

Que.	Scheme		Marks	AOs
3(a)	45 – 25 = 20 or e.g. ‘25 ,, 13 + 12 + y ,, 45’		M1	2.1
	12 ,, x ,, 32		A1	1.1b
			(2)	
(b)	To be independent $P(A) \times P(M) = P(A \text{ and } M)$		M1	1.1a
	$P(M) = \frac{P(A \text{ and } M)}{P(A)} = \frac{\frac{12}{45}}{\frac{25}{45}} = \frac{12}{25} \text{ or } \frac{25}{45} \times P(M) = \frac{12}{45}$  <u>or</u> $\frac{25}{45} \times \frac{x}{45} = \frac{12}{45} \text{ or } \frac{25}{45} \times \frac{12 + y}{45} = \frac{12}{45}$		A1	2.1
	The number of students taking part in music would be $\frac{12}{25} \times 45 = 21.6$	The number of students taking part in music but not art would be $y = 9.6$	A1	1.1b
	...so it is not possible for A and M to be independent (since it must be a whole number).		A1	2.2a
			(4)	
	(6 marks)			
Notes				
(a)	<b>M1:</b> for attempting to find range for x or attempt to find the largest/smallest number of students that could study Music only May be implied by one correct end point. Also may be implied with 20 given as an end point <b>A1:</b> oe allow 12 – 32 <u>or</u> x ...12 and x ,, 32 12 < x < 32 <u>or</u> x ...12 or x ,, 32 <u>or</u> x ...12, x ,, 32 all score M1A0			
(b)	<b>M1:</b> writing the definition of independence, must use A and M Allow any rearrangement Allow all three probabilities labelled followed by a correct equation/definition $P(A) = \frac{25}{45}, P(A \text{ and } M) = \frac{12}{45}, P(M) = \frac{x}{45} \text{ or } \frac{12 + y}{45}$ <b>A1:</b> P(M) = 0.48 oe <b>or</b> correct equation for P(M), or x or y (allow any letter for y) Do not award this mark if working with numbers e.g. P(A and M) = 12 <b>A1:</b> (dependent on M1 only and does not imply first A1) 21.6 oe (also allow $\frac{21.6}{45}$ ) <b>or</b> 9.6 oe <b>A1:</b> (dependent on all previous marks being scored) correct deduction from correct working. Ignore any reference to the range of values found in part (a).			
SC:	If M0 scored, allow access to 1 <sup>st</sup> and 2 <sup>nd</sup> A1 (to score maximum M0A1A1A0)			