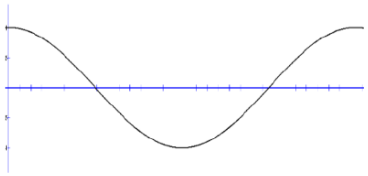
01. 0580_m24_ms_22 Q: 13

	287	**2**	**M1** for 360 – (180 – 107) oe or indicates correct angle on a diagram

02. 0580_m24_ms_22 Q: 20

	5.36 or 5.360 to 5.361	**2**	**M1** for $\frac{1}{2}\times 5.6\times 4.9\times \sin 23$ oe

03. 0580_m24_ms_22 Q: 23

(a)	 Correct sketch to go through (0, 1), close to (360, 1) and reasonably close to (180, –1)	**2**	**M1** for correct cosine curve shape through (0, 1)
(b)	72.9 and 287.1	**2**	**B1** for one correct If 0 scored, **SC1** for two angles with a sum of 360

04. 0580_s24_ms_21 Q: 17

	19.5 or 19.52…	**2**	**M1** for $\frac{1}{2}$ × 6.7 × 5.9 × sin 81 oe

05. 0580_s24_ms_21 Q: 20

	218.7, 321.3	**3**	**B2** for one correct or **M1** for $\sin x = -\frac{5}{8}$ oe If M1 or 0 scored, **SC1** for two reflex angles with a sum of 540 or two non-reflex angles with a sum of 180

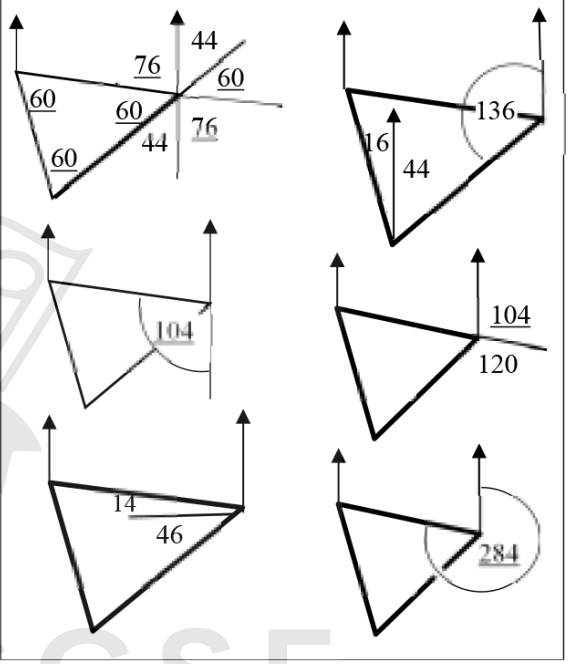
06. 0580_s24_ms_21 Q: 21

Question	Answer	Marks	Partial Marks
	33.2 or 33.18…	**4**	**M3** for $\tan = \frac{6.5}{\sqrt{4^2 + 9.1^2}}$ oe or **M2** for $4^2 + 9.1^2$ oe or $4^2 + 9.1^2 + 6.5^2$ oe or **M1** for recognising the angle *ECH*

07. 0580_s24_ms_22 Q: 12

	52.6 or 52.61 to 52.62	**2**	**M1** for $\cos[\ldots =]\frac{8.5}{14}$ oe

08. 0580_s24_ms_22 Q: 15

	224	**3**	**M2** for a fully correct method e.g. 360 – (180 – 104 + 60) oe or **B2** for 120, 136, 44, 46, 14, or 16 in the correct position or **B1** for 60, 76, 104 or 284 in the correct position or for interior angle of triangle = 60 i.e. these positions for B2 or B1: 

09. 0580_s24_ms_22 Q: 22

(a)(i)	cubic	**1**	
(a)(ii)	reciprocal	**1**	

Question	Answer	Mark	Partial Marks
(b)(i)	correct sine curve sketch through (0, 0), (180, 0) and (360, 0) 	**2**	**M1** for correct sine curve shape through the origin
(b)(ii)	203.6 and 336.4	**3**	**B2** for one correct or **M1** for $\sin x = -0.4$ oe If 0 or M1 scored, **SC1** for two reflex angles with a sum of 540 or two non-reflex angles with a sum of 180

10. 0580_s24_ms_23 Q: 9

	6.39 or 6.389...	**2**	**M1** for $\cos 37 = \frac{AB}{8}$ oe

11. 0580_s24_ms_23 Q: 22

Question	Answer	Marks	Partial Marks
	120, 300	**3**	**B2** for one correct or **M1** for $\tan x = -\sqrt{3}$ oe If 0 or M1 scored **SC1** for answers with difference of 180

12. 0580_s24_ms_23 Q: 24

	14.2 or 14.19 to 14.20	**4**	**M3** for $\tan = \frac{4}{\sqrt{15^2 + 5^2}}$ oe or **M2** for $15^2 + 5^2$ or $15^2 + 5^2 + 4^2$ or **M1** for recognition of angle VAC

13. 0580_m23_ms_22 Q: 22

Question	Answer	Marks	Partial Marks
22	24.9 or 24.93 to 24.94	**4**	**M3** for $\tan = \frac{4}{\sqrt{5^2+7^2}}$ oe or **M2** for $5^2 + 7^2$ oe or $5^2 + 7^2 + 4^2$ oe or **M1** for recognition of angle *PCA*.

