Question	Answer	Marks	Partial Marks
8(b)	For use of $\sin^2 x = 1 - \cos^2 x$ to write in terms of cos$x$ only e.g. $3(1-\cos^2 x) - 2\cos x = 1 - 3\cos x$	**M1**	
	Collects terms e.g. $3\cos^2 x - \cos x - 2 = 0$	**A1**	
	Factorises the left-hand side or solves: $(3\cos x + 2)(\cos x - 1) = 0$	**M1**	
	$x = 2.3[0]$, $x = 3.98$ and no extras	**A2**	not from wrong working **A1** for either; not from wrong working
9(a)	[area sector =] $2 \times \frac{1}{2} a^2 \phi$ or $\frac{1}{2} a^2 (2\phi)$ oe	**B1**	or [area kite =] $2a^2\phi$ or [area OPT =] $a^2\phi$ nfww
	[shaded area =] $\left[2 \times \frac{1}{2} \times\right] \frac{1}{2} a(a\tan\phi)$ oe or $a(a\tan\phi) - \frac{1}{2} a^2 (2\phi)$ oe soi	**B1**	or $[a^2\phi = \frac{1}{2} a \times PT \therefore]$ $PT = 2a\phi$ **and** $PT = a\tan\phi$ oe, nfww
	Correct equation using correct areas e.g. $a^2\phi = \frac{1}{2} a(a\tan\phi)$ or $a(a\tan\phi) - a^2\phi = a^2\phi$ soi	**M1**	or equates expressions for PT
	Correct completion to given equation $\tan\phi = 2\phi$	**A1**	
	Alternative method [$\frac{1}{2}$ area sector =] $\frac{1}{2} a^2 \phi$	**(B1)**	
	[$\frac{1}{2}$ shaded area =] $\frac{1}{2} \times \frac{1}{2} a(a\tan\phi)$ oe or $\frac{1}{2} a(a\tan\phi) - \frac{1}{2} a^2\phi$ oe soi	**(B1)**	
	Correct equation using correct areas e.g. $\frac{1}{2} a^2\phi = \frac{1}{4} a(a\tan\phi)$ or $\frac{1}{2} a^2 \tan\phi - \frac{1}{2} a^2\phi = \frac{1}{2} a^2\phi$ soi	**(M1)**	
	Correct completion to given equation $\tan\phi = 2\phi$	**(A1)**	

Question	Answer	Marks	Partial Marks
9(b)	$2a + a(2\phi) = \frac{1}{2}(2a\tan\phi + a(2\phi))$ oe or $a\tan\phi = 2a + a\phi$	**M2**	**M1** for arc length = $2a\phi$ soi or for $PT = a\tan\phi$ **and** $PT = 2a + a\phi$
	$\tan\phi = 2 + \phi$	**A1**	
10(a)(i)	$ar = 8$ and $ar^2 + ar^3 = 160$ soi	**B2**	**B1** for each
	Correct unsimplified quadratic equation in r e.g. $\left[a = \frac{8}{r} \text{ and so } \right] \frac{8}{r} \times r^2 + \frac{8}{r} \times r^3 = 160$ oe	**M1**	
	Correct simplification to $r^2 + r - 20 = 0$	**A1**	
10(a)(ii)	Factorises or solves: $(r + 5)(r - 4) = 0$	**M1**	
	$r = 4$	**A1**	
	$a = 2$	**A1**	
	Alternative method $5a^2 - 2a - 16 = 0$ oe	**(B1)**	
	Factorises or solves *their* 3-term quadratic in a	**(M1)**	
	$a = 2$	**(A1)**	
10(b)	$p + 2(q - 1) = 14$ oe	**B1**	
	$\frac{q}{2}\{2p + 4(q-1)\} = 168$ oe	**B1**	
	Eliminates p or q e.g. $\frac{q}{2}\{2(14 - 2(q-1)) + 4(q-1)\} = 168$ OR simplifies S_q: $q\{p + 2(q-1)\} = 168$ and writes $q(14) = 168$	**M1**	condone one error in rearrangement of either equation before substituting
	Correctly solves *their* equation for *their p* or *their q*	**M1**	**dep** on previous **M1**
	$q = 12$ and $p = -8$	**A2**	**A1** for $q = 12$ or $p = -8$