

01.0607_m24_ms_42 Q: 5

Question	Answer	Marks	Partial Marks
(a)	255 cao	3	B2 for 75 correctly referenced at <i>C</i> or <i>D</i> OR B1 for angle $ACD = 47$ B1 for angle $ACN(\text{orth}) = 58$ or $ACS(\text{outh}) = 122$
(b)	$[\cos] = \frac{123^2 + 154^2 - 183^2}{2 \times 123 \times 154}$	M2	M1 for $183^2 = 123^2 + 154^2 - 2 \times 123 \times 154 \times \cos[\dots]$
	81.87...	A1	

Question	Answer	Marks	Partial Marks
(c)	15 200 or 15 150 to 15 161	5	M2 for $CD = \frac{183 \sin 27}{\sin 106}$ or M1 for $\frac{CD}{\sin 27} = \frac{183}{\sin 106}$ OR M2 for $AD = \frac{183 \sin \text{their} 47}{\sin 106}$ or M1 for $\frac{AD}{\sin \text{their} 47} = \frac{183}{\sin 106}$ AND M1 for $\frac{1}{2} \times 154 \times 123 \times \sin 81.9$ M1 for $\frac{1}{2} \times 183 \times \text{their } CD \times \sin \text{their} 47$ or $\frac{1}{2} \times 183 \times \text{their } AD \times \sin 27$ or $\frac{1}{2} \times \text{their } CD \times \text{their } AD \times \sin 106$

Question	Answer	Marks	Partial Marks
(a)	$[BC =] \sqrt{8^2 + 7^2 - 2 \times 8 \times 7 \times \cos 73.4}$	M2	or M1 for $[BC^2] = 8^2 + 7^2 - 2 \times 8 \times 7 \times \cos 73.4$ M1 for 81.[00...]
	9.00[0...]	A1	
(b)	$[\sin \dots] = \frac{8 \times \sin 73.4}{9}$	M2	M1 for $\frac{8}{\sin BCA} = \frac{9}{\sin 73.4}$ oe
	58.4 or 58.41...	B1	
(c)	26.8 or 26.83...	2	M1 for $\frac{1}{2} \times 7 \times 8 \times \sin 73.4$ oe
(d)	1.64 or 1.641 to 1.642	3	M1 for area sector $BCD = \pi \times 9 \times 9 \times \frac{36}{360}$ M1 for area triangle $BCD = 0.5 \times 9 \times 9 \times \sin 36$
(e)	29.7 or 29.65 to 29.66 NFWW	2	M1 for $\frac{36}{360} \times 2\pi \times 9$ oe

03. 0607_s24_ms_43 Q: 11

Question	Answer	Marks	Partial Marks
(a)	$[\cos B] = \frac{72^2 + 85^2 - 102^2}{2 \times 72 \times 85}$	M2	M1 for $102^2 = 72^2 + 85^2 - 2 \times 72 \times 85 \times \cos[B]$
	80.57...	A1	
(b)	319.4	2	B1 for 40.6 or 139.4

Question	Answer	Marks	Partial Marks
(c)	14 17	6	<p>M2 for $\sin [A] = \frac{85 \sin 80.6}{102}$ or $\cos[A] = \frac{72^2 + 102^2 - 85^2}{2 \times 72 \times 102}$ or M1 for $\frac{85}{\sin A} = \frac{102}{\sin 80.6}$ or $85^2 = 72^2 + 102^2 - 2 \times 72 \times 102 \cos A$</p> <p>M1 for $[AP =] 72 \cos \text{their } A$ oe M1 for $[\text{time} =] \text{their } AP \div 32$ M1 adding <i>their</i> time to 13 00</p> <p>If 0 scored, SC1 for showing <i>BP</i> on diagram with right angle correctly placed on <i>AC</i></p>

04. 0607_m23_ms_42 Q: 8

Question	Answer	Marks	Partial Marks
(a)	40.7 or 40.69...	3	M2 for $55^2 - 37^2$ oe soi by 1656 or M1 for $55^2 = AB^2 + 37^2$ oe
(b)	125.7 or 126 or 125.7...	3	M2 for $[\sin ACD =] \frac{64 \times \sin 28}{37}$ or M1 for $\frac{64}{\sin ACD} = \frac{37}{\sin 28}$ oe
(c)(i)	116 or 116.2 to 116.3	2	M1 for $180 - 28 - \text{their}(b)$ soi by 26.29 or 26.3
(c)(ii)	296 or 296.2 to 296.3	1	FT $180 + \text{their}(c)(i)$
(d)	1280 or 1277 to 1278	3	M1 for $0.5 \times \text{their}(a) \times 37$ M1 for $0.5 \times 64 \times 37 \times \sin(180 - 28 - \text{their}(b))$

05. 0607_m23_ms_42 Q: 10

Question	Answer	Marks	Partial Marks
(a)	$\tan 63 = \frac{x}{BC}$ or $BC = \frac{x}{\tan 63}$	B1	
	$AB = 480 \times \frac{1000}{3600} \times 18$ oe	M1	
	$AB = 2400$ $AC = \frac{x}{\tan 63} + 2400$	A1	

Question	Answer	Marks	Partial Marks
(b)	1750 or 1750.[...]	5	<p>M4 for $\frac{2400 \tan 28}{\left(1 - \frac{\tan 28}{\tan 63}\right)}$ oe</p> <p>or M3 for $x \frac{\tan 28}{\tan 63} + 2400 \tan 28 = x$ oe</p> <p>or M2 for $\tan 28 = \frac{x}{\left(\frac{x}{\tan 63} + 2400\right)}$ oe</p> <p>or M1 for $\tan 28 = \frac{x}{AC}$</p> <p>OR</p> <p>M2 for $BD = \frac{2400 \sin 28}{\sin 35}$</p> <p>or M1 for $\frac{BD}{\sin 28} = \frac{2400}{\sin 35}$</p> <p>M2 for $x = \text{their } BD \sin 63$</p> <p>or M1 for $\sin 63 = \frac{x}{\text{their } BD}$</p>

06. 0607_s23_ms_41 Q: 9

Question	Answer	Marks	Partial Marks
(a)	235	2	<p>M1 for $180 + 55$ or for $360 - 125$ or for $270 - 35$ or for 35 or 55 or 125 or 145 correctly indicated at C.</p>
(b)	55.1 or 55.06...	2	<p>M1 for $\frac{1}{2} \times 12 \times 16 \sin 35$ oe</p>

Question	Answer	Marks	Partial Marks
(c)	40.4 or 40.41...	4	M2 for $[\sin C =] \frac{5 \sin 118}{12}$ or M1 for $\frac{12}{\sin 118} = \frac{5}{\sin C}$ oe M1 dep for $180 - 118 - \text{their } C$ dependent on sine rule used to find angle.
(d)	15.5 or 15.51... nfw	3	M2 for $\sqrt{5^2 + 16^2 - 2 \times 5 \times 16 \cos(35 + \text{their } A)}$ or M1 for $5^2 + 16^2 - 2 \times 5 \times 16 \cos(35 + \text{their } A)$ A1 for 241 or 240.6 to 240.7...

07. 0607_s23_ms_42 Q: 8

Question	Answer	Marks	Partial Marks
(a)	40.2 or 40.17 to 40.19	5	B1 for 27 M2 for $\sqrt{30^2 + (\text{their } 27)^2 - 2 \times 30 \times (\text{their } 27) \times \cos 140}$ oe or M1 for $30^2 + (\text{their } 27)^2 - 2 \times 30 \times (\text{their } 27) \times \cos 140$ M1 for $\text{their } 53.57 \div \text{their time from } B \text{ to } C$
(b)	[0]18.9 or [0]18.89 to [0]18.91	3	M2 for $\frac{\text{their } 27 \sin 140}{\text{their } 53.57}$ oe or M1 for $\frac{\sin \theta}{\text{their } 27} = \frac{\sin 140}{\text{their } 53.57}$

08. 0607_s23_ms_43 Q: 5

Question	Answer	Marks	Partial Marks
(a)	$\cos ACB = \frac{55^2 + 64^2 - 50^2}{2 \times 55 \times 64}$	M2	M1 for $50^2 = 55^2 + 64^2 - 2 \times 55 \times 64 \times \cos ACB$
	$[ACB =] 48.97... [= 49.0]$	A1	
(b)	$\sin CAB = \frac{55 \sin 49}{50}$	M2	M1 for $\frac{55}{\sin CAB} = \frac{50}{\sin 49}$ oe
	56.1 or 56.07 to 56.12	B1	
(c)	1330 or 1327 to 1328...	2	M1 for $0.5 \times 64 \times 55 \times \sin 49$ oe
(d)	331.9 to 333	2	FT $\text{their } 5(c) \div 4$ M1 for 0.5^2 or 2^2 or $\frac{1}{2} \times 32 \times 27.5 \sin 49.0$ oe