14. 0580_s23_ms_21 Q: 18

Question	Answer	Marks	Partial Marks
	236[.0…]	**4**	**M2** for $\frac{27.3\times \sin 125}{62.4}$ or **M1** for $\frac{27.3}{\sin UWV} = \frac{62.4}{\sin 125}$ **M1** for $180 + (125 - 90) + \textit{their}\ 21$ oe or $180 + (90 - \textit{their}\ 34)$ oe If 0 scored **SC1** for the correct bearing marked at *W*

15. 0580_s23_ms_21 Q: 19

Question	Answer	Marks	Partial Marks
(a)	correct sketch  Correct sketch to go through (0, 1), (360, 1) and (180, –1)	**2**	**B1** for correct cosine curve shape through (0, 1)
(b)	126.9 or 126.86 to 126.87 233.1 or 233.13 to 233.14	**3**	**B2** for 1 correct angle or **M1** for $\cos x = -\frac{3}{5}$ oe If M1 or 0 scored SC1 for two angles with a sum of 360

16. 0580_s23_ms_22 Q: 17

Question	Answer	Marks	Partial Marks
	40.7 or 40.73 to 40.74	**2**	**M1** for $\frac{1}{2}\times 92.5\times 71\sin x = 2143$ oe

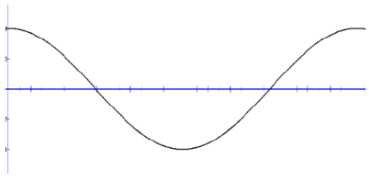
17. 0580_s23_ms_22 Q: 21

Question	Answer	Marks	Partial Marks
	216.9 or 216.86 to 216.87 323.1 or 323.13…	**3**	**B2** for one correct angle or **M1** for $\sin x = -\frac{3}{5}$ or better If M1 or 0 scored **SC1** for two reflex angles with a sum of 540 or two non-reflex angles with a sum of 180

18. 0580_w23_ms_21 Q: 18

Question	Answer	Marks	Partial Marks
	29.7 or 29.66[...]	**3**	**M2** for $[\sin y =]\ \frac{8.3\sin 105}{16.2}$ or **M1** for $\frac{16.2}{\sin 105} = \frac{8.3}{\sin y}$ oe

19. 0580_w23_ms_21 Q: 19

Question	Answer	Marks	Partial Marks
(a)	 Correct sketch to go through (0, 1), close to (360, 1) and reasonably close to (180, –1)	2	**B1** for correct cosine curve shape through (0,1)
(b)	282.1 or 282.12…	2	**B1** implied by 77.9 or 77.87 to 77.88 or 282.13 or **M1** for 360 – *their* acute angle

20. 0580_w23_ms_21 Q: 21

Question	Answer	Marks	Partial Marks
	55.9 or 55.85…	4	**M3** for $\tan[\ldots] = \frac{15.1}{\sqrt{4.5^2 + 9.2^2}}$ oe or **M2** for $[AH^2 =] 4.5^2 + 9.2^2$ or $[BH^2 =] 4.5^2 + 9.2^2 + 15.1^2$ or **M1** for recognising angle *BHA* if 0 scored **SC1** for [angle *BHD* =] 59.7[1…] or 59.72

21. 0580_w23_ms_21 Q: 22

Question	Answer	Marks	Partial Marks
	110 or 110.3…	4	**M3** for $[2\times]\ (2(\frac{1}{2} \times 13.6^2 \times \sin 41) - (\frac{41}{360} \times \pi \times 13.6^2))$ oe OR **M1** for $\left[\frac{1}{2}\times\right] 13.6^2 \times \sin 41$ oe **M1** for $[2\times] \frac{41}{360} \times \pi \times 13.6^2$ oe

22. 0580_w23_ms_22 Q: 7

Question	Answer	Marks	Partial Marks
	231	2	**B1** for any of these angles in correct place on diagram 51 or 129 or 141 between east line drawn from P and QP or 39 between west line drawn from P and QP or indicating the correct bearing of Q from P on the diagram or **M1** for $180 + (90 - 39)$ oe or $360 - (90 + 39)$ oe

23. 0580_w23_ms_23 Q: 19

Question	Answer	Marks	Partial Marks
	116.9 or 116.85…	4	**M3** for $180 - \sin^{-1}\left(\frac{18\sin 42}{13.5}\right)$ or **B3** for 63.1 or 63.14 to 63.15 or **M2** for $[\sin PRQ =] \frac{18\sin 42}{13.5}$ or **M1** for $\frac{18}{\sin PRQ} = \frac{13.5}{\sin 42}$ oe

24. 0580_w23_ms_23 Q: 21

Question	Answer	Marks	Partial Marks
(a)	11.7 or 11.74 to 11.75	3	**M2** for $\left(\frac{14}{2}\right)^2 + 5^2 + 8^2$ oe or **M1** for $\left(\frac{14}{2}\right)^2 + 5^2$, $5^2 + 8^2$ or $\left(\frac{14}{2}\right)^2 + 8^2$
(b)	42.9 to 43.14	3	**M2** for $\sin[\ldots.] = \frac{8}{\textit{their}\ \textbf{(a)}}$ oe or **M1** for recognising angle MBX where X is the midpoint of DC

25. 0580_m22_ms_22 Q: 21

Question	Answer	Marks	Partial Marks
(a)	35.1 or 35.05 to 35.06	**4**	**M3** for $\tan = \frac{14.5}{\sqrt{18.6^2 + 9^2}}$ oe or **M2** for $\left[AC^2 =\right] 18.6^2 + 9^2$ oe or better or $\left[AG^2 =\right] 18.6^2 + 9^2 + 14.5^2$ or **M1** for recognising the angle *GAC*

Question	Answer	Marks	Partial Marks
(b)	$30 - \sqrt{18.6^2 + 9^2 + 14.5^2}$ $30 - \frac{14.5}{\sin(their\ (a))}$ or $30 - \frac{\sqrt{18.6^2 + 9^2}}{\cos(their\ (a))}$	**M2**	**M1** for $AG^2 = 18.6^2 + 9^2 + 14.5^2$ oe or better or $\sin(their\ (a)) = \frac{14.5}{AG}$ or $\cos(their\ (a)) = \frac{\sqrt{18.6^2 + 9^2}}{AG}$
	4.75 to 4.78…	**A1**	

26. 0580_s22_ms_21 Q: 24

Question	Answer	Marks	Partial Marks
	28	**3**	**M2** for $24^2 + 12^2 + 8^2$ or **M1** for $24^2 + 12^2$ or $24^2 + 8^2$ or $12^2 + 8^2$

27. 0580_s22_ms_22 Q: 9

Question	Answer	Marks	Partial Marks
	239	**2**	**M1** for 180 + 59 or 360 – (180 – 59) oe or indicates correct angle on diagram

