Circles – Paper 2 – Mark Scheme

Question 1

17	**(a)** 52	1	
	(b) 64	1	
	(c) 71	2	**M1** angle CED = 19

Question 2

4	**(a)** 40	1	
	(b) 65	1	

Question 3

23	**(a)** (Angles in) same segment	1	Allow (angles on) the same arc
	(b) **(i)** 100	1	
	(ii) 43	1	
	(iii) 3	2	**B1** *OBC* or *OCB* = $\frac{1}{2}(180 - 86)$ (= 47)

Question 4

17	**(a)** 66°	**2**	**M1** for 90° clearly identified as *A*
	(b) 33°	**1**	
	(c) 123°	**2**	**B1** for *OBA* or *OAB* = 57°

Question 5

13	**(a)** 72	**1**	
	(b) 36	**1**	
	(c) 54	**2ft**	ft 90 – **(b)** **M1** *POQ* = 108

Question 6

20 (a)	35	**1**	
(b)	55	**1ft**	90 – **(a)** but $b > 0$
(c)	55	**1ft**	= **(b)**
(d)	125	**1ft**	180 – **(c)**

Question 7

7	**(a)** (*y* =) 80	**1**	
	(b) (*z* =) 40	**1**	
	(c) (*t* =) 10	**1ft**	Follow through 90 – their *y* or 50 – their *z*

Question 8

22	**(a)** Angles in same segment	**1**	
	(b) **(i)** 8.2(0)	**2**	**M1** for $\frac{CX}{3.84}=\frac{9.4}{4.4}$ (= 2.136) oe
	(ii) 24.7	**2**	**M1** for $\frac{\Delta}{5.41}=\left(\frac{9.4}{4.4}\right)^2$ (= 4.564) oe

Question 9

20	64.8 to 64.9	**6**	**M2** 5 tan 78 soi by 23.5 or **M1** $\tan 78 = \frac{PT}{5}$ or $\frac{5}{\tan 12}$ or $\frac{5\sin 78}{\sin 12}$ **M2** $\frac{360-2\times 78}{360}\times 2\times\pi\times 5$ soi by 17.8 **or M1** for $2\pi 5$ seen used **M1** for their arc + 2 (their *PT*)

Question 10

6	144	**2**	**M1** for *ABC* = 72 or *AOC* reflex = 216 Angles must be fully stated or marked in correct place on diagram

Question 11

10 **(a)**	95	**1**	
(b)	77	**2**	**B1** for [angle] *ACD* = 58° or [angle] *BAC* = 19° or [angle] *ANB* = 103° or [angle] *CAE* = 66°

Question 12

12	**(a)** 110	**1**	
	(b) 79	**2**	**B1** for *DAC* = 42 or *ACB* = 79 or *ACD* = 28

Question 13

14	52	**3**	**B2** for *AOB* = 104 or **B1** for *OAB* or *OBA* = 38

Question 14

13	**(a)** 24	**2**	**M1** for *MOC* = 48
	(b) 24	**2**	**M1** for *ACM* = 66 or **B1** for 48 – *their* **(a)**

Question 15

13 **(a)**	32	**2**	**B1** for *AOC* = 116
(b)	35	**2**	**B1** for *CDA* = 122

Question 16

19	**(a)**	*CBA* and *BDA* are equilateral oe	**1**	
	(b)	67[.0] or 67.02 to 67.03	**2**	**M1** for $\frac{120}{360} \times \pi \times 8^2$ oe
	(c) **(i)**	39.3 or 39.28 to 39.33	**3**	**M2FT** for *their*(**b**) $- \frac{1}{2} \times 8^2 \times \sin 120$ oe or **M1** for $\frac{1}{2} \times 8^2 \times \sin 120$ oe
	(ii)	78.6 or 78.7 or 78.56 to 78.66	**1FT**	**FT** 2 × *their*(**c**)(**i**) correctly evaluated

Question 17

16	**(a)**	108	**1**	
		Angle at **centre** is **twice** angle at **circumference** oe	**1**	
	(b) **(i)**	$-\frac{4}{3}$ oe	**1**	
	(ii)	−1	**1**	

Question 18

8	**(a)**	90	**1**	
	(b)	8.29 or 8.289… to 8.29	**2**	**M1** for $\frac{OP}{11} = \tan 37^\circ$ oe

Question 19

7	37	**2**	**M1** for 180 – 90 – 53 oe or **B1** for 53 or the right angle, either marked in correct place on diagram

Question 20

18	**(a)**	47	**1**	
	(b)	117	**2**	**M1** for 360 – (115 + 85 + 97)
	(c)	244	**2**	**B1** for 116 seen at centre or 122 seen at circumference

Question 21

11	**(a)**	112	**1**	
	(b)	56	**1**	
12		$2p^4$ final answer	**2**	**B1** for kp^4 or $2p^k$ as answer
13		$n > 3.75$	**2**	**M1** for $7 + 8 < 5n - n$ oe

Question 22

21	62 on answer line or clearly identified as $<ACB$ **and** two correct supporting reasons	**4**	**B1** for $<AOB = 124$ or for *their* $<AOB \div 2$ or other appropriate correct angle one step from $<ACB$ **B1** for any correct reason e.g. isosceles triangle **or** angles in triangle = 180 **B1** for a different correct reason leading directly to $<ACB$ e.g. angle at circumference is ½ angle at centre oe **B1** for 62

Question 23

6	42	**2**	**M1** for $Q = 90$ or $WPQ = 90 - 42$ or $WPQ = 48$

Question 24

21(a)	$[u =]$ 35	**1**	
	$[v =]$ 110	**2**	**B1** for ACB or $ADB = 35$
21(b)	75	**2**	**B1** for 150 or **M1** for $\frac{360 - 210}{2}$

Question 25

26	$[w =]$ 40	**1**	
	$[x =]$ 95	**2**	**B1** for angle $ABC = 85$ or *their* w + *their* $CBD = 85$
	$[y =]$ 45	**2**	**B1** for angle $CBD = 45$ or angle $ACD = 40$ or angle ACD = *their* w or y = *their* CBD

Question 26

22	$[w =]$ 54 $[x =]$ 126 $[y =]$ 60	**3**	**B1** for $[w =]$ 54 **B1** for $[x =]$ 126 If **B0 B0** for first two B marks then **B1** for *their* w + *their* $x = 180$ **B1** for $[y =]$ 60 or for *their* w + *their* x + *their* $y = 240$

Question 27

16	7.5 nfww	**3**	**M2** for $[OB^2 =] \left(\frac{12}{2}\right)^2 + 4.5^2$ oe or **B1** for recognition of right angle

Question 28

12	110	**3**	**B2** for $ADC = 25$ or **B1** for $AEC = 135$ or $CAE = 25$

Question 29

9	$[x =]$ 55 $[y =]$ 125	**1** **1FT**	 correct or **FT** (180 – their x)

Question 30

3	*B*	**1**	