09. 0607_s23_ms_43 Q: 12

Question	Answer	Marks	Partial Marks
	61.5 or 61.46....	6	B1 for AB or $BC = 10$ M2 for $CD = \frac{\text{their } BC}{\sin 30}$ oe or M1 for $\sin 30 = \frac{\text{their } BC}{CD}$ oe M2 for $BD = \frac{\text{their } BC}{\tan 30}$ oe or M1 for $\tan 30 = \frac{\text{their } BC}{BD}$ oe

10. 0607_w23_ms_42 Q: 7

Question	Answer	Marks	Partial Marks
(a)	$\cos ABD = \frac{7^2 + 5^2 - 7.63^2}{2 \times 7 \times 5}$	M2	M1 for $7.63^2 = 7^2 + 5^2 - 2 \times 7 \times 5 \times \cos ABD$
	$ABD = 76.96\dots$	A1	no errors or omissions
(b)	17.1 or 17.[0] or 17.04 to 17.05...	2	M1 for $0.5 \times 5 \times 7 \times \sin 77$
(c)	1.61 or 1.605 to 1.606...	4	M3 for $\frac{7 \sin 12}{\sin(77-12)}$ oe or M2 for $\frac{BC}{\sin 12} = \frac{7}{\sin(77-12)}$ or B1 for $[ACD =]65^\circ$

11. 0607_s21_ms_41 Q: 9

Question	Answer	Marks	Partial Marks
(a)	106 or 106.4 to 106.5	3	M2 for $\sqrt{32^2 + 12^2}$ and $\sqrt{20^2 + 20^2}$ oe or M1 for $32^2 + 12^2$ or $20^2 + 20^2$ oe
(b)(i)	632	3	M2 for $0.5 \times 20 \times 20$ and $0.5 \times 32 \times 12$ and 20×12 oe or M1 for $0.5 \times 20 \times 20$ or $0.5 \times 32 \times 12$ or $0.5 \times 12 \times 12$ or $0.5 \times 12 \times 12$
(b)(ii)	6	2	M1 for $\sqrt{\frac{\text{their } 632}{158}}$ or $\sqrt{\frac{158}{\text{their } 632}}$
(c)	69.4 or 69.42 to 69.45	2	M1 for $\tan[x] = \frac{32}{12}$ oe

12. 0607_s21_ms_43 Q: 7

Question	Answer	Marks	Partial Marks
(a)	17	3	M2 for $x + 5 + 8x + x + 5 = 180$ oe or M1 for angle $A = x + 5$
(b)	10.1 or 10.10...	4	B3 for correct sketch indicating roots or for $\frac{-(-1) \pm \sqrt{(-1)^2 - 4(1)(-92)}}{2(1)}$ oe or B2 for $p^2 - 2p + p - 2 [= 90]$ or better or M1 for $(p + 1)(p - 2) [= 90]$
(c)	7	3	M2 for $2(y - 4) = y - 1$ or better or M1 for $\frac{y - 4}{y - 1} = \sin 30$ If 0 scored SC1 for $\sin 30 = 0.5$
(d)	2.04 oe	6	B4 for $(5w - 1)(w + 3)$ or correct sketch indicating roots or $\frac{-14 \pm \sqrt{14^2 - 4(5)(-3)}}{2(5)}$ or B3 for $5w^2 + 14w - 3 = 0$ and M1 for correct calculation of area of triangle with <i>their</i> positive w OR M1 for $(w + 1)^2 + (2w + 3)^2 = 13$ B1 for $w^2 + w + w + 1$ oe or $4w^2 + 6w + 6w + 9$ oe and M1 for correct calculation of area of triangle with <i>their</i> positive w

Paper Perfection, Crafted With Passion

13. 0607_w21_ms_41 Q: 8

Question	Answer	Marks	Partial Marks
(a)	132	2	M1 for $\frac{1}{2} \times 6 \times 4$
(b)	213 or 213.3...	4	M1 for $6^2 + 4^2$ M2 for $2 \times \text{their} \left(\frac{1}{2} \times 6 \times 4\right) + 6 \times 11 + 4 \times 11 + \text{their} 7.211 \times 11$ or M1 for correct area of at least 3 faces
(c)	13.2 or 13.15...	3	M2 for $6^2 + 4^2 + 11^2$ oe e.g. $11^2 + (\text{their } DF)^2$ or M1 for $6^2 + 4^2$ or $4^2 + 11^2$ or $6^2 + 11^2$
(d)	17.6 or 17.7 or 17.63... to 17.71	2	M1 for $\sin = \frac{4}{\text{their } AF}$ oe

Question	Answer	Marks	Partial Marks
(e)	479 to 480	3	M1 for $\sqrt[3]{\frac{445.5}{\text{their}(a)}}$ oe soi by 1.5 oe or $\frac{2}{3}$ oe M1 for $(\text{their } 1.5)^2$ oe or for $\left(\frac{445.5}{\text{their}(a)}\right)^2 = \left(\frac{\text{area}}{\text{their}(b)}\right)^3$ oe

14. 0607_w20_ms_41 Q: 8

Question	Answer	Marks	Partial Marks
(a)	21.5 or 21.54...	2	M1 for $20^2 + 8^2$
(b)	8.94 or 8.944...	2	M1 for $12^2 - 8^2$

Question	Answer	Marks	Partial Marks
(c)	48.2 or 48.15 to 48.19...	2	M1 for $\cos[x] = \frac{8}{12}$ oe
(d)	22.5 or 22.6 or 22.54 to 22.59	2	M1 for $\tan[x] = \frac{\sqrt{12^2 - 8^2}}{\sqrt{20^2 + 8^2}}$ oe or $\tan[x] = \frac{\text{their}(b)}{\text{their}(a)}$ oe

15. 0607_s18_ms_42 Q: 5

Question	Answer	Marks	Partial Marks
(a)	20	2	M1 for $16^2 + (30 - 18)^2$
(b)	36.9 or 36.86 to 36.87	2	M1 for $\tan[\] = \frac{18}{24}$ oe
(c)	100	3	M2 for $2 \times (\text{their } \mathbf{(a)} + \sqrt{18^2 + 24^2})$ oe or M1 for $18^2 + 24^2$ or $RS = 30$ or $PQ = 30$ seen
(d)	576	3	M2 for $(40 \times 30) - 2 \times (0.5 \times 18 \times 24) - 2 \times (0.5 \times 16 \times 12)$ oe or M1 for any correct and relevant area
(e)	Correct explanation	2	B1 for partial explanation e.g. ratio of two sides the same, with names or numbers given.



Ace | GCSE
Paper Perfection, Crafted With Passion

Question	Answer	Marks	Partial Marks
(a)	192	2	M1 for $\frac{1}{3} \times (\sqrt{72})^2 \times 8$ oe
	cm ³	1	
(b)	12	2	M1 for $(\sqrt{72})^2 + (\sqrt{72})^2$ oe
(c)	10	3	M2 for $8^2 + (0.5 \text{ their (b)})^2$ or M1 for [PD oe =] $0.5 \times \text{their (b)}$
(d)	53.1 or 53.13	2	M1 for $\tan = \frac{8}{0.5 \times \text{their (b)}}$ or $\sin = \frac{8}{\text{their (c)}}$ or $\cos = \frac{0.5 \times \text{their (b)}}{\text{their (c)}}$
(e)(i)	$\sqrt{82}$ or 9.06 or 9.055...	3	M2 for $8^2 + (0.5 \times \sqrt{72})^2$ or $(\text{their (c)})^2 - (0.5 \times \sqrt{72})^2$ or M1 for $(0.5 \times \sqrt{72})^2$
(e)(ii)	62.1 or 62[.0] or 62.00 to 62.10	2	M1 for $\tan = \frac{8}{0.5 \times \sqrt{72}}$ oe
(f)	4 cao	3	M2 for $\sqrt[3]{\frac{24}{\text{their (a)}}}$ or $\sqrt[3]{\frac{\text{their (a)}}{24}}$ soi by 2 or $\frac{1}{2}$ or M1 for $\frac{24}{\text{their (a)}}$ or $\frac{\text{their (a)}}{24}$ soi by 8 or $\frac{1}{8}$