28. 0580_s22_ms_22 Q: 17

Question	Answer	Marks	Partial Marks
(a)	 Correct sketch to go through (0, 0), (180, 0) and (360, 0)	2	**B1** for correct sine curve shape through the origin

Question	Answer	Marks	Partial Marks
(b)	199.5 or 199.47… and 340.5 or 340.52 to 340.53…	3	**B2** for one correct or **M1** for $\sin x = -\frac{1}{3}$ oe If 0 scored **SC1** for two reflex angles with sum of 540 or two non-reflex angles with sum of 180

29. 0580_s22_ms_23 Q: 18

Question	Answer	Marks	Partial Marks
	252	3	**M2** for $180 \div (7 - 2)$ oe OR **M1** for $180 - x + y = 360$ oe **M1** for correct use of ratio

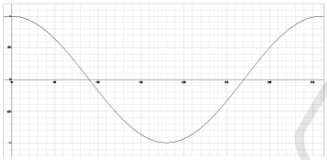
30. 0580_s22_ms_23 Q: 23

Question	Answer	Marks	Partial Marks
	221.8 or 221.81... and 318.2 or 318.18 to 318.19	3	**B2** for one correct or **M1** for $\sin x = -\frac{2}{3}$ oe If **0** scored, **SC1** for two reflex angles with a sum of 540 or two non-reflex angles with a sum of 180

31. 0580_w22_ms_21 Q: 18

Question	Answer	Marks	Partial Marks
	12.7 or 12.68 to 12.69	**4**	**M3** for $\frac{7\sin 115}{\sin(180-115-35)}$ or **B2** for 8.03… seen OR **B1** for [angle C =] 30 **M2** for $\frac{7\sin 115}{\sin(\textit{their}\ \text{angle}\ C)}$ or **M1** for $\frac{\sin 115}{BC}=\frac{\sin(\textit{their}\ \text{angle}\ C)}{7}$ oe

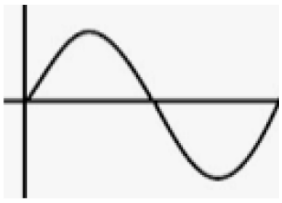
32. 0580_w22_ms_21 Q: 22

Question	Answer	Marks	Partial Marks
(a)	Correct sketch  Correct sketch to go through (0, 1), (360, 1) and (180, –1)	**2**	To go through (0, 1) and close to (360, 1) and reasonably close to (180, –1) **B1** for correct cosine curve shape through (0, 1)
(b)	120, 240	**2**	**B1** for each or for two values with sum of 360

33. 0580_w22_ms_22 Q: 10

Question	Answer	Marks	Partial Marks
(a)	3456	**1**	
(b)	0.75 or $\frac{3}{4}$ oe	**1**	
(c)	0.25 or $\frac{1}{4}$	**1**	

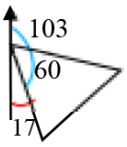
34. 0580_w22_ms_23 Q: 20

Question	Answer	Marks	Partial Marks
(a)	 Correct sketch to go through (0, 0), (180, 0) and (360, 0)	2	**B**1 for correct sine curve shape through the origin
(b)	187.2 and 352.8	3	**B2** for one correct value, if more than two answers given award **B2** if any of the correct answers found and may be in the working or **M1** for $\sin x = -\frac{1}{8}$ oe soi If **0** scored, **SC1** for two reflex angles with a sum of 540 or two non-reflex angles with a sum of 180

35. 0580_w22_ms_23 Q: 21

Question	Answer	Marks	Partial Marks
	076 or 076.4 to 076.5	5	**B3** for [angle ABC =] 144 or 144.4 to 144.5 OR **M2** for [$\sin ABC$ =] $\frac{17.6\sin 25}{12.8}$ oe or **M1** for $\frac{17.6}{\sin B} = \frac{12.8}{\sin 25}$ oe **M1** for 180 – *their* 35.5 AND **M1** for *their* angle ABC – (180 – 112) oe

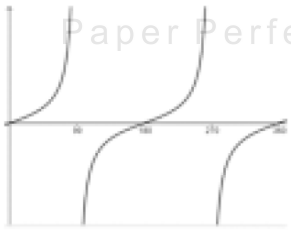
36. 0580_m21_ms_22 Q: 10

Question	Answer	Marks	Partial Marks
	343	**2**	**B1** for 103 in correct position **and** 60 or 17 in correct position 

37. 0580_m21_ms_22 Q: 23

Question	Answer	Marks	Partial Marks
	56.1 or 56.09…	**4**	**M3** for $\cos[\ldots] = \dfrac{\frac{1}{2}\sqrt{10^2+12^2}}{14}$ oe or **M2** for $[MC =] \frac{1}{2}\sqrt{10^2+12^2}$ oe or **M1** for $[AC^2 =] 10^2+12^2$ oe or **B1** for indicating required angle

38. 0580_s21_ms_21 Q: 19

Question	Answer	Marks	Partial Marks
(a)	Correct sketch 	**2**	**1** for one correct branch or correct sketch but with branches joined
(b)	11.3 or 11.30 to 11.31 and 191.3 or 191.30 to 191.31	**2**	**B1** for each If 0 scored **SC1** for two answers with a difference of 180°

39. 0580_s21_ms_22 Q: 14

Question	Answer	Marks	Partial Marks
	456 or 456.4…	4	**M2** for $\frac{18.2}{\tan 62}$ oe or **M1** for $\tan 62 = \frac{18.2}{x}$ oe **M1** for $\frac{1}{2}\left(\left(\text{their trapezium base}\right)+15.4\right)\times 18.2$ oe

40. 0580_s21_ms_22 Q: 23

Question	Answer	Marks	Partial Marks
	48.6 or 48.59… and 131.4 or 131.4…	2	**B1** for each If 0 scored **SC1** for two answers with a sum of 180°

41. 0580_s21_ms_23 Q: 21

Question	Answer	Marks	Partial Marks
	14.1 or 14.12...	3	**M2** for $\sin 65 = \frac{12.8}{BC}$ oe or better or **M1** for recognition that the line from B is perpendicular to AC

