REVISE
.wales

F2.16 — Polygons — interior & exterior angles

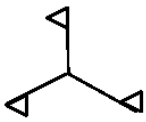
Mark schemes for the F2.16 question pack

Spec 3.4.3 — Unit 2

SOLUTIONS · 2025 SPECIFICATION

Mark schemes for the 10 questions in the corresponding revise.wales question pack (23 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes. *Pack layout © revise.wales.*

8.			*Answers/working may be seen on diagram.*
(Angle DOC or exterior angle =) $\frac{360}{5}(°)$	✓	M1	
$= 72(°)$	✓	A1	Sight of 72 (even x = 72) gains M1A1.
$(x =) \frac{180 - 72}{2}$	✓	M1	FT 'their 72' (but not 60°).
$= 54(°)$	✓	A1	
			Alternative method *(Sum of interior angles =)* *(5 – 2)×180° or equivalent* *M1* *= 540(°)* *A1* *FT 'their interior angle sum' (≠ 900)* *(x =) ½ × (540 ÷ 5)* *M1* *= 54(°)* *A1*

			allow SC1 for q = 22·3
2.(a)	Two dots placed at suitable points to ensure rotational order 2.	B1	Mark correct intention. B0 if extra dots offered.
2.(b)	Three dots placed at suitable points to ensure rotational order 3.	B1	Mark correct intention. B0 if extra dots offered.
2.(c)		B1	

				Award SC1 for an unsupported answer of 82 or 83.
11.	2, 5, 7, 7	in any order.	B3	B2 for satisfying 2 of the 3 conditions B1 for satisfying 1 of the 3 conditions Conditions to check: Mode 7, Range 5, Median 6 There must be 4 numbers written otherwise B0

12.(a)	48°	B1	
12.(b)	East	B1	
[illegible]	[illegible]	[illegible]	

10.(a) For a method that produces 2 prime factors from the set {3, 3, 5, 7} before the 2nd error.	M1	
3, 3, 5, 7	A1	C.A.O. For sight of the four correct factors (Ignore 1s)
$3^2 \times 5 \times 7$	B1	F.T. 'their primes' provided at least one index form used with at least a square. Allow $(3^2)(5)(7)$ and $3^2.5.7$ Inclusion of 1 as a factor gets B0.
10.(b) 42 = 2 × 3 × 7 or equivalent correct strategy.	M1	M1 for sight of 2, 3, 7 'together'. (Not for 2x21, 3x14 and 6x7.) (Not for just listing all factors 1,2,3,6,7,14,21.)
(HCF =) 21	A1	M1A0 for 3 × 7. FT 'their answer to 10(a)' only if of equivalent difficulty (at least two common prime factors).
11. −13	B1	
Scale on y-axis '2cm square ≡ 10 units'.	B1	
At least 7 correct plots and no incorrect plots.	P1	F.T. 'their (−2,−13)' AND 'their uniform scale' if possible. Allow ± '½ a small square'.
A smooth curve drawn through their plots.	C1	F.T. 'their 8 plots'. (Only if an uniform scale used.) OR a curve through the 7 given plots and (-2,-13). Allow intention to pass through their plots (within 1 small square, either horizontally **or** vertically of the point).
12.		*Answers/working may be seen on diagram.*
(Angle AÔB or exterior angle =) $\frac{360(°)}{8}$	M1	
$= 45(°)$	A1	Sight of 45 (even e.g. OÂB = 45) gains M1A1.
(OÂB =) $\frac{180 - 45}{2}$	M1	FT 'their 45' (but not 60°).
$= 67{\cdot}5(°)$	A1	
12. Alternative method 1		
(Sum of interior angles =) (8 – 2)×180° or equivalent	*M1*	
= 1080(°)	*A1*	*(Interior angle =) 135(°) implies M1A1*
(OÂB =) ½ × (1080 ÷ 8) or equivalent	*M1*	*FT 'their interior angle sum' (≠ 1440)*
= 67·5(°)	*A1*	
12. Alternative method 2		
(Using 16 right-angled triangles.)		
(Angle at O =) 360 / 16	*M1*	
= 22·5(°)	*A1*	
(OÂB =) 180 – 90 − 22·5	*M1*	*FT 'their 22·5'.*
= 67·5(°)	*A1*	

13.(a) (Number of sides =) $\frac{360}{36}$ $= 10$	M1 A1	
13.(b) $(180 - 36) \times 10$ or equivalent. $= 1440(°)$	M1 A1	FT 'their number of sides' if >2.
Alternative method. *(10 – 2) × 180 or equivalent.*	*M1*	*FT 'their number of sides' if >2.*