17. 0607_s15_ms_42 Q: 6

Qu.	Answer	Mark	Part Marks
(a)	150	2	M1 for $\sqrt{120^2 + 90^2}$
(b)	$\tan^{-1} \frac{90}{120}$ oe 53.13... or 36.86 to 36.87 or 106.26 73.739...	M1 A1 A1	i.e. trig ratio for any appropriate angle or M1 [$\cos =$] $\frac{150^2 + 150^2 - 180^2}{2 \times 150 \times 150}$ A1 0.28 oe
(c)	25 300 or 25 270 to 25 281	3	M2 for $\frac{73.74}{360} \times \pi \times 150^2 + 2 \times \frac{1}{2} \times 120 \times 90$ oe or M1 for $\frac{73.74}{360} \times \pi \times 150^2$ or $2 \times \frac{1}{2} \times 120 \times 90$ oe
(d)	6.74 to 6.75 or 7	3	M2 for <i>their</i> (c) $\times 8 \times 2 \div 60\,000$ oe or M1 for <i>their</i> (c) $\times 8 \times 2 \div$ figs 6 or <i>their</i> (c) $\times 8 \div 60\,000$ or <i>their</i> (c) $\times 2 \div 60\,000$

18. 0607_s20_ms_42 Q: 10

Question	Answer	Marks	Partial Marks
	6.29 or 6.288 to 6.293	6	M5 for $\frac{12 \times \tan 20 \times \tan 50}{\tan 50 - \tan 20}$ or M4 for $BC = \frac{12 \tan 20}{\tan 50 - \tan 20}$ or M3 for $BC \tan 50 = (12 + BC) \tan 20$ or M2 for $\tan 20 = \frac{DC}{12 + BC}$ and $\tan 50 = \frac{DC}{BC}$ or M1 for $\tan 20 = \frac{DC}{12 + BC}$ or $\tan 50 = \frac{DC}{BC}$

19. 0607_w18_ms_43 Q: 10

Question	Answer	Marks	Partial Marks
(a)	60.3 or 60.25 to 60.26	2	M1 for $\tan = \frac{7}{4}$ oe
(b)	54.5 or 54.46...	3	M2 for $\tan = \frac{7}{\frac{1}{2}\sqrt{6^2+8^2}}$ oe or M1 for 6^2+8^2 or 3^2+4^2 oe
(c)	8.6[0] or 8.602...	2	M1 for $7^2+(their\ 5)^2$ oe
(d)	69.6 or 69.58 to 69.59	2	M1 for $\cos = \frac{3}{their\ PC}$ oe
(e)	6.49 or 6.493...	3	M2 for $\frac{6\sin(their(d))}{\sin 60}$ oe or M1 for $\frac{\sin 60}{6} = \frac{\sin(their(d))}{BX}$

20. 0607_m22_ms_42 Q: 9

Question	Answer	Marks	Partial Marks
(a)	6.22 or 6.222 to 6.223	3	M2 for $\frac{4}{\sin 40}$ oe or M1 for $\sin 40 = \frac{4}{x}$ oe
(b)(i)	49.5 or 49.45 to 49.46	3	M2 for [cos=] $\frac{9^2+10^2-8^2}{2 \cdot 9 \cdot 10}$ oe or M1 for $8^2 = 9^2 + 10^2 - 2 \times 9 \times 10 \cos(...)$
(b)(ii)	5.85 or 5.845 to 5.851...	3	M2 for $\frac{BT}{9} = \cos(their(b)(i))$ oe or better or M1 for CT drawn and right angle at T

Question	Answer	Marks	Partial Marks
(c)	21[.0] or 20.98 to 21.00	5	M2 for $\frac{12\sin 35}{7}$ or M1 for $\frac{7}{\sin 35} = \frac{12}{\sin P}$ oe A1 for 79.5 or 79.50 to 79.51 M1 for $180 - their\ 79.5$ If 0 scored, SC1 for diagram showing the two angles

21. 0607_s21_ms_42 Q: 5

Question	Answer	Marks	Partial Marks
(a)	$20^2 + 10^2$	M1	
	22.360 to 22.361	A1	
(b)	$\tan 35 = \frac{10}{AB}$ oe	M1	$\frac{\sin 35}{10} = \frac{\sin 55}{AB}$, i.e correct implicit
	14.281...	A1	
(c)	17.4 or 17.43...	2	M1 for $\sin 35 = \frac{10}{AP}$ oe or $14.28^2 + 10^2$
(d)	30.5 or 30.52...	3	M1 for $20^2 + 14.28^2 - 2 \times 20 \times 14.28 \times \cos 125$ A1 for 931.5 to 931.6...
(e)	99.2 to 99.5	3	M2 for $[\cos =]$ $\frac{22.36^2 + (\text{their } 17.4)^2 - (\text{their } 30.5)^2}{2 \times 22.36 \times (\text{their } 17.4)}$ or M1 for $(\text{their } 30.5)^2 = 22.36^2 + (\text{their } 17.4)^2$ $- 2 \times 22.36 \times (\text{their } 17.4) \times \cos APB$

22. 0607_w21_ms_42 Q: 11

Question	Answer	Marks	Partial Marks
(b)(i)	PA and CA drawn and arc at A	1	
(b)(ii)	12.9 or 12.85 to 12.86	4	M3 for $\sin[...]=\frac{5 \sin 73.45}{\sqrt{20^2 + 8^2}}$ OR M1 for $\sqrt{20^2 + 8^2}$ M1 for $\frac{\text{their } AC}{\sin 73.45} = \frac{5}{\sin PAC}$ oe

23. 0607_w19_ms_43 Q: 9

Question	Answer	Marks	Partial Marks
(a)	$14^2 + 12^2 - 2 \times 14 \times 12 \times \cos 58$	M1	
	12.725 to 12.726	A2	or A1 for 161.9...
(b)	Angle at centre = $2 \times$ angle at circumference oe	1	
(c)	7.49 or 7.5[0] or 7.51 or 7.487 to 7.506	3	M2 for $\frac{6.365}{\sin 58}$ oe or M1 for $\sin 58 = \frac{6.365}{OB}$ oe

Question	Answer	Marks	Partial Marks
(d)	31.3 to 31.9 nfw	3	M2 for $\frac{116}{360} \times \pi \times (\text{their (c)})^2$ $-\frac{1}{2} \times (\text{their (c)})^2 \times \sin 116$ oe or M1 for $\frac{116}{360} \times \pi \times (\text{their (c)})^2$ oe or $\frac{1}{2} \times (\text{their (c)})^2 \times \sin 116$ oe

24. 0607_s17_ms_41 Q: 9

Question	Answer	Marks	Partial Marks
(a)	$[\cos x =] \frac{8^2 + 6^2 - 2^2}{2 \times 6 \times 8}$ oe	M2	M1 for $12^2 = 8^2 + 6^2 - 2 \times 8 \times 6 \cos[\dots]$
	117.3 or 117.2 to 117.3	B1	
(b)	$[\sin =] \frac{6 \times \sin(\text{their(a)})}{12}$ oe	M2	M1 for $\frac{6}{\sin A} = \frac{12}{\sin(\text{their(a)})}$ oe
	26.4 or 26.5 or 26.37 to 26.46	B1	

25. 0607_s17_ms_43 Q: 7

Question	Answer	Marks	Part Marks
(a)	9.77 or 9.766...	3	M2 for $\frac{8}{\cos 35}$ oe or M1 for $\cos 35 = \frac{8}{AB}$ oe
(b)	60.6 or 60.61...	3	M2 for $\frac{6^2 + 9^2 - 8^2}{2 \times 6 \times 9}$ or M1 for $8^2 = 6^2 + 9^2 - 2 \times 6 \times 9 \cos C$

26. 0607_s16_ms_42 Q: 5

Question	Answer	Mark	Part Marks
(a)	Any 2 of the following Angle $ADX =$ Angle BCX and same segment oe Angle $DAX =$ Angle CBX and same segment oe Angle $AXD =$ Angle BXC and vertically opp oe	2	B1 for one of the three pairs or for at least two pairs of angles without reasons or with incorrect reasons
(b)	7.5 oe	2	M1 for $\frac{2}{3} = \frac{5}{BX}$ oe
(c)	67.2 or 67.20 to 67.21 nfw	3	M2 for $[\cos =] \frac{2^2 + 5^2 - 4.61^2}{2 \times 2 \times 5}$ or M1 for $4.61^2 = 2^2 + 5^2 - 2 \times 2 \times 5 \cos(AXD)$