42. 0580_s21_ms_23 Q: 23

Question	Answer	Marks	Partial Marks
	70.5 or 70.52 to 70.53	**4**	**B3** for 59(.0) or 58.99… or 50.5 or 50.47 to 50.48 OR **M2** for $\frac{10^2+9^2-11^2}{2\times10\times9}$ oe or equivalent expression for smaller angle or **M1** for $11^2=10^2+9^2-2\times10\times9\cos(...)$ oe or equivalent expression for smaller angle **A1** for $\frac{1}{3}$ oe

43. 0580_w21_ms_21 Q: 6

Question	Answer	Marks	Partial Marks
(a)	32.8	**2**	**M1** for 8[cm] to 8.4[cm] seen or for *their* measurement [in cm] multiplied by 4
(b)	065	**1**	
(c)	*X* correctly placed 7 cm from *P* on a bearing of 140°	**2**	**M1** for *X* on bearing of 140 from *P* or for *X* 7 cm from *P* If 0 scored **SC1** for *X* on bearing of 140 from *Q* **and** 7 cm from *Q*

44. 0580_w21_ms_21 Q: 9

Question	Answer	Marks	Partial Marks
	54.3 or 54.31…	**2**	**M1** for cos [*x*] = $\frac{7}{12}$ oe

45. 0580_w21_ms_21 Q: 18

Question	Answer	Marks	Partial Marks
	1150	3	**M2** for $\left(\frac{1}{2}\times 800\times 2300\times \sin 30\right)\div 400$ oe or **M1** for $\frac{1}{2}\times 800\times 2300\times \sin 30$ oe

46. 0580_w21_ms_21 Q: 20

Question	Answer	Marks	Partial Marks
	109.4 to 109.5 and 250.5 to 250.6	3	**B2** for one correct angle or **M1** for $\cos x = \frac{5}{3} - 2$ or better If 0 scored **SC1** for two angles that sum to 360

47. 0580_w21_ms_21 Q: 21

Question	Answer	Marks	Partial Marks
	68.6 or 68.55 to 68.56	4	**M3** for tan[..] = $\frac{9}{\frac{1}{2}\sqrt{5^2+5^2}}$ oe or **M2** for $\frac{1}{2}\sqrt{5^2+5^2}$ oe or **M1** for $5^2 + 5^2$ oe or $2.5^2 + 2.5^2$ oe or $x^2 + x^2 = 5^2$ oe or **B1** for indicating required angle

48. 0580_w21_ms_22 Q: 22

Question	Answer	Marks	Partial Marks
	196.6 or 196.60… and 343.4 or 343.39…	**3**	**B2** for one correct angle or **M1** for $\sin x = -\frac{2}{7}$ or better If 0 scored **SC1** for two angles that sum to 540°

49. 0580_w21_ms_23 Q: 19

Question	Answer	Marks	Partial Marks
	33.8 or 33.78 to 33.80	**4**	**M2** for $2\times12.6\times\sin 40$ oe or **M1** for $\sin 40 = \frac{(...)}{12.6}$ oe **M1** for $\frac{80}{360}\times2\times\pi\times12.6$ oe

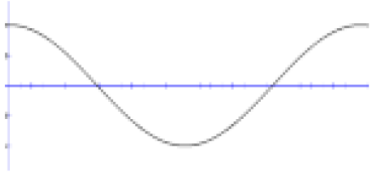
50. 0580_w21_ms_23 Q: 23

Question	Answer	Marks	Partial Marks
(a)	13.6 or 13.60…	**3**	**M2** for $12^2+5^2+4^2$ or **M1** for 5^2+4^2 or 12^2+4^2 or 12^2+5^2
(b)	17.1 or 17.08 to 17.10…	**3**	**M2** for $\sin = \frac{4}{\textit{their}\ \textbf{(a)}}$ oe or $\tan = \frac{4}{\textit{their}\ AP}$ or $\cos = \frac{\textit{their}\ AP}{\textit{their}\ \textbf{(a)}}$ or **M1** for recognising angle *CAP*.

51. 0580_w21_ms_23 Q: 24

Question	Answer	Marks	Partial Marks
	60 and 240	**2**	**B1** for 60 or 240 If 0 scored **SC1** for two answers with a difference of 180°

52. 0580_m20_ms_22 Q: 19

Question	Answer	Marks	Partial Marks
(a)	Correct sketch 	2	Needs all three features for 2 marks: • Correct curve shape • Maximum at (0, 1) and at (360, 1) and minimum at (180, − 1) • Passing through (90, 0) and (270, 0) only **B1** for two correct features

Question	Answer	Marks	Partial Marks
(b)	75.5 or 75.52… and 284.4 to 284.5	3	**B2** for one correct or **M1** for $\cos x = \frac{1}{4}$ oe If 0 scored, **SC1** for two answers with a sum of 360

53. 0580_s20_ms_21 Q: 13

	Answer	Marks	Partial Marks
	16.6 or 16.64…	5	**M2** for $21 \times \frac{18}{13.5} = [AC]$ oe or **M1** for scale factor $\frac{13.5}{18}$ or $\frac{18}{13.5}$ oe soi Then Pythagoras method: and **M2** for $\sqrt{28^2 + 18^2}$ [÷ 2] or $\sqrt{(theirAC)^2 + 18^2}$ [÷ 2] or **M1** for $AD^2 = 28^2 + 18^2$ or $AD^2 = (theirAC)^2 + 18^2$ OR alternative trigonometry method e.g. **M1** for $\tan E = \frac{21}{13.5}$ and **M1** for $AD = \frac{18}{\cos their\ 57.3}$

54. 0580_s20_ms_21 Q: 19

	Answer	Marks	Partial Marks
	12.2 or 12.24…	**5**	**M4** for tan = $\frac{4.5}{\sqrt{20^2+5.5^2}}$ oe or **M1** for recognising angle *GAC* **M1** for $\frac{495}{20\times5.5}$ **M1** for $\sqrt{20^2+5.5^2}$ or $\sqrt{20^2+5.5^2+(their4.5)^2}$ **M1** for tan = $\frac{their4.5}{\sqrt{20^2+5.5^2}}$ oe