10.(a) $\frac{1}{6} \times \frac{1}{4}$ or equivalent $= \frac{1}{24}$ ISW	M1 A1	Accept 0·0416... or 0·0417 or 0·042 for M1A1 M1A0 for '1 in 24', '1:24'.
10.(b) $\frac{1}{5} + \frac{1}{10}$ or equivalent. $= \frac{3}{10}$ or equivalent. ISW	M1 A1	
11. $(AC^2 =)\ 10{\cdot}8^2 + 14{\cdot}4^2$ $AC^2 = 324$ or $(AC =)\ \sqrt{324}$ $(AC =)$ 18(cm) (Area ACD =) $\frac{24 \times 18}{2}$ $= 216\ (cm^2)$	M1 A1 A1 M1 A1	Accept equivalent of using cos rule (as cos 90 = 0). F.T. $\sqrt{}$'their 324' provided M1 gained. Final answer of AC = 324 is M1A0A0. *Alternative method to find AC* *A correct and complete method (using two trigonometric relationships)* *M2* *AC = 18(cm)* *A1* FT 'their stated AC'. (May be shown on the diagram) Accept equivalent of using ½ × 24 × 18 × sin 90 (as sin 90 = 1).
12. One correct evaluation $7{\cdot}2 \le x \le 7{\cdot}3$ 2 correct evaluations $7{\cdot}275 \le x \le 7{\cdot}295$, one < 0, one > 0. 2 correct evaluations $7{\cdot}275 \le x \le 7{\cdot}285$, one < 0, one > 0. $x = 7{\cdot}28$	 B1 B1 M1 A1	*Correct evaluation regarded as enough to identify if negative or positive. If evaluations not seen accept 'too high' or 'too low'.* *Look out for equating $x^3 - 5x = 350$* x $x^3 - 5x - 350$ 7·2 −12·75(2) 7·21 −11(·2..) 7·22 − 9(·7...) 7·23 − 8(·2...) 7·24 − 6(·6...) 7·25 −5(·1...) 7·26 − 3(·6...) 7·275 −1(·3....) 7·27 − 2(·1...) 7·284 0(·04..) **7·28** **−0·5(7..)** **7·285** **0·1(9..)** **7·29** **0·9(7..)** 7·295 1(·7....) 7·3 2·5(17)
13.(a) an expression	B1	
13.(b) an equation	B1	
14. (Mid-points) 2·5, (7·5), 12·5 and 17·5. $8 \times 2{\cdot}5 + (0 \times 7{\cdot}5) + 7 \times 12{\cdot}5 + 5 \times 17{\cdot}5$ (20 + 0 + 87·5 + 87·5 = 195) ÷ 20 = 9.75	B1 M1 m1 A1	Allow for sight of mid-points. F.T. 'their mid-points' including bounds, provided they fall within the classes (including lower and upper bounds and used consistently). C.A.O.
15. $(x =)\ \frac{360}{15}$ or $180 - \frac{(15-2) \times 180}{15}$ or equivalent = 24(°) (BR =) 8 × cos 24 or 8 × sin (90 – 24) = 7·3(0...)(cm) or 7·31(cm)	M1 A1 M2 A1	May be seen in parts. FT 'their stated value for x' (x < 90°) M1 for $\frac{BR}{8}$ = cos 24 or $\frac{BR}{8}$ = sin (90 – 24) Accept equivalent of using sin rule (as sin 90 = 1). *Alternative method to find BR* *A correct and complete method (using two trigonometric relationships and possibly Pythagoras's theorem)* *M2* *BR = 7·3(0...)(cm) or 7·31(cm)* *A1*

6(a)(i) Unambiguously indicates or states 'Yes' with a reason, e.g. 'both 25 kg to 35 kg', 'the highest frequencies at the same mass'	E1	*Ignore any additional spurious or contradictory statements provided 'Yes' selected* Allow 'Yes' with a reason, e.g. 'both at 30 kg', 'both at the same mass', 'both have the same mass', 'tallest (highest frequency) is 30 kg for both polygons' Do not accept 'Yes' with a reason, e.g. 'don't know', 'both in the same place', 'the groups have the same width', 'the graph tells us this'
6(a)(ii) Unambiguously indicates or states 'Can't tell' with a reason, e.g. 'there were 30 dogs with a masses between 15 kg and 25 kg', 'no raw data is given', 'the actual mass of each dog is not given', 'the data is grouped'	E1	*Ignore any additional spurious or contradictory statements provided 'Can't tell' selected* Allow 'Can't tell' with a reason, e.g. 'doesn't show this', 'you can't tell the exact number of dogs' 'doesn't give the amount of dogs' Do not accept 'Can't tell' with a reason, e.g. 'don't know', 'it is an estimate', 'it isn't accurate', 'because they can be anywhere from 10 kg to 20 kg'
6(a)(iii) Unambiguously indicates or states 'Correct' with a reason, e.g. 'Pencwm polygon shows a greater drop for greater masses', 'fewer dogs but more large dogs in Glanafon', 'more dogs in Pencwm, but fewer large dogs', 'about the same number of large dogs, with fewer dogs in Glanafon', 'about the same number of large dogs, with more dogs in Pencwm',	E1	*Ignore any additional spurious or contradictory statements provided 'Correct' selected* **Do not** allow a reason based on calculations of proportions **alone**, e.g. Pencwm 27.5%, Glanafon 41.6% Allow 'Correct' with a reason, e.g. 'Pencwm (polygon) shows a steeper drop from 30 kg', 'line for Pencwm is steeper (drop)', 'Glanafon (polygon) has a less steep drop for larger dogs', 'the greater masses are more frequent (in Glanafon)' '2 of the 3 points for Glanafon are above Pencwm', 'Pencwm line drops below Glanafon after 40 (kg)' Do not accept 'Correct' with a reason, e.g. '36 dogs in Pencwm and 37 dogs in Glanafon' alone without considering proportion, 'the greatest is 45 kg', 'higher frequency in Glanafon', 'Pencwm is bigger but doesn't have higher proportion' 'as seen by the skew in (the) Glanafon (polygon)', 'seen by the shape (of the polygon) for Glanafon'