27. 0607_w16_ms_41 Q: 7

Qu.	Answer	Mark	Part Marks
(a)	42.[0] or 41.98 to 41.99	2	M1 for $\tan = \frac{9}{10}$ oe
(b)	$\tan = \frac{\sqrt{9^2 + 10^2}}{20}$ oe 33.91 to 33.93	M2 A1	or M1 for $\sqrt{9^2 + 10^2}$ or $\sqrt{9^2 + 10^2 + 20^2}$
(c)	12.4 or 12.39 to 12.40... nfw	3	M1 for $20^2 + 22^2 - 2 \times 20 \times 22 \cos 33.9$ A1 for 153 to 154

28. 0607_s15_ms_42 Q: 11

Qu.	Answer	Mark	Part Marks
(a) (i)	117 or 116.8 ...	4	M2 for $\sin[\theta] = \frac{70\sin 35}{45}$ oe or M1 for $\frac{\sin[\theta]}{70} = \frac{\sin 35}{45}$ oe M1 for 180 – their θ
(ii)	42.4 or 42.36 to 42.37	4	M2 for $[\cos[\theta]] = \frac{70^2 + 80^2 - 55^2}{2 \times 70 \times 80}$ or M1 for $55^2 = 70^2 + 80^2 - 2 \times 70 \times 80 \times \cos[\theta]$ A1 for 0.739 or 0.7388 ... or $\frac{8275}{11200}$ or $\frac{1655}{2240}$ or $\frac{331}{448}$
(b)	21.1 to 21.3	2FT	M1 for $45\sin(145 - \text{their (a)(i)})$ oe

29. 0607_s21_ms_41 Q: 10

Question	Answer	Marks	Partial Marks
(a)(i)	42	1	
(a)(ii)	71	1	
(a)(iii)	109	1	FT 180 – their(ii)
(a)(iv)	29	1	
(a)(v)	38	1	
(b)	74.2 or 74.21 to 74.25...	5	M1 for $[AB =] 2 \times 11 \cos 19$ oe M2 for $[AD =] \frac{\text{their}AB \times \sin(\text{their}42)}{\sin(\text{their}109)}$ or $[BD =] \frac{\text{their}AB \times \sin(\text{their}29)}{\sin(\text{their}109)}$ or M1 for $\frac{AD}{\sin \text{their}42} = \frac{\text{their}AB}{\sin \text{their}109}$ or $\frac{BD}{\sin \text{their}29} = \frac{\text{their}AB}{\sin \text{their}109}$ and M1 for $[Area =] 0.5 \times \text{their}AB \times \text{their}AD \times \sin(\text{their}29)$ or $[Area =] 0.5 \times \text{their}AB \times \text{their}BD \times \sin(\text{their}42)$ or $[Area =] 0.5 \times \text{their}AD \times \text{their}BD \times \sin(\text{their}109)$

30. 0607_w21_ms_43 Q: 11

Question	Answer	Marks	Partial Marks
(a)	$[AC =] \sqrt{120^2 + 45^2 - 2 \times 45 \times 120 \times \cos 48}$	M2	M1 for $[AC^2] = 120^2 + 45^2 - 2 \times 45 \times 120 \times \cos 48$
	95.90 to 95.91	A1	
(b)	95.5 or 95.50 to 95.51...	4	M2 for $\sin ADC = \frac{95.9 \times \sin 28}{54}$ or M1 for $\frac{95.9}{\sin ADC} = \frac{54}{\sin 28}$ oe M1 for $180 - 28 - \text{their } ADC$

Question	Answer	Marks	Partial Marks
(c)	552 or 553 or 554 or 551.5 to 553.9	4	M3 for $5137 - 0.5 \times 120 \times 45 \times \sin 48 - 0.5 \times 95.9 \times 54 \times \sin(\text{their } ACD)$ OR M1 for area $ABC = 0.5 \times 45 \times 120 \times \sin 48$ or M1 for area $ABD = 0.5 \times 95.9 \times 54 \times \sin ACD$ OR M2 for $\sin ACB = \frac{120 \times \sin 48}{95.9}$ or M1 for $\frac{120}{\sin ACB} = \frac{95.9}{\sin 48}$ M1 for area $BCD = 0.5 \times 45 \times 54 \times \sin(360 - \text{their } (b) - \text{their } ACB)$

Paper Perfection, Crafted With Passion

Question	Answer	Marks	Partial Marks
(a)	9.91 or 9.912...	7	<p>B3 for $[AC=] \sqrt{133}$ or 11.5 or 11.53... or M1 for $11^2 + 12^2 - 2 \times 11 \times 12 \times \cos 60$ A1 for 133</p> <p>B2 for area = 57.2 or 57.15 to 57.16 or M1 for $\frac{1}{2} \times 12 \times 11 \times \sin 60$</p> <p>M1 for $\frac{1}{2} \times \text{distance} \times \text{their } AC = \text{their Area}$</p> <p>OR</p> <p>B3 for $[AC=] \sqrt{133}$ or 11.5 or 11.53... or M1 for $11^2 + 12^2 - 2 \times 11 \times 12 \cos 60$ A1 for 133</p> <p>M2 for $\sin ACB = \frac{12 \sin 60}{\text{their } AC}$ or for $\sin BAC = \frac{11 \sin 60}{\text{their } AC}$ or M1 for $\frac{12}{\sin ACB} = \frac{\text{their } AC}{\sin 60}$ or for $\frac{11}{\sin BAC} = \frac{\text{their } AC}{\sin 60}$</p> <p>M1 for $11 \sin ACB$ or $12 \sin BAC$</p>
(b)(i)	$\frac{112}{\frac{1}{3} \times 8 \times 6}$ oe leading to 7	M2	M1 for $\frac{1}{3} \times 8 \times 6 \times h = 112$ oe
(b)(ii)	8.60 or 8.602...	3	M2 for $7^2 + 5^2$ or M1 for diagonal of base = 10 or half = 5

Question	Answer	Marks	Partial Marks
(b)(iii)	59.5 or 59.48 to 59.51	3	<p>M2 for $2 \times \text{inv tan } \frac{4}{7}$ oe</p> <p>or M1 for $\text{tan } \dots = \frac{4}{7}$</p> <p>OR</p> <p>M2 for $[\cos \dots =]$</p> $\frac{(\sqrt{65})^2 + (\sqrt{65})^2 - 8^2}{2 \times \sqrt{65} \times \sqrt{65}} \text{ oe}$ <p>or M1 for correct implicit version of cosine rule</p>

32. 0607_s20_ms_43 Q: 7

Question	Answer	Marks	Partial Marks
(a)	$2 \times 5 \times \cos 30$	M2	or M1 for $\frac{x}{5} = \cos 30$ oe
	8.660...	A1	
(b)	241 or 240.9... to 241.2...	4	<p>M1 for $3 \times 8.66 \times 5$</p> <p>M1 for $3 \times \frac{120}{360} \times \pi \times 5^2$</p> <p>M1 for $\frac{1}{2} \times 8.66^2 \times \sin 60$</p>
(c)	2890 to 2895	1	FT $12 \times \text{their (b)}$

Question	Answer	Marks	Partial Marks
(a)	11.2 or 11.19 to 11.20	3	M2 for $\sqrt{8.1^2 + 9.6^2 - 2 \times 8.1 \times 9.6 \times \cos 78}$ OR M1 for $8.1^2 + 9.6^2 - 2 \times 8.1 \times 9.6 \times \cos 78$ A1 for 125 or 125.4...
(b)	$\sin DAC = \frac{9.6 \times \sin 78}{\text{their(a)}} \text{ oe}$	M2	M1 for $\frac{9.6}{\sin DAC} = \frac{\text{their(a)}}{\sin 78} \text{ oe}$
	56.97 to 57.05...	A1	
(c)	14.8 or 14.79 to 14.81	3	M2 for $BC = \frac{\text{their(a)} \times \sin(57+15)}{\sin 46}$ or M1 for $\frac{BC}{\sin(57+15)} = \frac{\text{their(a)}}{\sin 46} \text{ oe}$

Question	Answer	Marks	Partial Marks
(d)	35.0 to 35.3	4	B1 for angle $ACB = 62$ soi M1 for area $ABC = 0.5 \times \text{their(a)} \times \text{their(c)} \times \sin \text{their}(62)$ or $0.5 \times \text{their(c)} \times (13.7 \text{ or } 13.74 \text{ to } 13.75) \times \sin 46$ or $0.5 \times \text{their(a)} \times (13.7 \text{ or } 13.74 \text{ to } 13.75) \times \sin(57+15)$ M1 for area $ADC = 0.5 \times 8.1 \times 9.6 \times \sin 78 \text{ oe}$