55. 0580_s20_ms_22 Q: 9

	Answer	Marks	Partial Marks
	285	**2**	**M1** for 180 + 105 or 75 or 105 seen in correct position at *B*

56. 0580_s20_ms_22 Q: 27

	Answer	Marks	Partial Marks
	64.9 or 64.89 to 64.90	**6**	**B5** for [cos =] $\frac{100+72-100}{2\times10\times\sqrt{72}}$ OR **M1** for 8^2+6^2 **M1** for 6^2+6^2 **M2** for $\frac{(theirAF)^2+(theirAH)^2-(theirHF)^2}{2\times(theirAF)\times(theirAH)}$ or **M1** for $(theirHF)^2 = (theirAF)^2 + (their\ AH)^2 - 2\times(theirAF)\times(their\ AH)\cos(HAF)$ *AF*, *AH* etc from correct method

57. 0580_s20_ms_23 Q: 8

	Answer	Marks	Partial Marks
	[0]94	2	**M1** for 86 or 274 – 180 or for sketch with 274 marked correctly

58. 0580_s20_ms_23 Q: 20

	Answer	Marks	Partial Marks
	65.3 or 65.28..	4	**M3** for $\cos = \dfrac{\frac{1}{2}\sqrt{11^2+11^2}}{18.6}$ or better or **M2** for $AM = \frac{1}{2}\sqrt{11^2+11^2}$ oe or **M1** for $AC^2 = 11^2 + 11^2$ If 0 scored, **SC1** for identifying angle *VAM*

59. 0580_w20_ms_21 Q: 21

Question	Answer	Marks	Partial Marks
	11.7 or 11.73…	3	**M2** for $\sin 43 = \dfrac{PT}{17.2}$ oe or **M1** for identifying angle *PVT*

60. 0580_w20_ms_22 Q: 13

Question	Answer	Marks	Partial Marks
	60	3	**M2** for $12 \times \sqrt{13^2 - 12^2}$ or **M1** for $13^2 - 12^2$ or for 12 × *their* 5 from Pythagoras or trig

61. 0580_w20_ms_22 Q: 19

19(a)	61.1 or 61.08 to 61.09...	**3**	**M2** for $[\sin x =] \frac{8\sin 100}{9}$ oe or better or **M1** for $\frac{9}{\sin 100} = \frac{8}{\sin x}$ oe
19(b)	11.7 or 11.66 to 11.67	**3**	**M2** for $\frac{1}{2}\times 9\times 8\times \sin(180-100-\textit{their}$ **(a)**$)$ oe or **M1** for 180 – 100 – *their* **(a)**

62. 0580_w20_ms_22 Q: 25

Question	Answer	Marks	Partial Marks
	63.4 or 63.43... 243.4 or 243.4...	**2**	**B1** for each If 0 scored **SC1** for two answers with a difference of 180

63. 0580_w20_ms_23 Q: 21

Question	Answer	Marks	Partial Marks
(a)	1.07 or 1.071 to 1.072	**3**	**M2** for [8 −] 8 cos 30 oe or **M1** for $\frac{OP}{8} = \cos 30$ oe
(b)	2.9[0] or 2.895 to 2.901	**3**	**M1** for $\frac{30}{360}\times\pi\times 8^2$ oe **M1** for $\frac{1}{2}\times 8\times \textit{their}\, 6.93\times \sin 30$ oe or $\frac{1}{2}\times 8\cos 30\times 4$ oe

64. 0580_w20_ms_23 Q: 25

Question	Answer	Marks	Partial Marks
	126.9 or 126.86 to 126.87 and 306.9 or 306.86 to 306.87	3	**B2** for one correct or **M1** for $\tan x = -\frac{4}{3}$ if 0 scored then **SC1** for two answers with a difference of 180°

65. 0580_m19_ms_22 Q: 7

	Answer	Mark	Partial Marks
	308	2	**M1** for 180 + 128 oe or 52 seen

66. 0580_s19_ms_21 Q: 7

	Answer	Mark	Partial Marks
	6.88 or 6.882 to 6.883	2	**M1** for $\sin 35$ [=] $\frac{x}{12}$ oe or better

67. 0580_s19_ms_21 Q: 21

	Answer	Mark	Partial Marks
	60.5 or 60.50…	4	**M3** for $\tan = \frac{10}{\frac{1}{2}\sqrt{8^2+8^2}}$ oe or **M2** for $[\frac{1}{2}\times]\sqrt{8^2+8^2}$ or **M1** for 8^2+8^2 or 4^2+4^2 or **B1** for recognising the angle required

68. 0580_s19_ms_22 Q: 24

	Answer	Mark	Partial Marks
	31.9 or 31.85...	**4**	**M3** for tan = $\frac{12}{\sqrt{18^2+7^2}}$ oe or **M2** for $\sqrt{18^2+7^2}$ or **M1** for 18^2+7^2 or **B1** for identifying correct angle *CAG*

69. 0580_w19_ms_21 Q: 13

	Answer	Mark	Partial Marks
	45[.0] or 44.99 to 45.00	**2**	**M1** for $\frac{1}{2}\times 13\times 11\times \sin 39$ oe

70. 0580_w19_ms_21 Q: 16

	Answer	Mark	Partial Marks
	109.3 or 109.26 to 109.27	**3**	**M2** for $\frac{12\sin 39}{8}$ or **M1** for $\frac{8}{\sin 39}=\frac{12}{\sin(...)}$ oe

71. 0580_w19_ms_22 Q: 8

	Answer	Mark	Partial Marks
	282	**2**	**M1** for 180 + 102 or 360 – (180 – 102)

72. 0580_w19_ms_23 Q: 8

	Answer	Mark	Partial Marks
(a)	21.1 or 21.10…	**1**	
(b)	158.9 or 158.8 to 158.9	**1**	**FT** 180 – *their* **(a)** providing answer is an obtuse angle

73. 0580_m18_ms_22 Q: 16

	Answer	Mark	Partial Marks
(a)	2.24	2	**M1** for $0.5\times1.6\times2.8$
(b)	3.22 or 3.224 to 3.225	2	**M1** for $[AC^2 =]1.6^2 + 2.8^2$

