1	(a)		sphere	1	B1	
	(b)		12	1	B1	cao
	(c)		10	1	B1	cao
						Total 3 marks

2	(a)		3.0 – 3.2	1	B1	for in the range 3.0 – 3.2
	(b)		Parallelogram	1	B1	allow trapezium
	(c)		2	1	B1	cao
	(d)		Correctly labelled	1	B1	Angle *DAB* or angle *DCB* or both labelled
	(e)	$\frac{1}{2}(6+10)\times 4$		2	M1	for correct application of formula allow triangle method
			32		A1	cao
						Total 6 marks

3	(a)		cylinder	1	B1	
	(b)(i)		6	1	B1	
	(b)(ii)		8	1	B1	
	(c)	20 × 8 × 11		2	M1	
			1760		A1	
						Total 5 marks

4	(a)		pentagon	1	B1	
	(b)		85	1	B1	for 83 – 87
	(c)		parallel sides marked	1	B1	No additional sides marked
	(d)		No with reason	1	B1	No and, for example, 12 ÷ 4 = 3 but 5 ÷ 3 does not equal 3
						Total 4 marks

5	(10 – 2) × 180 oe (= 1440) **or** (6 – 2) × 180 oe (= 720)		4	M1	for a method to find the sum of the interior angles of a decagon or a hexagon
	'1440' – 148 – 2×150 – 2×168 – 2×134 – 2×125 (=138) **or** '1440' – 1302 (= 138) **or** '720' – 148÷2 – 150 – 168 – 134 – 125 (= 69) **or** '720' – 651 (= 69)			M1	Allow omission of one angle
	360 – '138' **or** 360 – 2 × '69'			M1	
		222		A1	
	Alternative method (exterior angles)				
	360 – 2×(180 – 125) – 2×(180 – 134) – 2×(180 – 168) – 2×(180 – 150) – (180 – 148) **or** 360 – 2×55 – 2×46 – 2×12 – 2×30 – 32		4	M2	If not M2 then award M1 for at least 3 or (180 – 125) , (180 – 134) , (180 – 168) , (180 – 150), (180 – 148) **or** at least 3 of 55, 46, 12, 30, 32
	180 + '42'			M1	
		222		A1	
					Total 4 marks

6	a		Kite drawn	1	B1	
	b		Octagon	1	B1	
	ci		Cuboid	1	B1	
	cii		8	1	B1	
						Total 4 marks

7	$8.5^2 + 5.6^2$ (=103.61)		3	M1	
	$\sqrt{8.5^2 + 5.6^2}$			M1	
		10.2		A1	awrt 10.2
					Total 3 marks

8	(a)		4	1	B1	or 'four'
	(b)(i)		54	1	B1	allow from 52 to 56 (inclusive) including decimals eg 52.5
	(b)(ii)		Acute	1	B1	allow incorrect spelling as long as meaning is clear
	(c)(i)		[Square based] Pyramid	1	B1	allow rectangular based pyramid or 'pyramid' allow incorrect spelling as long as meaning is clear
	(c)(ii)		8	1	B1	or 'eight'
						Total 5 marks

9	a		Trapezium	1	B1	
	b		42	1	B1	Accept 40 – 44
	c		Correct lines marked	1	B1	
	d		2	1	B1	
						Total 4 marks

10	(a)		12	1	B1	
	(b)		8	1	B1	
	(c)	Two intersecting arcs with equal radius		2	M1	For arcs that intersect within guidelines or correct equilateral triangle drawn without arcs
			Correct equilateral triangle with arcs		A1	
						Total 4 marks

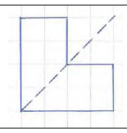
11	(a)		Pentagon	1	B1	
	(b)		acute angle clearly indicated with '*A*'	1	B1	allow either angle or both acute angles indicated
	(c)		reflex angle clearly indicated with '*R*'	1	B1	accept either the interior reflex angle, or any of the exterior reflex angles, if labelled outside of the shape with an arc
						Total 3 marks

12	(a)		1	1	B1	or one line (only) on the diagram clearly indicated
	(b)		2	1	B1	
	(c)		126	1	B1	allow ±2
						Total 3 marks

13	(a)		Parallelogram drawn	1	B1	
	(b)(i)		Pyramid	1	B1	accept square based pyramid or rectangular based pyramid
	(ii)		5	1	B1	Allow five
						Total 3 marks

