

Venn Diagrams Mark Scheme

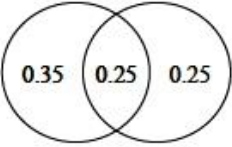
Q1.

	5ST1H_01 Scheme	Marks
<p>(a)</p> <div style="border: 1px solid black; padding: 10px; width: fit-content; margin: 10px auto;"> </div> <p>(b)(i)</p> <p>(ii) $\frac{60}{100}$ oe</p> <p>(c) $\frac{35}{100}$ oe</p> <p>$\frac{5}{20}$ oe</p>	<p>5</p> <p>15 or 35</p> <p>All correct</p>	<p>B1</p> <p>B1</p> <p>B1 (3)</p> <p>B1 (1)</p> <p>M1A1ft (2)</p> <p>M1A1 (2)</p> <p>[8]</p>
Notes		
<p>(a) B1 for 5 B1 for 15 or 35 in correct region of Venn diagram B1 fully correct including 45 (Allow 0.05, 0.15, 0.35 and 0.45)oe</p> <p>(b)(ii) M1 for '$\frac{35}{k}$' with $k > '35'$ A1ft for '$\frac{35}{100}$'</p> <p>(c) M1 for '$\frac{5}{5} + '15'$' (may be implied by correct answer)</p>		

Q2.

Question	Scheme	Marks
(a)(i)	$\frac{16}{30}$	B1
(ii)	$\frac{19}{30}$	B1
(iii)	$\frac{10+6+5}{30} = \frac{21}{30}$	M1 A1 (4)
(b)	$\frac{6}{30} \times \frac{5}{29} = \frac{30}{870} \left(= \frac{1}{29} \right)$	M1 A1 (2)
(c)	$P(\text{Temp} > 29 \mid \text{rain}) = \frac{6}{11} (= 0.54(54\dots))$ $P(\text{Temp} > 29 \mid \text{does not rain}) = \frac{10}{19} (= 0.52(63\dots))$	B1
	$\frac{6}{11} > \frac{10}{19}$ so when it rains, there is a (slightly) higher chance of the temperature being above 29°C /Greg's thought is incorrect. Or $\frac{6}{11} (= 0.5454\dots) \approx \frac{10}{19} (= 0.5263\dots)$ so rain has no/little effect on the temperature being above 29°C/Greg's thought is incorrect.	B1 (2) [8]
Notes		
(a)(i)	Allow equivalent fraction, awrt 0.53 or awrt 53%	
(a)(ii)	Allow equivalent fraction, awrt 0.63 or awrt 63%	
(a)(iii)	M1 for either $\frac{10+6+5}{30}$ or $\frac{16}{30} + \frac{11}{30} - \frac{6}{30}$ A1 allow equivalent fraction, 0.7 or 70%	
(b)	M1 for $\frac{k}{30} \times \frac{(k-1)}{29}$ with $0 < k < 30$ A1 allow equivalent fraction, awrt 0.03 or awrt 3%	
	SC: $\frac{6}{30} \times \frac{6}{30}$ scores M1A0	
(c)	1 st B1 for either conditional probability (allow rounded or truncated)	
	$P(\text{Temp} > 29 \mid \text{rain}) = \frac{6}{11} \quad \text{or} \quad P(\text{Temp} > 29 \mid \text{does not rain}) = \frac{10}{19}$	
	Watch out for $\frac{16}{30} = 0.53$ which is not a conditional probability and scores B0	
	2 nd B1 both conditional probabilities and correct conclusion	

Q3.

Question	Scheme	Marks
(a)	<u>Exhaustive /yes</u> as probabilities <u>add to 1</u> (or $0.3+0.2+0.5=1$)	B1 (1)
(b)(i)	0.5 and 0.7 = 0.35 o.e.	M1 A1
(ii)	'0.35' \neq 0.2 o.e. (so not independent)	B1ft (3)
(c)	0.6 + 0.5 - 0.25 OR  OR 0.35 + 0.25 + 0.25 = 0.85 o.e.	M1 A1 (2) [6]
Notes		
(a)	B1 <u>State Exhaustive or yes</u> AND state/show probabilities <u>add to 1</u> NB: Exhaustive/yes alone is B0.	
(b)(i)	M1 identifying (0.3+0.2) and (0.2+0.5) (Implied by correct answer)	
(b)(ii)	May state with words or symbols. (e.g. overlap is not '0.35' OR $P(X) \times P(Y) \neq 0.2$ OR $P(X \cap Y) \neq '0.35'$) Accept their (b)(i) for 0.35 but only if $0 <$ their (b)(i) < 1 (and $\neq 0.2$)	
(c)	M1 for correct method e.g. use of $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ OR Venn diagram with 0.35, 0.25, 0.25 OR 0.35 + 0.25 + 0.25	

Q4.

Question	Answer	Additional guidance	Mark
(a)	B1 eg the number of films that were produced in the UK and made more than £40 million	B1 for a correct description which includes both events	(1)
(b)	B1 $\frac{5}{20}$	B1 allow equivalent fraction, decimal or percentage	(1)
(c)	M1 $\frac{3}{20}$ or for $\frac{k}{8}$ with $0 < k < 8$ A1 $\frac{3}{8}$	M1 for use of conditional probability $P(B A) = \frac{P(A \text{ and } B)}{P(A)}$ or for use of Venn diagram A1 allow equivalent fraction, decimal or percentage	(2)
(d)	M1 $\frac{5}{20} \neq \frac{3}{8}$ A1ft so they are not independent	M1 for a comparison of their part (b) and their part (c) A1ft for correct conclusion based on their values (M1 must have been scored)	(2)

Q5.

Question number	Answer	Additional guidance	Mark
(a)(i)	B1 $(0.3+0.4=)$ 0.7	For probability answers accept equivalent fractions, decimals or percentages	(1)
(a)(ii)	B1 0.3		(1)
(a)(iii)	M1 $\frac{0.3}{0.5}$ A1 0.6		(2)
(b)	M1 0.8×0.5 A1 0.4		(2)

Q6.

Question	Answer	Additional guidance	Mark
(a)(i)	B1 $\frac{13}{40}$	B1 $\frac{13}{40}$ or equivalent or also allow 0.33 or 33%	(1)
(ii)	B1 $\frac{7}{40}$	B1 $\frac{7}{40}$ or equivalent or also allow 0.18 or 18%	(1)
(b)(i)	B1 $\frac{18}{40}$	B1 $\frac{18}{40}$ or equivalent	(1)
(ii)	B1 $\frac{9}{40}$	B1 $\frac{9}{40}$ or equivalent also allow 0.23 or 23%	(1)
(iii)	B1 ft $\frac{1}{2}$	B1 ft $\frac{1}{2}$ or ft their (ii)/their(i) provided they are both probabilities	(1)