74. 0580_s18_ms_21 Q: 7

	Answer	Mark	Partial Marks
	4.8[0] or 4.802…	2	**M1** for $[AC^2 =]\ 2.5^2 + 4.1^2$

75. 0580_s18_ms_21 Q: 14

	Answer	Mark	Partial Marks
	19.3 or 19.26 to 19.27 nfww	3	**M2** for $[\sin =]5.9\times\frac{\sin 84.6}{17.8}$ or **M1** for $\frac{5.9}{\sin B}=\frac{17.8}{\sin 84.6}$ oe

76. 0580_s18_ms_22 Q: 7

	Answer	Mark	Partial Marks
	320	2	**M1** for 180 + 140 oe

77. 0580_s18_ms_23 Q: 23

	Answer	Mark	Partial Marks
	102.1 or 102.06 to 102.07	4	**M2** for $[\cos x =]\frac{11^2+5^2-13^2}{2\times11\times5}$ or **M1** for $13^2 = 11^2 + 5^2 - 2\times11\times5\cos x$ **A1** for $-0.209\ldots$ or $-\frac{23}{110}$

78. 0580_w18_ms_21 Q: 6

	Answer	Mark	Partial Marks
	[0]47	2	**B1** for 133 or 47 seen or **M1** for 227 – 180 oe

79. 0580_w18_ms_22 Q: 12

	Answer	Mark	Partial Marks
	154.5 or 154.5…	2	**B1** for 25.5 or 25.46 to 25.47 or **M1** for $180 - \sin^{-1}(0.43)$ oe

80. 0580_w18_ms_22 Q: 22

	Answer	Mark	Partial Marks
	25.1 or 25.06…	4	**M3** for $\tan = \frac{8}{\sqrt{16.2^2 + 5.5^2}}$ oe or **M2** for $\sqrt{16.2^2 + 5.5^2}$ or **M1** for $16.2^2 + 5.5^2$ or **B1** for identifying correct angle

81. 0580_w18_ms_23 Q: 23

	Answer	Mark	Partial Marks
	16.6 or 16.60…	4	**M3** for $\tan = \frac{4}{\sqrt{12^2 + 6^2}}$ oe or **M2** for $\sqrt{12^2 + 6^2}$ or **M1** for $12^2 + 6^2$ oe or **B1** for recognising angle *PAC* is required

82. 0580_m17_ms_22 Q: 9

	Answer	Mark	Partial Marks
	18.1 or 18.10….	3	**M2** for $\sqrt{20^2-\left(\frac{1}{2}(17)\right)^2}$ oe or **M1** for $h^2+\left(\frac{1}{2}(17)\right)^2=20^2$

83. 0580_s17_ms_21 Q: 13

	Answer	Mark	Partial Marks
	22.6 or 22.61 to 22.62	3	**M2** for sin [=] $\frac{5}{13}$ oe or **M1** for identifying angle AGE

84. 0580_s17_ms_22 Q: 12

	Answer	Mark	Partial Marks
	34.8 or 34.84 to 34.85	2	**M1** for sin [=] $\frac{4}{7}$

85. 0580_s17_ms_22 Q: 17

	Answer	Mark	Partial Marks
	4.34 or 4.336 to 4.337	3	**M2** for $\frac{8.15\sin 30}{\sin 110}$ or **M1** for $\frac{\sin 110}{8.15}=\frac{\sin 30}{AC}$ oe

86. 0580_s17_ms_22 Q: 19

	Answer	Mark	Partial Marks
	37.4 or 37.38… and 142.6 or 142.6…	3	**B2** for one correct or **M1** for 0.5 × 8 × 7 sin = 17 oe If zero or **M1** only scored, **SC1** for two answers with a sum of 180

87. 0580_s17_ms_23 Q: 1

	Answer	Mark	Partial Marks
	0.407 or 0.4067...	**1**	

88. 0580_s17_ms_23 Q: 15

	Answer	Mark	Partial Marks
	35.8 or 35.77….	**3**	**M2** for $[\sin =]\frac{24\times\sin 71.8}{39}$ or **M1** for $\frac{39}{\sin 71.8}=\frac{24}{\sin x}$ oe

89. 0580_s17_ms_23 Q: 22

	Answer	Mark	Partial Marks
	35.3 or 35.26…	**4**	**M3** for $[\tan =]\ \frac{26}{\sqrt{26^2+26^2}}$ oe or **M1** for $[AC^2 =]\ 26^2+26^2$ oe and **M1** for [tan =] 26 ÷ *their AC* oe or for angle *CAG* indicated

90. 0580_w17_ms_21 Q: 21

	Answer	Mark	Partial Marks
	46.7 or 46.68 to 46.69	**4**	**M3** for tan […=] $\frac{9}{\frac{1}{2}\sqrt{12^2+12^2}}$ oe or **M1** for $\left[\frac{1}{2}\times\right]\sqrt{12^2+12^2}$ oe e.g. $\sqrt{\frac{12^2}{2}}$ and **M1** for identifying angle *MCE*

91. 0580_w17_ms_22 Q: 26

	Answer	Mark	Partial Marks
	21.8 or 21.80…	4	**M3** for $\tan = \frac{2}{\sqrt{3^2+4^2}}$ oe or **M1** for $\sqrt{3^2+4^2}$ or $\sqrt{3^2+4^2+2^2}$ and **M1** for recognising angle *QAC*

92. 0580_w17_ms_23 Q: 18

	Answer	Mark	Partial Marks
	73.6 or 73.63 to 73.64	4	**B3** for 27.4 or 27.36… OR **M2** for $\frac{5.9\sin 79}{12.6}$ oe or **M1** for $\frac{\sin[C]}{5.9} = \frac{\sin 79}{12.6}$ oe and **M1dep** for 180 – 79 – *their C* (dep on at least **M1** earned)

93. 0580_m16_ms_22 Q: 3

	Answer	Mark	Partial Marks
	75.1 or 75.09 to 75.10	2	**M1** for cos […=] $\frac{0.9}{3.5}$

