REVISE
.wales

2.23 — Three independent events & tree diagrams

Mark schemes for the 2.23 question pack

Spec 3.5.6 — Unit 2

SOLUTIONS · 2025 SPECIFICATION

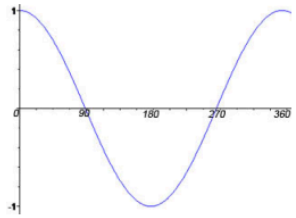
Mark schemes for the 7 questions in the corresponding revise.wales question pack (29 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes. Pack layout © revise.wales.

16.(a) $(0.8)^3$ or equivalent = 0.512 or equivalent		M1 A1	Allow $80(\%)^3$ Fractional answer: 64/125 (ISW)
16.(b) $2 \times (0.8)^2 \times 0.2$ OR equivalent = 0.256 or equivalent		M2 A1	M1 for sight of $0.8^2 \times 0.2$ or for sight of 0.128. Fractional answer: 32/125 (ISW)

13. $2\times\frac{5}{10}\times\frac{4}{9}\times\frac{3}{8}$	M2	M1 for sight of $\frac{5}{10}\times\frac{4}{9}\times\frac{3}{8}$
$=\frac{120}{720}$ or equivalent $\left(\frac{1}{6}\right)$	A1	CAO. Mark final answer. SC1 for an answer of ¼ or 0.25 from the use of calculating 'with replacement'

15.(a) $\frac{1}{6}\times\frac{1}{6}\times\frac{1}{6}$ $= \frac{1}{216}$ or equivalent. ISW	M1 A1	 Allow decimal equivalents 0.004(6…) OR 0.005 OR corresponding percentage values. Unsupported decimal answer of 0.0046(…) gains both marks.
15.(b) Sight of $\frac{1}{6}\times\frac{1}{6}\times\frac{1}{6}\times\frac{1}{6}\quad\left(=\frac{1}{1296}\right)$ Sight of $\frac{5}{6}\times\frac{1}{6}\times\frac{1}{6}\times\frac{1}{6}\times 4\quad\left(=\frac{20}{1296}\ or\ \frac{5}{324}\right)$ $\left(\frac{1}{6}\times\frac{1}{6}\times\frac{1}{6}\times\frac{1}{6}+\frac{5}{6}\times\frac{1}{6}\times\frac{1}{6}\times\frac{1}{6}\times 4=\right)$ $\frac{21}{1296}\quad\left(=\frac{7}{432}\right)$ ISW.	B1 B2 B1	 B1 for sight of $\frac{5}{6}\times\frac{1}{6}\times\frac{1}{6}\times\frac{1}{6}\quad\left(=\frac{5}{1296}\right)$ CAO. NB: sight of $\frac{1}{6}\times\frac{1}{6}\times\frac{1}{6}\times\frac{6}{6}\quad\left(=\frac{6}{1296}\right)$ gains B1B1, but $\frac{1}{6}\times\frac{1}{6}\times\frac{1}{6}\left(=\frac{1}{216}\right)$ gains B0.

		(4, 4).
14.(a) $\frac{3}{12}\times\frac{2}{11}\times\frac{1}{10}$ $=\frac{6}{1320}\left(=\frac{1}{220}\right)$ ISW	M1 A1	Accept decimal answer of 0.0045(45…)
14.(b) (1–'three vowels'–'three consonants') $=1-\frac{3}{12}\times\frac{2}{11}\times\frac{1}{10}-\frac{9}{12}\times\frac{8}{11}\times\frac{7}{10}$ $=\frac{810}{1320}\left(=\frac{27}{44}\right)$ ISW	M2 A1	M1 for $\frac{3}{12}\times\frac{2}{11}\times\frac{1}{10}+\frac{9}{12}\times\frac{8}{11}\times\frac{7}{10}$ OR $1-\frac{3}{12}\times\frac{2}{11}\times\frac{1}{10}$ OR $1-\frac{9}{12}\times\frac{8}{11}\times\frac{7}{10}$ Accept decimal answer of 0.61(36…) If no marks award SC1 for an answer of $\frac{972}{1728}\left(=\frac{36}{64}\text{ or }\frac{9}{16}\right)$ ISW from working with replacement.
Alternative method *P(Two vowels, one consonant) +* *P(One vowel, two consonants =)* $3\times\frac{3}{12}\times\frac{2}{11}\times\frac{9}{10}+3\times\frac{3}{12}\times\frac{9}{11}\times\frac{8}{10}$ *OR* $3\times\frac{9}{12}\times\frac{3}{11}\left(\times\frac{10}{10}\right)$ $=\frac{810}{1320}\left(=\frac{81}{132}\ or\ \frac{27}{44}\right)$ *ISW*	*M2* *A1*	*M1 for* $3\times\frac{3}{12}\times\frac{2}{11}\times\frac{9}{10}$ *OR* $3\times\frac{3}{12}\times\frac{9}{11}\times\frac{8}{10}$ *OR* $\frac{3}{12}\times\frac{2}{11}\times\frac{9}{10}+\frac{3}{12}\times\frac{9}{11}\times\frac{8}{10}$ *NB: sight of* $\frac{9}{12}\times\frac{3}{11}\times\frac{10}{10}$ *gains M1, but* $\frac{9}{12}\times\frac{3}{11}$ *gains M0.* *Accept decimal answer of 0.61(36…)* *If no marks, award SC1 for an answer of* $\frac{972}{1728}\left(=\frac{36}{64}\ or\ \frac{9}{16}\right)$ *ISW from working with replacement.*