34. 0607_s19_ms_41 Q: 8

Question	Answer	Marks	Partial Marks
(a)	Correct Pythagoras statement leading to $11^2 - 6^2$ or $121 - 36$ or 85	M2	or M1 for $[BD]^2 + 6^2 = 11^2$ oe
	9.219...	A1	9.219... implies M1 A1
(b)	43.8 or 43.80... nfw	3	M2 for $\cos[ABD] = \frac{9.22^2 + 13^2 - 9^2}{2 \times 9.22 \times 13}$ or better or M1 for $9^2 = 9.22^2 + 13^2 - 2 \times 9.22 \times 13 \cos [ABD]$ oe

Question	Answer	Marks	Partial Marks
(c)	69.1 or 69.13 to 69.14... nfw	3	M1 for $0.5 \times 9.22 \times 6$ oe M1 for $0.5 \times 9.22 \times 13 \times \sin$ (<i>their</i> 43.8) oe
(d)	17.7 or 17.69...	3	M1 for $6^2 + 13^2 - 2 \times 6 \times 13 \cos (90 + \textit{their} 43.8)$ A1 for 313 or 312.9 to 313.0

35. 0607_s19_ms_43 Q: 11

Question	Answer	Marks	Partial Marks
(a)	$\tan 41 = \frac{FB}{5.5}$ oe	M1	e.g. $\frac{\sin 49}{5.5} = \frac{\sin 41}{FB}$
	= 4.7810.. [= 4.781]	A1	
(b)	37.6 or 37.63 to 37.64	2	M1 for $\tan[FCB] = \frac{4.781}{6.2}$ oe
(c)	$[CD =] \frac{4.781}{\tan 18} - 6.2$ oe	M2	M1 for $\tan 18 = \frac{4.781}{BD}$ oe
	8.5144...	A1	
(d)	14.6 or 14.58 to 14.60	3	B2 for 212.7... or M1 for $[AD^2 =] 5.5^2 + (8.514 + 6.2)^2 - 2 \times 5.5 \times (8.514 + 6.2) \times \cos 78$
(e)	39.5 or 39.6 or 39.54 to 39.6[0]	2	M1 for $0.5 \times 5.5 \times (8.514 + 6.2) \times \sin 78$

36. 0607_w19_ms_42 Q: 11

Question	Answer	Marks	Partial Marks
(a)	$8^2 + 9^2 - 2 \times 8 \times 9 \times \cos 64$	M1	
	9.048... [=9.05]	A1	
(b)(i)	[Area ABD] = $0.5 \times 8 \times 9 \times \sin 64$	M1	
	Area BDC = 57.3 – <i>their</i> ABD	M1	
	<i>their</i> 24.94 = $0.5 \times 6.5 \times 9.05 \times \sin BDC$	M1	
	Angle BDC = 57.98 to 58.02	A1	If 58.0... must see 58.0 not 58 alone
(b)(ii)	77.4 to 77.54...	5	M1 for $6.5^2 + 9.05^2 - 2 \times 6.5 \times 9.05 \times \cos 58$ A2 for $\sqrt{61.8}$ or 7.86 or A1 for 61.8 seen M1 for $\frac{\text{their } 7.86}{\sin 58} = \frac{9.05}{\sin BCD}$ oe or $\frac{1}{2} \times \text{their } 7.86 \times 6.5 \times \sin BCD = \text{their } 24.94$ or $9.05^2 = 6.5^2 + (\text{their } 7.86)^2 - 2 \times 6.5 \times (\text{their } 7.86) \times \cos BCD$ or better

37. 0607_s18_ms_41 Q: 9

Question	Answer	Marks	Partial Marks
(a)	12.2 or 12.21 to 12.22	2	M1 for $\sin 70 = \frac{[]}{13}$ oe
(b)	15.5 or 15.49...	2	M1 for $\tan 50 = \frac{BD}{13}$ oe
(c)	5.32 or 5.316 to 5.319...	4	B1 for [angle DBC =] 20 M1 for $(\text{their } BD)^2 + 15^2 - 2 \times \text{their } BD \times 15 \cos(\text{their } DBC)$ A1 for 28.26 to 28.30...
(d)	art 195	3	M2 two of $0.5 \times 13 \times 13 \times \sin 40$ oe $0.5 \times 13 \times \text{their } BD$ oe $0.5 \times 15 \times \text{their } BD \times \sin(\text{their } 20)$ or M1 for one of above

38. 0607_s18_ms_42 Q: 9

Question	Answer	Marks	Partial Marks
(a)	$[\cos A] = \frac{11^2 + 9.1^2 - 8.2^2}{2 \times 11 \times 9.1}$	M2	M1 for $8.2^2 = 11^2 + 9.1^2 - 2 \times 11 \times 9.1 \times \cos[]$
	46.98 to 46.99	A1	
(b)	$[\sin B] = \frac{11}{8.2} \times \sin 47.0$	M2	M1 for $\frac{8.2}{\sin 47} = \frac{11}{\sin B}$
	78.8 or 78.74 to 78.84	A1	If 0 scored then SC1 for correct answer from cosine rule or other method
(c)	36.6 or 36.54 to 36.60...	2	M1 for $0.5 \times 9.1 \times 11 \times \sin 47.0$ or M1 for $0.5 \times 9.1 \times 8.2 \times \sin(\text{their}(\mathbf{b}))$ or M1 for $0.5 \times 8.2 \times 11 \times \sin(180 - 47 - \text{their}(\mathbf{b}))$
(d)	6.65 or 6.66 or 6.647 to 6.656...	2	M1 for $9.1 \times \sin 47.0$ oe or $\text{their}(\mathbf{c}) \div (0.5 \times 11)$

39. 0607_w18_ms_41 Q: 11

Question	Answer	Marks	Partial Marks
(a)	$0.5 \times 8.6 \times 9.3 \times \sin A = 23.5$	M1	
	35.99... [= 36.0]	A1	
(b)	$[x =] \sqrt{8.6^2 + 9.3^2 - 2 \times 8.6 \times 9.3 \times \cos 36}$	M2	or M1 for $[x^2 =] 8.6^2 + 9.3^2 - 2 \times 8.6 \times 9.3 \times \cos 36$
	5.57 or 5.569 to 5.571...	A1	M1 with correct answer scores full marks
(c)	$\sin B = \frac{9.3 \times \sin 36}{\text{their}(\mathbf{b})}$	M2	or M1 for $\frac{9.3}{\sin B} = \frac{\text{their}(\mathbf{b})}{\sin 36}$
	78.8 or 78.9 or 79.[0] or 78.77 to 78.98...	A1	M1 with correct answer scores full marks

40. 0607_w18_ms_43 Q: 6

Question	Answer	Marks	Partial Marks
(a)	96.9 or 96.90...	2	M1 for $0.5 \times 11 \times 23 \times \sin 50$ oe
(b)	18[.0] or 18.02...	3	B2 for 325 or 324.7... or M1 for $11^2 + 23^2 - 2 \times 11 \times 23 \times \cos 50$ oe

41. 0607_s17_ms_41 Q: 3

Question	Answer	Marks	Partial Marks
(a)	49.8 or 49.84 to 49.85	3	M2 for $\frac{30}{\sin 37}$ oe or M1 for $\sin 37 = \frac{30}{AC}$ oe
(b)	39.7 or 39.8 or 39.74 to 39.81...	3	M2 for $\frac{30}{\tan 37}$ or <i>their</i> (a) $\times \cos 37$ oe or M1 for $\tan 37 = \frac{30}{BC}$ or $\cos 37 = \frac{BC}{\text{their}(a)}$ oe

Question	Answer	Marks	Partial Marks
(c)	21.7 or 21.8 or 21.67 to 21.81	3	M2 for $\frac{30}{\tan 26} - \text{their}(b)$ or $\frac{(\text{their}(a)) \times \sin(180 - (180 - 37) - 26)}{\sin 26}$ oe or M1 for $\frac{30}{\tan 26}$ or $\frac{\text{their}(a)}{\sin 26} = \frac{CD}{\sin(180 - (180 - 37) - 26)}$ oe
(d)	325 or 326 or 327 or 325[.0] to 327.2	2	M1 for $\frac{1}{2} \times \text{their}(c) \times 30$ oe

42. 0607_s17_ms_42 Q: 9

Question	Answer	Marks	Partial Marks
(a)(i)	$\frac{1}{2} \times x \times (x+2) \times \frac{\sqrt{3}}{2}$ oe or better final answer	2	M1 for $\frac{1}{2} \times x \times (x+2) \times \sin 60$
(a)(ii)	equating to $18\sqrt{3}$ and correct elimination of $\sqrt{3}$	M1	Dependent on correct answer used from (a)(i) or answer to (a)(i) contains $\sin 60$ but is otherwise correct.
	Completion with at least one step	A1	No errors or omissions
(b)(i)	7.54 or 7.544... , -9.54 or -9.544...	2	B1 for each If 0 scored, M1 for substitution in formula or sketch or $(x+1)^2 - 73$ or better
(b)(ii)	6.53 or 6.54 or 6.529 to 6.536...	2	M1 for $\sin 60 = \frac{[]}{\text{their}7.54}$ oe