94. 0580_m16_ms_22 Q: 15

	Answer	Mark	Partial Marks
	111.2 or 111.1 to 111.2	4	**M2** for [cos =] $\frac{2.8^2+3.6^2-5.3^2}{2\times 2.8\times 3.6}$ or **M1** for implicit form **A1** for [cos =] –0.362 to –0.361

95. 0580_s16_ms_21 Q: 26

	Answer	Mark	Partial Marks
(a)	20.1 or 20.07 to 20.08	**2**	**M1** for $\frac{1}{2}\times 7\times 10\times \sin 35$ oe
(b)	5.86 or 5.858…..	**4**	**M2** for $7^2+10^2-2\times 7\times 10\times \cos 35$ **A1** for 34.3 .. or **M1** for $\cos 35=\frac{7^2+10^2-AC^2}{2\times 7\times 10}$

96. 0580_s16_ms_23 Q: 23

	Answer	Mark	Partial Marks
(a)	9.11 or 9.110…	**4**	**M3** for $\sqrt{5^2+3^2+7^2}$ or **M2** for $\sqrt{5^2+3^2}$ or $\sqrt{3^2+7^2}$ or $\sqrt{5^2+7^2}$ or **M1** for 5^2+3^2 or 3^2+7^2 or 5^2+7^2
(b)	33.3 or 33.28 to 33.29	**3**	**M2** for $\sin=\frac{5}{their(a)}$ oe or **B1** for identifying angle *ECH*

97. 0580_w16_ms_21 Q: 24

	Answer	Mark	Partial Marks
(a)	13.9 or 13.85 to 13.86	**3**	**M2** for $\sqrt{8^2+8^2+8^2}$ oe or **M1** for 8^2+8^2 or better for one face
(b)	35.1 to 35.5[4…]	**2**	**M1** for $\sin=\frac{8}{their\,(a)}$ or $\cos=\frac{\sqrt{8^2+8^2}}{their\,(a)}$ or $\tan=\frac{8}{\sqrt{8^2+8^2}}$ oe

98. 0580_w16_ms_22 Q: 9

	Answer	Mark	Partial Marks
	234 or 234.3 to 234.4	3	**M2** for [dist =] $\frac{300}{\tan 52}$ oe or **M1** for correct implicit trig statement allow **M1** if they use *their* 52 or *their* 38 provided it is marked on the diagram or **B1** for 52 or 38 correctly placed If zero scored, **SC1** for final answer 384

99. 0580_w16_ms_23 Q: 21

	Answer	Mark	Partial Marks
(a)	14.4 or 14.42 to 14.43	2	**M1** for $\frac{1}{2} \times 6.2 \times 4.7 \times \sin 82$ oe
(b)	30.7 or 30.72…	2	**M1** for $\sin = \frac{2050}{\frac{1}{2} \times 107 \times 75}$

100. 0580_m15_ms_22 Q: 18

	Answer	Mark	Partial Marks
	14.4 or 14.36...	4	**M3** for $\tan = \frac{6}{their\sqrt{15^2 + 18^2}}$ oe or better or **M1** for $AC = \sqrt{15^2 + 18^2}$ and **M1** for identifying required angle

101. 0580_s15_ms_22 Q: 14

	Answer	Mark	Partial Marks
	684	3	**M2** for $0.95 \times 4 \times 3 \times 60$ or **M1** for 0.95×4 [$\times 3$] or $4 \times 3 \times 60$ or $0.95 \times 3 \times 60$ or $0.95 \times 4 \times 60$

102. 0580_s15_ms_23 Q: 3

	Answer	Mark	Partial Marks
	66.4[2…]	2	**M1** for cos […=] $\frac{2}{5}$ oe

103. 0580_s15_ms_23 Q: 11

	Answer	Mark	Partial Marks
	12.2 or 12.18 to 12.19	3	**M2** for $\frac{24\sin 30}{\sin 100}$ or **M1** for correct implicit equation e.g. $\frac{\sin 100}{24}=\frac{\sin 30}{BC}$

104. 0580_w15_ms_22 Q: 11

	Answer	Mark	Partial Marks
	6.24 or 6.244 to 6.245	3	**M2** for $\sqrt{8^2-5^2}$ or **M1** for $8^2=5^2+x^2$ or better

105. 0580_w15_ms_22 Q: 13

	Answer	Mark	Partial Marks
	8.12 or 8.118…	3	**M2** for $\frac{12.4}{\sin 74}\times\sin 39$ or **M1** for implicit version $\frac{\sin 39}{y}=\frac{\sin 74}{12.4}$ oe

106. 0580_w15_ms_23 Q: 9

	Answer	Mark	Partial Marks
	23.6 or 23.57 to 23.58	2	**M1** for $\sin[=]\frac{2}{5}$ oe

107. 0580_s14_ms_21 Q: 11

	Answer	Mark	Partial marks
	113.9 to 114.0	4	**M2** for $[\cos =] \frac{8^2+2^2-9^2}{2\times 8\times 2}$ or **M1** for $9^2 = 8^2 + 2^2 - 2 \times 8 \times 2 \times \cos x$ **A1** for -0.406 or -0.4063 to -0.4062 or $-\frac{13}{32}$ If **0** scored **SC2** for 54.3[1…] or 11.7 or 11.71 to 11.72 **SC1** for $[\cos =] \frac{9^2+2^2-8^2}{2\times 9\times 2}$ or $[\cos =] \frac{9^2+8^2-2^2}{2\times 9\times 8}$

108. 0580_s14_ms_22 Q: 4

		Answer	Mark	Partial marks
		7.06 or 7.063 to 7.064	2	**M1** for $\frac{[\ ]}{8} = \cos 28$ or better

109. 0580_s14_ms_22 Q: 21

		Answer	Mark	Partial marks
	(a)	4.47 or 4.472[…]	3	**M2** for $\sqrt{6^2-4^2}$ or **M1** for $[PM]^2 + 4^2 = 6^2$ or $6^2 - 4^2$
	(b)	48.2 or 48.18 to 48.19	3	**M2** for $\cos[\text{correct angle}] = \frac{4}{6}$ oe or **M1** for recognising a correct angle

