Question	Answer	Marks	Guidance
8(b)	$\frac{n!}{(n-4)!4!}=\frac{6n!}{(n-2)!2!}$	**B1**	
	$(n-2)(n-3)=72$	**2**	**B1** for $(n-2)(n-3)$
			B1 for 72
	$n=11$ only	**2**	**M1** for correct attempt to form and solve a quadratic equation **A1** for $n=11$ only
9(a)	$AOD=2\times\tan^{-1}\left(\frac{2}{3}\right)$	**M1**	For correct method to find *AOD*
	$AOD=1.1760...$ $AOD=1.176$ [to 3dp]	**A1**	Need to see 4 dp or more to justify 3 dp answer
9(b)	Major arc $MN=(2\pi-1.176)12$	**B1**	
	ND or $MA=12-\sqrt{13}$	**B1**	
	Perimeter = major arc *MN* + *MA* + *ND* + 16 oe	**B1**	For *their* values in a correct plan, may be implied by a correct answer
	Perimeter = 94.1	**B1**	
9(c)	Minor sector area = $\frac{1}{2}\times1.176\times12^2$ **or** Major sector area = $\frac{1}{2}\times(2\pi-1.176)\times12^2$	**B1**	
	Area = major sector area – remainder of rectangle or Area = area of circle – minor sector area – remainder of rectangle or Area = circle – rectangle – minor sector + triangle *AOD*	**B1**	For *their* values in a correct plan, may be implied by a correct answer
	Area = 350	**B1**	Allow greater accuracy
10(a)	At *A* $y=4$	**B1**	
	At *B* $y=\frac{13}{16}$ or 0.8125	**B1**	

Question	Answer	Marks	Guidance
10(b)	**Either** Area of trapezium = $\frac{231}{32}$	**B1**	Allow unsimplified
	$\int_{-1}^{2}\frac{1}{(x+2)^2}+\frac{3}{x+2}\,dx$ $=\left[-\frac{1}{x+2}+3\ln(x+2)\right]_{-1}^{2}$	**2**	**B1** for $-\frac{1}{x+2}$ **B1** for $3\ln(x+2)$
	$\left[\left(-\frac{1}{4}+3\ln 4\right)-(-1)\right]$	**M1**	For correct use of limits in *their* integral, but must have at least one of the two preceding **B** marks
	Area = $\frac{207}{32}-\ln 64$	**2**	**A1** for $\frac{207}{32}$ **A1** for $-\ln 64$
	Or $\int_{-1}^{2}-\frac{17}{16}x+\frac{47}{16}-\frac{1}{(x+2)^2}-\frac{3}{x+2}\,dx$ $\left[\left(-\frac{17}{32}x^2+\frac{47}{16}x+\frac{1}{x+2}-3\ln(x+2)\right)\right]_{-1}^{2}$	**(3)**	**B1** for $-\frac{17}{32}x^2+\frac{47}{16}x$ **B1** for $\int\frac{1}{(x+2)^2}dx=-\frac{1}{(x+2)}$ **B1** for $\int\frac{3}{x+2}dx=3\ln(x+2)$
	$\left(-\frac{17}{8}+\frac{47}{8}+\frac{1}{4}-3\ln 4\right)-\left(-\frac{17}{32}-\frac{47}{16}+1\right)$	**(M1)**	For correct use of limits in *their* integral, but must have at least one of the two preceding **B** marks
	Area = $\frac{207}{32}-\ln 64$	**(2)**	**A1** for $\frac{207}{32}$ **A1** for $-\ln 64$
11(a)(i)	0	**B1**	
11(a)(ii)	-3	**B1**	
11(a)(iii)	$\left(\frac{1}{2}(25+15)\times 30\right)+\left(\frac{1}{2}(30+60)\times 10\right)+\left(\frac{1}{2}\times 20\times 60\right)$	**M1**	For an unsimplified expression for the required area allowing at most one incorrect length
	Total distance = 1650	**A1**	
11(b)(i)	$v=4\cos\frac{5\pi}{3}-4$ $=-2$	**M1**	
	Speed = 2	**A1**	