Area & Perimeter – Paper 2 – Mark Scheme

Question 1

7	1.62	3	**M1** $\frac{1}{4}\ \pi\ 0.8^2$ **M1** adding (0.8×1.4) to their $k\pi$

Question 2

10	24.3(0788…)	3	**M1** $5 \times 3.5 + 2 \times 1.5$ **M1** $(\surd)\ 1.5^2 + 3.5^2$

Question 3

17	**(a)** 201	2	**M1** $\pi \times 8^2$
	(b) 87.9 or 88.0	4	**M1** $\frac{45}{360} \times 2 \times \pi \times 12$ ….. d **M1** $2 \times \pi \times 8$ ……..e **M1 ft** for their (4d + e) which must come from multiples of π **SC2** 43.9 or 44.0

Question 4

17	**(a)** 10.9	2	**M1** for $\frac{40}{360} \times \pi \times 5.6^2$
	(b) 15.1	2	**M1** for $\frac{40}{360} \times \pi \times 2 \times 5.6$ (= 3.91..)

Question 5

15	31.4 cao	3	**M1** $\frac{1}{2} \times 2 \times \pi \times 3$ oe **M1** $6 + 8 + 6 + 1 + 1 + k\pi$

Question 6

13	245 or 246	3	**M1** $\pi \times 5^2$ **M1** 18^2 – their $k\pi$

Question 7

8	1200	2	**M1** figs 8 ÷ 40 × figs 9 ÷ 15 or **M1** (figs 8 × figs 9) ÷ (40 × 15)

Question 8

18	315	3	**M1** $\frac{x}{360} \times 2 \times \pi \times 8$ oe **M1** $\frac{x}{360} \times 2 \times \pi \times 8\ (+ 16) = (16 +)\ 14\pi$

Question 9

11	**(a)** 85.8	**2**	**M1** for 23.25 and 19.65 seen
	(b) 456.8625 cao	**1**	

Question 10

16	**(a)** Answer given **(b)** $k = (\pm)\sqrt{\frac{4A}{(4-\pi)}}$ or $2\sqrt{\frac{A}{(4-\pi)}}$	**2** **3**	**M1** $(A =)k^2 - \pi\left(\frac{k}{2}\right)^2$ **E1** $A = k^2 - \frac{\pi k^2}{4}$ correctly completed to $4A = 4k^2 - \pi k^2$ **M1** factorising (must contain a π) **M1** division (by coefficient of k^2) **M1** square root

Question 11

5	**(a)** 7853 to 7855 or 7850 or 7860 www **(b)** 0.7853 to 0.7855 or 0.785 or 0.786	**2** **1ft**	**M1** for $\pi \times 50^2$ Their **(a)** ÷ 10 000 evaluated

Question 12

19	4.32	**4**	**M1** for $\frac{50}{360} \times \pi \times 9^2$ **M1** for $0.5 \times 9^2 \times \sin 50$ **M1** for subtracting their triangle from their sector (dependent on at least M1)

Question 13

7	4.46 or 4.456 to 4.459 cao	**3**	**B1** for 28 seen **M1**ft for $\frac{their 28}{2\pi}$ oe or better.

Question 14

12	112 or 112.3 to 112.33	**3**	**M2** for $\pi \times 6^2 - \pi \times 0.5^2$ or **M1** for $\pi \times 6^2$ or $\pi \times 0.5^2$ seen	

Question 15

14	114.6 or 114.57(67027..) to 114.59(1155..)	**3**	**M2** $2 \times \pi \times 4 \times x/360 = 8$ **or M1** $2 \times \pi \times 4 \times x/360$	**M2** $x/360 = 8/2\pi4$ or **B1** $8/2\pi4$ or $2\pi4/8$ seen

Question 16

17	$10r^2$ cao www	**3**	**B1** for $(\frac{\theta}{360} =) \frac{4r}{2 \times \pi \times 5r}$ **M1** for $\frac{4r}{2 \times \pi \times 5r} \times (5r)^2 \pi$

Question 17

21	52.3 or 52.27 to 52.28	**3**	**SC2** for 28.3 or 28.7 to 28.8 If 0, **M2** for $\frac{135}{360} \times \pi \times 24 + 2 \times 12$ or **M1 for** $\frac{135}{360} \times \pi \times 24$

Question 18

5	10.5 www	**2**	**M1** for $42 = \frac{1}{2} \times BC \times 8$ or better

Question 19

7	260	**3**	**M2** for [2 ×](4 × 10 + 18 × 5) oe or **M1** for a correct area statement

