Critical path analysis

Answers

Further Maths topic practice

This topic online

Q	Answer	Marks
1	**a)** 1: (0, 0); 2: (5, 5); 3: (3, 4); 4: (9, 10); 5: (13, 13); 6: (17, 17) **b)** 17 days **c)** A, E, H	5
2	Network: A and B start at the source; C and D follow A; E follows B and C (B and C end at the same event); F follows D; G follows E and F and ends at the sink. No dummies are needed.	4
3	**a)** 1: (0, 0); 2: (4, 7); 3: (6, 6); 4: (9, 12); 5: (13, 13); 6: (16, 18); 7: (22, 22) **b)** BEH; 22 days **c)** A 3, C 3, D 4, F 3, G 2, I 2	6
4	**a)** Network with one dummy from the event at the end of A to the event at the end of B; C starts at the end of A, D at the end of B **b)** D depends on A and B but C depends only on A, so A cannot simply end where B ends: the dummy shows that D also needs A.	5
5	**a)** A: none; B: none; C: none; D: A; E: A, B; F: C; G: D, E, F; H: D, E **b)** G depends on D, E and F but H only on D and E, so the dummy carries D and E to the start of G without making H depend on F.	4
6	**a)** 1: (0, 0); 2: (6, 6); 3: (6, 6); 4: (13, 13); 5: (15, 15); 6: (18, 19); 7: (23, 23) **b)** A, C, D, G, I (critical paths A, D, I and A, C, G); 23 days **c)** B 2, E 1, F 1, H 1 **d)** The number of days the activity can be delayed (or extended) without making the whole production late.	7
7	**a)** 18 hours **b)** 3 **c)** The bound assumes no worker is ever idle; the order of the tasks may force some idle time, so more workers could be needed.	6
8	**a)** 1: (0, 0); 2: (4, 4); 3: (2, 4); 4: (7, 8); 5: (10, 10); 6: (13, 13); AEH **b)** B 2, C 1, D 2, F 1, G 1 **c)** Gantt chart: A from 0 to 4, E from 4 to 10, H from 10 to 13, B from 0 to 2 (float to 4), C from 4 to 7 (float to 8), D from 2 to 6 (float to 8), F from 7 to 9 (float to 10), G from 7 to 12 (float to 13)	7
9	**a)** Network with dummies from the end of A and from the end of B to a new event where D starts; C starts at the end of A, E at the end of B **b)** D needs A and B, but C needs only A and E needs only B, so D must start at its own event with a dummy from each. **c)** 16 weeks; A, C, F	8
10	**a)** 1: 0, 2: 3, 3: 5, 4: 11, 5: max(12, 11 + x), 6: 18, 7: max(max(12, 11 + x) + 4, 21) **b)** $x \geq 6$ **c)** 21 days; float of F = 4	7

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11	**a)** 1: (0, 0); 2: (7, 7); 3: (4, 5); 4: (10, 10); 5: (16, 16); 6: (14, 15); 7: (21, 21); 21 days **b)** B 1, G 1, I 2 **c)** Delayed by 3 days: 24 days **d)** Delayed by 2 days: 23 days **e)** Delayed by 1 day: 22 days	8
12	**a)** Network with two dummies: one from the end of A to the end of B (E starts there), one from the end of D to the end of E (H starts there) **b)** 1: (0, 0); 2: (4, 4); 3: (6, 8); 4: (3, 3); 5: (9, 9); 6: (10, 12); 7: (10, 10); 8: (15, 15); 9: (17, 17); critical A, C, D, F, G, I, J (paths ADGJ and CFIJ, 17 days) **c)** B 2, E 2, H 2 **d)** 3	10

Full worked solutions, written out by hand, are on the solutions sheet for this topic.

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