Exercise 1

Paper 1 style · No calculator

1 6 marks SL 4.5 · 4.6 · 4.11 ●○○ Routine

In a year group of 50 students, 28 take art (A), 20 take music (M) and 8 take both.

(a) Find the number of students who take neither subject. **[2]**

(b) Find $P(A \cup M)$. **[1]**

(c) Find $P(M \mid A)$. **[2]**

(d) Determine whether A and M are independent. **[1]**

The markscheme is on the next page: try the question first. Written and verified by a practising IB mathematics teacher, produced with AI assistance; solved twice and recomputed by software. Not affiliated with or endorsed by the International Baccalaureate Organization.
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MARKSCHEME (a)

$28 + 20 - 8 = 40$ take at least one **(M1)**

$50 - 40 = 10$ **A1**

Total 2 marks

MARKSCHEME (b)

$\frac{40}{50} = \frac{4}{5}$ **A1**

Total 1 mark

MARKSCHEME (c)

$\frac{P(M \cap A)}{P(A)} = \frac{8/50}{28/50}$ **(M1)**

$= \frac{8}{28} = \frac{2}{7}$ **A1**

Total 2 marks

MARKSCHEME (d)

$P(A)P(M) = \frac{28}{50} \times \frac{20}{50} = 0.224 \neq \frac{8}{50} = 0.16$: not independent **R1**

Total 1 mark

Note Or: $P(M \mid A) = \frac{2}{7} \neq P(M) = \frac{2}{5}$.