6(b) (Total number of dogs 20 + 30 + 45 + 25 + 7 + 4 =) 131	B1	May be implied by the sight of ((20 + 30 + 45 + 25 + 7 + 4) ÷ 6 =) 21.8(33...)
10×20 + 20×30 + 30×45 + 40×25 + 50×7 + 60×4 (= 200 + 600 + 1350 + 1000 + 350 + 240) (= 3740)	M1	Ignore any additional products seen FT 'their midpoints' provided at least 5 are within or at the bounds of the relevant groups e.g. use of • lower bounds of each group gives 3085 • upper bounds of each group gives 4395
÷ 131	m1	FT an error in summing 20, 30, 45, 25, 7 and 4
(28.5(496.... kg) so) 3.95 (kg) (less)	A2	CAO ISW further rounding or truncation Allow 4 (kg) from correct working Accept (29 (kg) and) 3.5 (kg) from correct working Award A1 for any of the following as the final answer • 28.5(496.... kg) • 29 (kg) (from correct working) OR Award A1 on FT from M1 m1 previously awarded for a correct evaluation of 'their estimate mean' e.g. use of lower bounds gives (3085/131 =) 23.54…
6(b) Alternative MS if Glanafon's last 2 points used for possible award of B1 M1 m1 only *(Sight of 20 + 30 + 45 + 25 + 10 +7 =) 137*	*B1*	May be implied by the sight of ((20 + 30 + 45 + 25 + 10 + 7) ÷ 6 =) 22.8(33...)
10×20 + 20×30 + 30×45 + 40×25 + 50×10 + 60×7 *(= 200 + 600 + 1350 + 1000 + 500 + 420)* *(= 4070)*	*M1*	*Ignore any additional products seen* *FT 'their midpoints' provided at least 5 are within or at the bounds of the relevant groups* *e.g. use of* • *lower bounds of each group gives 3385* • *upper bounds of each group gives 4755*
÷ 137	*m1*	*FT an error in summing 20, 30, 45, 25, 10 and 7*

Unit 2: Intermediate Tier	Mark	Comments
6(a)(i) 18 to 24 hours	B1	
6(a)(ii) 97	B1	
6(a)(iii) 13	B1	
6(a)(iv) States or unambiguously implies 'No' with a reason, e.g. 'no people in group 0 to 6 hours'	E1	Allow 'No' with e.g. 'the point before 6 hours is at zero' Do not allow 'Can't tell' with e.g. 'it is grouped data' Do not accept "No' with e.g. 'it is grouped data' (unless explaining why) 'there is no point at 6' '6 hours has a frequency of 0' 'it does not match a group of people' 'the first point is at 0 and the second one is at 20' 'the first plot is at 20' 'the first plot is at 9 hours' 'the first plot above 0 is at 9 hours' 'there is no information at 6 hours, it starts at 9 hours' 'the shortest time is 9 hours'
6(b) Sight of 22.5, 25.5, 29.5 and 31.5 (mm)	B1	Award B1 for sight of 4 × 0.5 in an appropriate calculation Allow 0.4999(….) for 0.5, must clearly be a recurring 9 digit
22.5 + 25.5 + 29.5 + 31.5 or 22+25+29+31 + 4 × 0.5 or equivalent	M1	If B0, FT provided unambiguously chosen: 22 < 'their 22.5' ≤ 23, 25 < 'their 25.5' ≤ 26, 29 < 'their 29.5' ≤ 30, and 31 < 'their 31.5' ≤ 32,
109 (mm)	A1	CAO. Ignore incorrect units given Ignore any working for least possible thickness also given, e.g. 21.5 + 22.5 + 28.5 + 30.5 = 105

13. (Number of sides =) $\frac{360}{180 - 171}$ = 40 (sides)	M2 A1	Award M1 for sight of one of the following: • 180 – 171 • an appropriate 9. CAO. Allow an embedded answer but penalise -1 if contradicted by number of sides $\neq$ 40.
13. Alternative method $\frac{(n-2)\times 180}{n} = 171$ or $180n - 360 = 171n$ or equivalent $9n = 360$ or equivalent $n = 40$ (sides)	*M1* *m1* *A1*	*Brackets may be implied by later correct work.* *CAO.* *Allow an embedded answer but penalise -1 if contradicted by number of sides $\neq$ 40.*