43. 0607_s16_ms_41 Q: 11

Question	Answer	Mark	Part Marks
(a)	$9^2 = (3x - 1)^2 + (2x)^2$ $-2(2x)(3x - 1) \cos 60$ oe $81 = 9x^2 - 6x + 1 + 4x^2 - 6x^2 + 2x$ oe $7x^2 - 4x - 80 = 0$	M1 A2 A1	or B1 for $9x^2 - 3x - 3x + 1$ Completion with no errors or omissions
(b) (i)	$\frac{-(-4) \pm \sqrt{(-4)^2 - 4 \times 7 \times (-80)}}{2 \times 7}$ oe $x = 3.68$ or $3.678\dots$ or -3.11 or -3.107 to -3.106	M1 B2	or sketch of quadratic graph (any relevant one) with 1 positive root and 1 negative root B1 for either
(ii)	[AB =] 7.36 or 7.356 to 7.357 [BC =] 10[.0] or 10.03 to 10.04	1FT 1FT	FT 2 \times a positive root FT 3 \times a positive root - 1
(c)	31.9 or 32[.0] or 31.85 to 32[.00]	2FT	M1 for $\frac{1}{2} \times \text{their } AB \times \text{their } BC \sin 60$ oe

44. 0607_s16_ms_42 Q: 11

Question	Answer	Mark	Part Marks
(a)	5.4[0] or 5.396...	2	M1 for $\tan 34 = \frac{AB}{8}$ oe or better
(b)	20.4 or 20.38... nfw	5	B1 for angle $D = 146$ M2 for $[\sin C =] \frac{8 \sin(\text{their } D)}{19}$ or M1 for $\frac{8}{\sin C} = \frac{19}{\sin(\text{their } D)}$ oe A1 for [angle $C =] 13.6$ or 13.61 to 13.63 OR B1 for angle $A = 56$ M2 for $[\sin C =] \frac{\text{their } AB \times \sin(\text{their } A)}{19}$ or M1 for $\frac{\text{their } AB}{\sin C} = \frac{19}{\sin(\text{their } A)}$ oe A1 for [angle $C =] 13.6$ or 13.61 to 13.63
(c)	48[.0] or 48.1 or 48.04 to 48.12 cao	2	M1 for $0.5 \times \text{their}(a) \times 19 \times \sin(90 + \text{their}(b))$ oe

45. 0607_s16_ms_43 Q: 5

Question	Answer	Mark	Part Marks
(a)	$0.5 \times 12.4 \times x \times \sin 30 [= 34.1]$ oe	1	
(b)	6.21 or 6.205 to 6.206	3	B2 for 38.50 to 38.51 or M1 for $11^2 + 12.4^2 - 2 \times 11 \times 12.4 \times \cos 30$
(c)	62.3 or 62.4 or 62.33 to 62.41...	3	M2 for $\sin A = \frac{11 \times \sin 30}{\text{their} 6.21}$ or $\cos A = \frac{12.4^2 + (\text{their}(b))^2 - 11^2}{2 \times 12.4 \times \text{their}(b)}$ or M1 for $\frac{11}{\sin A} = \frac{\text{their} 6.21}{\sin 30}$ oe
(d)	6.2	2	M1 for $12.4 \times \sin 30$ oe

46. 0607_w16_ms_42 Q: 8

Question	Answer	Mark	Part Marks
(a)	$\frac{\sqrt{8}}{3}$ or $\frac{2\sqrt{2}}{3}$ or $\sqrt{\frac{8}{9}}$	3	M2 for $\frac{\sqrt{3^2 - 1^2}}{3}$ or M1 for $3^2 - 1^2$ If 0 scored, SC1 for 0.943 or 0.9428... or $\sqrt{0.889}$
(b) (i)	$[\cos B] = \frac{9^2 + 10^2 - 11^2}{2 \times 9 \times 10}$ oe	2	M1 for $11^2 = 9^2 + 10^2 - 2 \times 9 \times 10 \times \cos B$
(b) (ii)	$0.5 \times 9 \times 10 \times \text{their exact (a)}$ Leading to $30\sqrt{2}$	M2 A1	M1 for $0.5 \times 9 \times 10 \times \text{their (a)}$ (their (a) must be < 1) Cancelling seen or $\frac{180\sqrt{2}}{6}$ or $\frac{90\sqrt{2}}{3}$ or $\frac{60\sqrt{2}}{2}$ seen

47. 0607_w16_ms_42 Q: 9

Question	Answer	Mark	Part Marks
(a)	21.5 or 21.45 to 21.46...	2	M1 for $100 - \pi \times 5^2$ oe
(b) (i)	5.77 or 5.773 to 5.774	2	M1 for $\tan 60 = \frac{10}{x}$ oe
(ii)	21.5 or 21.54 to 21.55	2	M1 for $10 + 2 \times \text{their (b)(i)}$ oe or $10 + \frac{10}{\sin 60}$ oe
(iii)	100 to 101.0... nfw	4	M3 for $0.5 \times 10 \times \text{their (b)(i)} + 0.5 \times 10 \times \text{their (b)(i)} + 0.5 \times 10 \times 10 \sin 60$ oe or M2 for any 2 of these or M1 for any 1 of these OR M3 for $0.5 \times (\text{their(b)(ii)})^2 \times \sin 60 - 10^2$ oe or M2 for $0.5 \times (\text{their(b)(ii)})^2 \times \sin 60$ oe or M1 for <i>their</i> attempt at area of triangle $ABC - 100$

48. 0607_w15_ms_41 Q: 5

Question	Answer	Mark	Part Marks
(a)	9.83 or 9.829 to 9.830	2	M1 for $\frac{BC}{12} = \cos 35$ or better
(b)	59.2 or 59.16 to 59.17	3	M2 for $[\cos =] \frac{12^2 + 10^2 - 11^2}{2 \times 12 \times 10}$ or M1 for $11^2 = 12^2 + 10^2 - 2 \times 12 \times 10 \cos \theta$
(c)	85.3 or 85.4 or 85.34 to 85.37	3	M1 for $0.5 \times 12 \times \text{their } BC \times \sin 35$ oe M1 for $0.5 \times 12 \times 10 \times \sin(\text{their } CAD)$ oe

49. 0607_w15_ms_42 Q: 12

Question	Answer	Mark	Part Marks
(a)	30.4 or 30.41...	3	M1 for $x^2 = 15^2 + 20^2 - 2 \times 15 \times 20 \times \cos 120$ A1 for 925
(b)	$\sin B = \frac{20 \sin 120}{\text{their } 30.4}$ 34.71 to 34.73...	M2 A1	M1 for $\frac{20}{\sin B} = \frac{\text{their } 30.4}{\sin 120}$ becomes M2 if 34.71 to 34.73... seen
(c)	116 or 115.8....	4	B1 for angle $A = 34.7$ or 34.71 to 34.73... or angle $B = 55.3$ or 55.26... to 55.29 M1 for $AB = \frac{12}{\sin \text{their } 34.7}$ (= 21.1) oe M1 for $AF = \frac{12}{\tan \text{their } 34.7}$ (= 17.3) oe
(d)	414 or 413.7 to 413.9	3	M2 for $12 \times 15 + 0.5 \times 12 \times \text{their } 17.3 + 0.5 \times 15 \times 20 \times \sin 120$ oe or M1 for any correct area.

50. 0607_w15_ms_43 Q: 1

Question	Answer	Mark	Part Marks
(a)	9.84 or 9.840 to 9.841	2	M1 for $\sin 41 = \frac{BD}{15}$ oe or better
(b)	83.6 or 83.64 to 83.65	2	M1 for $0.5 \times 17 \times \text{their (a)}$ oe
(c)	$17^2 + 15^2 - 2 \times 17 \times 15 \cos 41$ 129 or 129.0 to 129.1 11.4 or 11.36...	M1 A1 A1	If 0 scored SC2 for 11.4 or 11.36...