110. 0580_s14_ms_23 Q: 14

		Answer	Mark	Partial marks
		8.23 or 8.234 to 8.235	3	**M2** for $[PR=] \frac{12.5\times \sin 37}{\sin 66}$ or **M1** for $\frac{PR}{\sin 37} = \frac{12.5}{\sin 66}$ oe

111. 0580_s14_ms_23 Q: 16

		Answer	Mark	Partial marks
		65.4 or 65.37 to 65.4	4	**M3** for $\cos = \frac{5}{12}$ or $\frac{\sqrt{3^2+4^2}}{12}$ oe or **M1** for $\sqrt{3^2+4^2}$ and **M1** for clearly identifying angle *GAC*

112. 0580_w14_ms_21 Q: 16

	Answer	Mark	Partial marks
	142 or 142.0…	5	**B1** for *CBD* = 30 **M2** for $[\sin D =] \frac{6 \times \sin theirB}{8}$ oe or **M1** for $\frac{6}{\sin D} = \frac{8}{\sin(their30)}$ oe **A1** for [*D* =] 22 or 22.0 or 22.02… **B1FT** for 90 + (*their*30 + *their*22) evaluated correctly for their final answer or for 360 – 90 – *theirBCD* evaluated correctly for their final answer

113. 0580_w14_ms_21 Q: 19

		Answer	Mark	Partial marks
(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 $their(\mathbf{b}) - \frac{1}{2} \times 8^2 \times \sin 120$ 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

114. 0580_w14_ms_22 Q: 13

	Answer	Mark	Partial marks
	13.5 or 13.45[..]	3	**M2** for $\sqrt{\frac{2 \times 85}{\sin 110}}$ or **M1** for ½ × a^2 × sin 110 = 85 or $\frac{2 \times 85}{\sin 110}$ oe [180.9..]

115. 0580_s13_ms_21 Q: 23

	Answer	Mark	Partial marks
	24.8 or 24.77 to 24.78	4	**M1** for recognition of angle *CEA* **M1** for $\sqrt{12^2+5^2}$ **M1** for tan = $\frac{6}{\text{their } AE}$ oe

116. 0580_s13_ms_23 Q: 18

	Answer	Mark	Partial marks
	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

117. 0580_w13_ms_21 Q: 21

	Answer	Mark	Partial marks
	(a) 73.7 or 73.73 to 73.74	3	**M1** for $\frac{20}{3+2}\times2$ or **B1** for $BX=8$ **M1** for tan [ ] = $\frac{6}{\textit{their } 8}$ or better
	(b) **120**	2	**M1** for $\frac{1}{2}\times20\times12$ oe

118. 0580_w13_ms_22 Q: 21

	Answer	Mark	Partial marks
	(a) 37.2 or 37.17 to 37.19	3	**M2** for $\sin[\ ]=\frac{4\times\sin65}{6}$ or **M1** for $\frac{4}{\sin[]}=\frac{6}{\sin65}$ oe
	(b) 11.7 or 11.72 to 11.74	3	**M1** for [*B* =] 160 – 65 – *their* **(a)** **M1** for $\frac{1}{2}\times4\times6\times\sin$ *their* 77.8

119. 0580_w13_ms_23 Q: 10

	Answer	Mark	Partial marks
	160	**3**	**M1** for $\sin 15 = \frac{[]}{628}$ oe or better

120. 0580_w13_ms_23 Q: 16

	Answer	Mark	Partial marks
	(a) 8.61 or 8.609 to 8.6102	**4**	**M1** for $\frac{1}{2} \times 3^2 \times \pi \times \sin 120$ **M1** for $\frac{30}{360} \times \pi \times 3^2 [\times 2]$ **M1** for area of triangle + 2 sectors
	(b) 430 or 431 or 430.4 to 430.41	**1FT**	FT their **(a)** × 50

121. 0580_s12_ms_21 Q: 5

	Answer	Mark	Partial marks
	23.2	**2**	**M1** for $\sin 53.2 = \frac{x}{29}$ implicit form or better

122. 0580_s12_ms_21 Q: 20

	Answer	Mark	Partial marks
	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*)

123. 0580_s12_ms_22 Q: 9

	Answer	Mark	Partial marks	
	452	**3**	**M1** $\tan 78.3 = \frac{x}{58.4}$ **M1** "282" + 170	**SC2** 282 in **answer space**

124. 0580_s12_ms_22 Q: 12

	Answer	Mark	Partial marks
(a)	10(.0)	**2**	**M1** $\frac{1}{2} \times 8 \times 5 \times \sin 150$
(b)	210	**2**	**M1** 30° correctly placed at *B* or *C* oe

125. 0580_s12_ms_23 Q: 6

	Answer	Mark	Partial marks
	31.7	**2**	**M1** $0.5 \times 9 \times 15 \times \sin 28$

126. 0580_s12_ms_23 Q: 21

	Answer	Mark	Partial marks
(a)	7.55 www	**3**	**M2** $(\frac{1}{2}\sqrt{(8^2 + 8^2)})^2 + 5^2$ or $4^2 + 5^2 + 4^2$ seen **or M1** $8^2 + 8^2$ or $5^2 + 4^2$ or $4^2 + 4^2$ or 5^2 + (their *MB*)^2 seen
(b)	41.5 www	**3**	**M2** $\sin(B) = \frac{5}{(a)}$ or $\tan(B) = \frac{5}{\text{their } MB}$ or $\cos(B) = \frac{\text{their } MB}{(a)}$ or **M1** recognition of angle *PBM*

127. 0580_w12_ms_23 Q: 18

	Answer	Mark	Partial marks
	122.2	**4**	**M2** for 13sin23/6 **A1** 57.8 or **M1** for $\frac{\sin 23}{6} = \frac{\sin A}{13}$

128. 0580_w12_ms_23 Q: 24

	Answer	Mark	Partial marks
	(a) 12.7	**3**	**M2** for $10^2 + 5^2 + 6^2$ or **M1** for one of $10^2 + 5^2$ or $6^2 + 5^2$ or $10^2 + 6^2$
	(b) 28.2	**3**	**M2** for sin *x* = 6/**(a)** or **M1** for identifying angle *PDB*