fractions, decimals or percentages for all probabilities $\frac{7}{11} = 0.6\bar{3}$ or $63.6\bar{3}\%$ $\frac{5}{8} = 0.625$ or 62.5%
	All probabilities for bag A and B correct	B1	Withhold first appropriate mark if rounded values are used. Fully correct answer is
	At least one combined probability correct for their probabilities	B1ft	Bag A Bag B Probability
	All combined probabilities correct for their probabilities	B1ft	$\frac{7}{11}$ $\frac{5}{8}$ $\frac{20}{88}$ $\frac{3}{8}$ $\frac{21}{88}$ $\frac{5}{8}$ $\frac{35}{88}$ $\frac{8}{8}$ $\frac{88}{88}$
(b)	$\frac{41}{88}$	B1ft	oe fraction, decimal or percentage ft their probabilities
	Additional Guidance		

ns

7)	(a) $520 = \frac{720}{(1+i)^3}$ $(1+i)^3 = \frac{720}{520}$ $= 1.3846\dots$ $1+i = \sqrt[3]{1.3846}$ $i = 0.114576$ Interest rate is 11.5%	M1	4	If T & I no other marks unless answer is 11.5 or 11.45 Use of 1.38 with working 11.33% M1m1 A1 If 11% M1 m1 or 673.41 or 673.42 or 673.415 m1 for attempt to multiply by $[1.09]^3$ with at least 2 terms correct Accept 205.42
	(b) $\frac{R}{1.09} + \frac{R}{1.09^2} + \frac{R}{1.09^3} = 520$ $3.2781 R = 520 \times 1.09^3$ Amount is £205.43	M1 m1A1		
		A1		
	Total	8		

6)	6(a) 3, 4, 5, 6, 7, 8 or 30, 40, 50, 60, 70, 80, in stem Correct order for all countries	B1	5	In ascending or descending order
		B3		In ascending or descending order B2 for one side fully correct or both sides correct but unordered or both sides ordered with one error or omission B1 for one side correct but unordered or both sides ordered with two or three errors or omissions or both sides unordered with one error or omission Any values
	B1	Correct key for either side		
	B1ft	Gives modes (81 and 53) or medians (80 and 53) or means (76.5... and 55.9...)		
(b)	Gives ranges (16 and 36) or IQRs (10 and 14) or standard deviations (5.2... and 10.3...) Makes sensible comments about at least one pair of values	B1ft		
		B1	3	
		Total	8	

8)	(a) (percentage of) people who lost all of their passport, tickets and money	B1	oe
	(b) $100 - (10 + 13 + 9 + 14 + 23 + 11 + 8)$ 12	M1	100 - 88
		A1	
	(i) 0.1	B1	oe eg, 10%
(ii) 0.11	B1	oe eg, 11% SC1 $\frac{11}{88}$ if answer $\frac{10}{88}$ seen in (c)(i) Accept equivalents for SC1 as long as 88 seen somewhere.	
(d) 4100×0.14 574	M1	oe	
	A1		

TOTAL: 56