Paper Perfection, Crafted With Passion

51. 0607_m21_ms_42 Q: 8

Question	Answer	Marks	Partial Marks
(a)	218	1	
(b)	$4^2 + 17^2 - 2 \times 4 \times 17 \times \cos 142$	M2	M1 for implicit cosine rule
	20.30...	A1	
(c)	007 or 006.92 to 006.98	3	M2 for $\sin B = \frac{4 \sin 142}{20.3}$ oe or M1 for $\frac{4}{\sin B} = \frac{20.3}{\sin 142}$ oe OR M2 for $\sin A = \frac{17 \sin 142}{20.3}$ oe or M1 for $\frac{17}{\sin A} = \frac{20.3}{\sin 142}$ oe
(d)	11.5 or 11.47...	3	B1 for 3 h 36 min or 3.6 h seen M1 for $\frac{4+17+20.3}{\text{their } 3.6}$

52. 0607_s21_ms_43 Q: 8

Question	Answer	Marks	Partial Marks
(a)	$\frac{18^2 + 13^2 - 16^2}{2 \times 18 \times 13}$	M2	M1 for $16^2 = 18^2 + 13^2 - 2 \times 18 \times 13 \cos(\dots)$
	59.574 to 59.575	A1	
(b)	164 or 163.8 to 163.9	3	M1 for $\frac{1}{2} \times 18 \times 7$ oe M1 for $\frac{1}{2} \times 18 \times 13 \times \sin 59.57$ oe

Question	Answer	Marks	Partial Marks
(c)	15.5 or 15.52...	2	M1 for $\sin 59.57 = \frac{\text{distance}}{18}$ oe
(d)	191 or 190.5 to 190.6	6	M2 for $7^2 + 13^2 - 2 \times 7 \times 13 \cos(90 + 59.57)$ or B1 for [angle $BCD =$] 149.57 M2 for $\frac{7 \sin(90 + 59.57)}{\text{their } BD}$ or M1 for $\frac{\text{their } BD}{\sin(90 + 59.57)} = \frac{7}{\sin DBC}$ M1 for $180 + \text{their } DBC$ oe

53. 0607_w21_ms_41 Q: 11

Question	Answer	Marks	Partial Marks
(a)	$[\cos =] \frac{159^2 + 108^2 - 217^2}{2 \times 159 \times 108}$	M2	M1 for $217^2 = 159^2 + 108^2 - 2 \times 159 \times 108 \times \cos[ABC]$
	107.17 to 107.18	A1	
(b)(i)	$\frac{159 \sin 107.2}{217}$	M2	M1 for $\frac{\sin BAC}{159} = \frac{\sin 107.2}{217}$
	44.42 to 44.43	A1	
(b)(ii)	261 or 260.5 to 260.6	1	

Question	Answer	Marks	Partial Marks
(c)	02 03	5	B4 for 3h 13 mins or 3.215 to 3.22 hours OR M2 for $108 \cos 44.4$ or M1 for $\cos 44.4 = \frac{[AN]}{108}$ M1 for $\text{their } 77.2 \div 24$ If 0 scored, SC1 for converting <i>their</i> time in hours to hours and minutes or minutes only

54. 0607_s20_ms_42 Q: 8

Question	Answer	Marks	Partial Marks
(a)(i)	138	1	
(a)(ii)	318	1	FT <i>their</i> (i) + 180
(b)	48.8 or 48.78...	2	M1 for $\tan[x =] \frac{6.13}{5.37}$
(c)	31.1 or 31.08...	3	M2 for $\frac{6.13 \times 5.37}{2} + \frac{1}{2} \times 6.13 \times 6.42 \times \sin 48$ or M1 for $\frac{6.13 \times 5.37}{2}$ or $\frac{1}{2} \times 6.13 \times 6.42 \times \sin 48$
(d)	5.11 or 5.111...	3	B2 for 26.1... or M1 for $6.13^2 + 6.42^2 - 2 \times 6.13 \times 6.42 \times \cos 48$
(e)	201 or 200.9 to 201.1...	4	B3 for 69[.0] or 68.89 to 68.90 or M2 for $\sin C = \frac{\sin 48}{\text{their}(d)} \times 6.42$, [C = 69.0] or M1 for $\frac{\sin C}{6.42} = \frac{\sin 48}{\text{their}(d)}$

55. 0607_s20_ms_43 Q: 11

Question	Answer	Marks	Partial Marks
(a)	165 or 165.4...	3	M1 for $80^2 + 120^2 - 2 \times 80 \times 120 \times \cos 110$ A1 for 27 366 to 27 367
(b)	43[.0] or 42.97 to 43.11	3	M2 for $\frac{120 \sin 110}{\text{their}(a)}$ or M1 for $\frac{\sin ABC}{120} = \frac{\sin 110}{\text{their}(a)}$
(c)	283	2	FT 240 + <i>their</i> (b) B1 for 27 or 50 or 130 correctly identified at C

Question	Answer	Marks	Partial Marks
(d)	1525	5	M1 for $\cos(\text{their } (b)) = \frac{x}{80}$ A1 for 58.4 or 58.5 or 58.40 to 58.54 M1 for $\text{their } 58.5 \div 37$ M1 for correctly converting <i>their</i> time to hours and mins.

56. 0607_w20_ms_42 Q: 6

Question	Answer	Marks	Partial Marks
(a)	$[\cos =] \frac{44^2 + 95^2 - 62^2}{2 \times 44 \times 95}$	M2	M1 for $62^2 = 44^2 + 95^2 - 2 \times 44 \times 95 \cos[\dots]$
	31.64...	A1	
(b)	145 or 145.4 to 145.5	3	B2 for [angle $DAC =$] 38.8 or 38.83 to 38.84 or M1 for $\cos [DAC] = \frac{74}{95}$ oe
(c)	23.1 or 23.05 to 23.09	2	M1 for $\frac{\text{distance}}{44} = \sin 31.6$ oe
(d)	3300 or 3296 to 3302	3	M1 for $0.5 \times 95 \times \text{their}(c)$ oe M1 for $0.5 \times 74 \times 95 \times \sin(\text{their } 38.8)$ oe

57. 0607_s19_ms_42 Q: 11

Question	Answer	Marks	Partial Marks
(a)	118 or 117.7 to 117.8	3	M2 for $\frac{102}{\cos 30}$ oe or M1 for $\frac{102}{DC} = \cos 30$ oe or $102 = DC \times \cos 30$ oe
(b)	106 or 106.2...	3	M1 for $110^2 + 102^2 - 2 \times 110 \times 102 \times \cos 60$ A1 for 11 284
(c)	7860 or 7858 to 7870	3	M1 for $0.5 \times 102 \times \text{their } DC \times \sin 30$ oe (3000 or 3010 or 3001 to 3009) M1 for $0.5 \times 102 \times 110 \times \sin 60$ oe (4860 or 4858...)

Question	Answer	Marks	Partial Marks
(d)	236 or 236.2 to 236.4...	4	B2 for 56.3 or 56.4 or 56.25 to 56.44... or M2 for $\frac{102 \sin 60}{\text{their } AB}$ oe or M1 for $\frac{\sin 60}{\text{their } AB} = \frac{\sin BAD}{102}$ oe and M1 for $180 + \text{their angle } BAD$ oe

58. 0607_w19_ms_41 Q: 7

Question	Answer	Marks	Partial Marks
(a)	[Angle $ABC =$] 120	B1	
	$10^2 + 12^2 - 2 \times 10 \times 12 \cos(\text{their } ABC)$	M1	
	19.078 to 19.079	A2	A1 for 364

Question	Answer	Marks	Partial Marks
(b)	$\frac{10 \sin 120}{19.08}$	M2	M1 for $\frac{19.08}{\sin 120} = \frac{10}{\sin ACB}$ oe
	26.99...	A1	M1 only and A1 imply M2 A1
(c)	249.8 to 250[.0]	4	M2 for $[\cos ACD =] \frac{21^2 + 19.08^2 - 18^2}{2 \times 21 \times 19.08}$ oe or M1 for $18^2 = 21^2 + 19.08^2 - 2 \times 21 \times 19.08 \times \cos(ACD)$ M1 for $360 - (30 + 27 + \text{their } ACD)$ oe
(d)	5.45 or 5.446 to 5.448	2	M1 for $12 \sin 27.0$ oe
(e)	52[.0] or 51.94 to 51.99...	2	M1 for $\frac{1}{2} \times 19.08 \times \text{their (d)}$ or for $\frac{1}{2} \times 10 \times 12 \times \sin 120$ oe or for $\frac{1}{2} \times 19.08 \times 12 \times \sin 27$

