GCSE Mathematics – Higher Tier

Spot the Mistake: Probability

Solutions and mark scheme

Every question is worth 4 marks: (a) B1 for the correct line; (b) B1 for a clear explanation; (c) M1 for a correct method and A1 for the correct answer. Accept equivalent explanations and methods.

Q	(a)	(b) What went wrong	(c) Correct solution
1	Line 3	Probabilities sum to 1, so $3x$ is what is left: $1 - 0.55$.	$3x = 0.45,\ x = 0.15$
2	Line 2	The question asks about tails, so use P(tails) = $1 - 0.35 = 0.65$.	$0.65 \times 400 = 260$ tails
3	Line 3	Exactly one also includes B happening without A.	$0.12 + 0.6 \times 0.7 = 0.12 + 0.42 = 0.54$
4	Line 2	Without replacement there are 4 red left out of 7.	$\frac{5}{8} \times \frac{4}{7} = \frac{20}{56} = \frac{5}{14}$
5	Line 3	Adding counts "six on both" twice. Use 1− P(no sixes).	$1 - \left(\frac{5}{6}\right)^2 = 1 - \frac{25}{36} = \frac{11}{36}$
6	Line 1	The 8 students who play both are counted twice.	$22 + 15 - 8 = 29;\ 40 - 29 = 11;\ \mathrm{P} = \frac{11}{40}$
7	Line 2	We already know the student is a girl, so divide by the 30 girls.	$\frac{14}{30} = \frac{7}{15}$
8	Line 4	Divide by P(same colour), because we are told the colours match.	$\frac{20}{56} \div \frac{26}{56} = \frac{20}{26} = \frac{10}{13}$
9	Line 3	The totals are not equally likely. There are $4 \times 3 = 12$ equally likely outcomes.	(2,3), (3,2), (4,1): $\frac{3}{12} = \frac{1}{4}$
10	Line 3	B' means not in B, so $A \cap B'$ is the multiples of 3 that are not multiples of 4. $\{12\}$ is $A \cap B$.	$A \cap B' = \{3, 6, 9\},\ \mathrm{P} = \frac{3}{12} = \frac{1}{4}$