16. Use of 7175 AND (1)·2345 or (1)23·45(÷100) 7175 × 1·2345 = (£)8858	B1 M1 A1	Or equivalent complete method. FT for 'their 7175' provided 7170 ≤ x < 7180 and 'their 1·2345' provided 1·234 ≤ y < 1·235 Sight of (£)8857·53(75) or (£)8857·54 implies B1M1. CAO.
17.(a) General cosine curve with appropriate orientation and position. Correct sketch with curve passing through (0°,1), (90°,0) and (270°,0) and approximately (180°,-1) and (360°,1) AND 90(°), 180(°), 270(°), 360(°) indicated on the x-axis AND -1 and 1 indicated on the y-axis.  	M1 A1	Ignore curve shown for values x< 0° or x> 360°. Accept 180° as mid-way between 0° and 360° if unlabelled. Accept 360° as unlabelled provided the sketch does not exceed 360°.
17.(b) 46(°) AND 314(°) OR 45·6(°) AND 314·4(°) OR 45·57(29…°) AND 314·4(27…°).	B2	B1 for sight of one correct angle. Allow embedded answers. If more than two answers offered award B1 for sight of one correct angle. If no marks, awarded SC1 for truncated answers 45(°) AND 315(°) OR 45·5(°) AND 314·5(°).
18. 0·7×0·2×0·1×6 = 0·084 or equivalent	M2 A1	M1 for sight of 0·7×0·2×0·1 OR 0·014 OR 7/500 or equivalent. Fractional answer: 21/250 or equivalent. (ISW)
19. Sight of $25x^2 + 15x - 15x - 9$ $25x^2 - 19x - 9 = 0$ $x = \frac{-(-19) \pm \sqrt{(-19)^2 - 4 \times 25 \times (-9)}}{2 \times 25}$ $x = \frac{19 \pm \sqrt{1261}}{50}$ x = 1·09 with x = –0· 33 (answers to 2dp)	B1 B1 M1 A1 A1	Or equivalent. '= 0' required, but may be implied by an attempt to use the quadratic formula or if $a = 25, b = -19$, $c = -9$ used in the quadratic formula. **This substitution into the formula must be seen for M1, otherwise award M0A0A0.** FT 'their derived quadratic equation' of equivalent difficulty (a, b and c must be non-zero). Allow one slip in substitution **for M1 only**, but must be correct formula. Can be implied from at least one correct value of x evaluated, provided M1 awarded. CAO for their quadratic equation.

	= 42·1(86… cm²) OR 42·2(cm²)	A1	
15.	An irrational number which correctly evaluates to between 9 and 10, for example: $\sqrt{90}, \pi^2, \sqrt{5}+7, \pi+6, \sqrt{107}-1, \sqrt[3]{823}, 3\pi$	B1	Number in the box takes precedence, otherwise the answer must be clearly identified. Allow B1 if the answer in the box is not irrational, but has clearly come from evaluating an irrational number e.g. 9·49(…), from evaluating $\sqrt{90}$.

17. $3\times\frac{1}{6}\times\frac{1}{6}\times\frac{1}{6}$ or equivalent	M2	M1 for sight of $\frac{1}{6}\times\frac{1}{6}\times\frac{1}{6}\left(=\frac{1}{216}\right)$(one correct product).
$=\frac{3}{216}\left(=\frac{1}{72}\right)$ ISW	A1	Accept decimal answer of 0·0138(8…) OR 0·0139.

End of solutions