59. 0607_s18_ms_43 Q: 6

Question	Answer	Marks	Partial Marks
(b)	$\begin{pmatrix} 187 \text{ or } 187.1 \text{ to } 187.2 \\ -46.5 \text{ or } -46.49\dots \end{pmatrix}$	5	M2 for <i>their</i> $72.5 + 140\cos35$ oe or M1 for $\frac{[\dots]}{140} = \cos35$ oe seen (140cos35 oe) M2 for <i>their</i> $33.8 - 140\sin35$ oe or M1 for $\frac{[\dots]}{140} = \sin35$ oe seen (140 sin35 oe)
(c)(i)	$(\textit{their } 187)^2 + (\textit{their}[-] 46.5)^2$	M1	
	193 or 192.6 to 192.9	B1	

Question	Answer	Marks	Partial Marks
(c)(ii)	$\tan[x] = \frac{\textit{their } 46.5}{\textit{their } 187}$ oe soi by 13.9...	M1	
	284 or 283.9 to 284.0	B2	M1 for $270 + \textit{their } x$ oe

60. 0607_w18_ms_42 Q: 10

Question	Answer	Marks	Partial Marks
(a)	60.2 or 60.22 to 60.23.	4	B1 for angle $ACB = 95$ M2 for $\frac{120\sin(\textit{their } CAB)}{\sin(\textit{their } ACB)}$ oe or M1 for $\frac{BC}{\sin(\textit{their } CAB)} = \frac{120}{\sin(\textit{their } ACB)}$

Question	Answer	Marks	Partial Marks
(b)	228 or 228.1 to 228.2 nfw	4	M2 for $\cos[ABD] = \frac{120^2 + 90^2 - 80^2}{2 \times 120 \times 90}$ or M1 for $80^2 = 120^2 + 90^2 - 2 \times 120 \times 90 \cos ABD$ A1 for 41.8 or 41.80 to 41.81

61. 0607_s17_ms_42 Q: 7

Question	Answer	Marks	Partial Marks
(a)	Correct sketch showing bearings and distances	3	B1 for 310° bearing approx correct (270 to 360) and marked B1 for 250° bearing approx correct (180 to 270) and marked B1 for distances correctly marked
(b)	120	1	
(c)	$40^2 + 65^2 - 2 \times 40 \times 65 \times \cos \textit{their} 120$	M1	<i>their</i> 120 must be between 0 and 180 Allow $\cos 120 = \frac{40^2 + 65^2 - []^2}{2 \times 40 \times 65}$
	91.78 to 91.79	A2	A1 for 8425 or $5\sqrt{337}$
(d)	288 or 287.8...	4	M2 for $\frac{40 \sin(\textit{their}120)}{91.8}$ oe or M1 for $\frac{\sin \theta}{40} = \frac{\sin(\textit{their}120)}{91.8}$ oe If cosine rule used, M2 for explicit expression or M1 for implicit. A1 for 22.2 or 22.16 to 22.17... If 0 scored SC2 for answer 108 or 107.8...

62. 0607_w17_ms_41 Q: 8

Question	Answer	Marks	Partial Marks
(a)	300°	3	B1 for $ABN' = 150$ or $ABS' = 30$ B1 for $N'BC = 120$ or $CBS' = 60$ OR B1 for $ACB = 35$ B1 for $N'CB = 60$
(b)	$\frac{60}{\cos 55}$ oe	M2	or M1 for $\cos 55 = \frac{60}{AC}$ oe
	104.60 to 104.62	A1	
(c)	9780 or 9776 to 9782. ...	6	B1 for angle $ADC = 41$ M2 for $[AD =] \frac{104.6 \sin 76}{\sin(\text{their } 41)}$ (154.7...) or M1 for $\frac{104.6}{\sin(\text{their } 41)} = \frac{AD}{\sin 76}$ M1 for $\frac{1}{2} \times 60 \times 104.6 \times \sin 55$ oe M1 for $\frac{1}{2} \times 104.6 \times \text{their } AD \times \sin 63$ oe
(d)	93.2 or 93.16 to 93.23	2	M1 for $104.6 \times \sin 63$ oe

63. 0607_w17_ms_42 Q: 10

Question	Answer	Marks	Partial Marks
(a)(i)	125	1	
(a)(ii)	305	2	FT <i>their</i> (i), Dep on (i) < 180 M1 for $180 + \text{their}(i)$, Dep on (i) < 180

Paper Perfection, Crafted With Passion

Question	Answer	Marks	Partial Marks
(b)	69.3 or 69.32 to 69.33	3	M1 for $90^2 + 120^2 - 2 \times 90 \times 120 \cos 35$ A1 for 4806...
(c)	60.3 or 60.28 to 60.29	3	M2 for $\frac{115 \sin 65}{120}$ oe or M1 for $\frac{115}{\sin BAC} = \frac{120}{\sin 65}$ oe
(d)(i)	8730 or 8728 to 8730...	4	M1 for $0.5 \times 90 \times 120 \times \sin 35$ M2 for $0.5 \times 120 \times 115 \times \sin(180 - 65 - \text{their (c)})$ oe or M1 for angle $ACB = 180 - 65 - \text{their (c)}$
(d)(ii)	349 or 349.1 to 349.2...	3	FT <i>their</i> (d)(i) $\div 25$ M2 for <i>their</i> (i) $\div 25$ oe or M1 for squaring scale oe or for figs 349 or 3491 to 3492

64. 0607_s16_ms_41 Q: 7

Question	Answer	Mark	Part Marks
(a)	19.9 or 19.89 to 19.90	3	M2 for $36^2 - 30^2$ soi by 396 or M1 for $AD^2 + 30^2 = 36^2$ oe
(b)	30 \div tan 68 oe 12.12...	M2 A1	M1 for $\tan 68 = \frac{30}{AC}$ oe
(c)	301 or 301.3 to 301.4 or 239 or 238.6 to 238.7	3	B2 for 31.3 or 31.30 to 31.35 or M1 for $\tan = 12.1 \div \text{their (a)}$ oe

65. 0607_w16_ms_42 Q: 2

Question	Answer	Mark	Part Marks
(a)	2.83 or 2.828...	3	B2 for $\sqrt{8}$ or $2\sqrt{2}$ final answer or M2 for $2^2 + 2^2$ or M1 for correct sketch
(b)	225 cao	2	B1 for 45 soi by e.g. 135 If 0 scored SC1 for 224.9 to 225.1
(c)	8 cao	2	M1 for $2 \times 3 + 0.5 \times 2 \times 2$ oe

66. 0607_w16_ms_43 Q: 8

Question	Answer	Mark	Part Marks
(a)	360 – (155 + 115) oe	1	e.g. 25 + 65 with those angles marked on diagram
(b)	36.9 or 36.86 to 36.87	2	M1 $\tan [C] = \frac{60}{80}$ oe
(c)	100 or 99.93 to 100.04	2	M1 for $60^2 + 80^2$ oe
(d)	94.0 or 94.1 or 94.01 to 94.06	4	B1FT for $ACD = 63.1$ to 63.13 M1 for $75^2 + (\text{their } 100)^2 - 2 \times 75 \times \text{their } 100 \times \cos \text{their } 63.1$ A1 for 8838 to 8846

Question	Answer	Mark	Part Marks
(e)	123 or 123.4 to 123.5	4	M2 for $\frac{75 \sin(\text{their } 63.1)}{\text{their } 94.1}$ or for $[\cos =] \frac{(\text{their } 100)^2 + (\text{their } 94.1)^2 - 75^2}{2 \times (\text{their } 100) \times (\text{their } 94.1)}$ or M1 for $\frac{\sin CAD}{75} = \frac{\sin(\text{their } 63.1)}{\text{their } 94.1}$ or for $75^2 = (\text{their } 100)^2 + (\text{their } 94.1)^2 - 2(\text{their } 100)(\text{their } 94.1)$ A1 for 45.3 or 45.4 or 45.29 to 45.37

67. 0607_s15_ms_43 Q: 7

Qu.	Answer	Mark	Part Marks
(a)	86 [.0] or 86.03 to 86.04	2	M1 for $\frac{AB}{150} = \cos 55$ oe
(b)	246° or 245.5 to 245.6	4	M2 for $[\cos =] \frac{120^2 + 150^2 - 235^2}{2 \times 120 \times 150}$ (120.6) or M1 for $235^2 = 120^2 + 150^2 - 2 \times 120 \times 150 \cos \theta$ M1 for 125 + their 120.6
(c)	13 000 or 13 030 to 13 035	3	M2 for $\frac{1}{2} \times 150 \times \text{their } 86 \times \sin 55$ oe $+\frac{1}{2} \times 120 \times 150 \times \sin(\text{their } DAC)$ oe or M1 for 1 of above areas soi by 5283 to 5285. ... or 7746. ...