14	(a)		Pentagon	1	B1

15	$7x + 3x + 8x = 360$ oe			4	M1	M2 for $7x = 140$
	$(x =)\ 360 \div 18\ (= 20)$				M1	(140 can be on diagram)
	$360 \div (180 - 7 \times$ "20") oe or $360 \div (180 -$ "140") $\frac{(n-2)\times 180}{n} = 7\times$"20" oe or $360 \div 40$					M1 for $360 \div$ exterior angle
			9		A1	
						Total 4 marks

16	(a)		**C**, **E**	1	B1	accept **E** and **C** as order does not matter
	(b)		**A**, **F**	1	B1	accept **F** and **A** as order does not matter
	(c)		Correct line	1	B1	correct line with no other lines
	(d)		12	1	B1	
	(e)		8	1	B1	
						Total 5 marks

17	(a)		Isosceles	1	B1	
	(b)		Correct lines of symmetry drawn	1	B1	with no additional lines
	(c)		5	1	B1	
						Total 3 marks

18	(a)		cylinder	1	B1 allow circular prism
	(b)		12	1	B1
					Total 2 marks

19 (i)	360 – (92 + 44) (= 224) oe **or** 92 + 44 + x + x = 360 oe		3	M1	
	'224' ÷ 2 or 2x = '224' oe			M1	
		112		A1	
(ii)		Correct reason	1	B1 dep on M1 for a correct reason Angles in a quadrilateral sum to 360° (accept Angles in a quadrilateral sum to 360°)	
				Total 4 marks	

20	360 ÷ 8 (= 45) or 360 ÷ 5 (= 72) or 180 – (360 ÷ 8) (= 135) oe or 180 – (360 ÷ 5) (= 108) oe		4	M1 finding interior or exterior angle of octagon or pentagon Angles may be seen on diagram – but must be obtuse if interior and acute if exterior.
	'72' – '45' (= 27) or '135' – '108' (= 27)			M1 (dep 1st M1) using a pair of interior or pair of exterior angles to find angle *IBC* Angle may be seen on diagram.
	$\frac{180-'27'}{2}$ (= 76.5)			M1
		76.5		A1
				Total 4 marks

21	(c)		the pair of parallel sides marked	1	B1 only 2 sides marked correctly
	(d)		pentagon	1	B1

22	(a)		Trapezium	1	B1
	(b)		F	1	B1
	(c)		4	1	B1 or "four"
	(d)		2	1	B1 or "two"
					Total 4 marks

23	$\frac{360}{10}$ (= 36) ext angle **or** $\frac{(10-2)\times 180}{10}$ (= 144)		4	M1	method to find interior or exterior angle. (angles may be seen on diagram)
	x = "144" – 90 (= 54) or $x = \frac{"540"-3\times"144"}{2}$ (=54) or $x = 90-"36"(=54)$ 54 on the diagram is insufficient – must see working			M1	method to find x (must show it is intended to be x) eg use of int angle – 90° use of ext angle + x = 90° use of pentagon *GHIJA* All figures in " " must come from correct working
	$BAD = CDA = GDE = DGF = \frac{360-2\times"144"}{2}(=36)$			M1	A correct method to find an angle of 36° within the shape (not exterior angle) or 36° shown in correct place in diagram
	There are other correct methods. Please check for correct working.	x = 54 y = 54		A1	dep on M3 to find each of x and y and the correct value of 54 for both from correct working
					Total 4 marks
ALT	ADG = "144" – 2 × "36" (= 72)			M1	
	JA is parallel to GD			M1	
	$DGA = DAG$ (y) [isosceles triangle]			M1	
	$x = DGA = y$	shown		A1	
	There are other correct methods. Please check for correct working.				**Total 4 marks**

24	(a)		Prism	1	B1	Accept pentagon(al) prism
	(b) (i)		7	1	B1	
	(ii)		10	1	B1	
	(c)	±(70 − 8 × 5) or − 30 or 70 – 5 – 5 – 5 – 5 – 5 – 5 – 5 – 5 oe		2	M1	Could be done in 2 parts
		Correct answer scores full marks (unless from obvious incorrect working)	30		A1	
						Total 5 marks

25	(a)		Octagon	1	B1	
	(b)		Acute	1	B1	
	(c)		Chord drawn	1	B1	
	(d)		360	1	B1	
						Total 4 marks

26	(a)		Pentagon	1	B1	
	(b)		7.6	1	B1	accept 7.4 – 7.8
	(c)		*T* marked at interior angle *E* **or** exterior angle *C*	1	B1	must be the interior angle at *E* or exterior angle at *C*. Allow both angles to be marked but no others. Allow *t*
						Total 3 marks

27	(a)		8	1	B1 cao
	(c)		2	1	B1 cao

28	(a)		Octagon	1	B1