Question 20

18	**15.4** or 15.35 to 15.36	**4**	**M1** for $\frac{120}{360}\times\pi\times5^2$ oe **M1** for $\frac{1}{2}\times5^2\times\sin120$ oe **M1** for $\frac{120}{360}\times\pi\times5^2-\frac{1}{2}\times5^2\times\sin120$ oe

Question 21

3	15.7 or 15.70 to 15.71	**2**	**M1** for 2 × π × 2.5

Question 22

7	170	**2**	**M1** for $\frac{1}{2}\times(12+22)\times10$ oe

Question 23

19	1.38 or 1.39 or 1.384 to 1.389	**7**	**M3** [Area Δ =] $\frac{1}{2}\times8\cos60\times8\sin60$ or **M1** for [*AE* =] 8cos 60 and **M1** for [*ED*] = 8sin 60 and **M1** for Area sector $\frac{30}{360}\times\pi\times8^2$ and **M1** for Area rectangle = 8 × 8cos60 or 8 × 4 **M1** for *their* 32 – (*their* 13.86 + *their* 16.76) or better

Question 24

21		62.3 or 62.26 to 62.272	**5**	**M1** for $\frac{2}{3}\times2\pi\times6$ and **M2** for $(\frac{2}{3}+\frac{1}{3})\times2\pi\times4$ oe or **M1** for $\frac{2}{3}\times2\pi\times4$ or $\frac{1}{3}\times2\pi\times4$ and **M1** for $2\times(2+4)+k\pi, k\neq0$

Question 25

15	**(a)**	4.77 or 4.774 to 4.775	**2**	**M1** for 30 ÷ [2]π
	(b)	35.7 or 35.8 or 35.74 to 35.82	**2**	**M1** for 0.5 × π × (*their* **(a)**)^2 or 0.5 × π × (30 ÷ 2π)^2

Question 26

11	31.4 or 31.36 to 31.37	**3**	**M2** for $\left[\frac{2}{2}\times\right]6.1\times\pi+2\times6.1$ oe or **B2** for 19.16 to 19.17 or 19.2 or **M1** for $6.1\times\pi$ or for $12.2\times\pi$

Question 27

16	36.8 or 36.80 to 36.81	**3**	**M1** for $\frac{26}{360}\times 2\times\pi\times 15$ **M1** for 2×15 + a term involving π

Question 28

25	2.9[0] or 2.898 to 2.901	**5**	**M4** for $\frac{30}{360}\times\pi\times 8^2 - 0.5\times 8\cos 30\times 8\sin 30$ or **M1** for $\frac{30}{360}\times\pi\times 8^2$ and **M2** for [area of triangle =] $0.5\times 8\cos 30\times 8\sin 30$ oe or **M1** for $\frac{OC}{8}=\cos 30$ oe or $\frac{BC}{8}=\sin 30$ oe

Question 29

11	16.58 cao	**3**	**B2** for 16.6 or 16.580 to 16.583 final answer or 16.58 not as final answer or **M1** for $\frac{38}{360}\times 2\times\pi\times 25$ and **B1** for rounding their more accurate answer correctly to 4sf

Question 30

20	27	**3**	**M2** for $\frac{6\pi}{\pi\times 2\times 9}\times\pi\times 9^2$ oe or **M1** for $\frac{6\pi}{\pi\times 2\times 9}$ oe

Question 31

23	69.3 or 69.28…	**4**	**M2** for height $=\sqrt{8^2-4^2}$ or **M1** for $4^2+h^2=8^2$ oe **and M1** for $\frac{1}{2}(8+12)\times$ *their* perp height oe

Question 32

9	10.3 oe	**2**	**M1** for $5x = 51.5$ oe

Question 33

4	58	**2**	**M1** for $\frac{(13+16)\times 4}{2}$ or $4\times 13+\frac{1}{2}\times 4\times 3$ oe

Question 34

17	1024 cao	**5**	**B4** for 1023 to 1024.0… or 1020 or **M3** for $\frac{125}{360}\times\pi\times48^2-\frac{125}{360}\times\pi\times40^2+32\times8$ or **M1** for $\frac{125}{360}\times\pi\times48^2$ or $\frac{125}{360}\times\pi\times40^2$ **and M1** for $32\times8+k\pi$ If B0 scored **B1** for *their* more accurate decimal answer rounded correctly to an integer

Question 35

14 **(a)**	30	**1**	
(b)	47.5	**2**	**M1** for 4.5 × 5 oe