Bergen County Mathematics League

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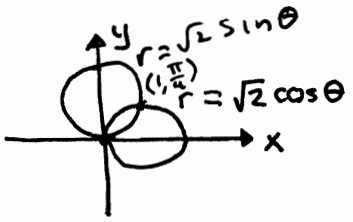
Brief Contest Solutions #6

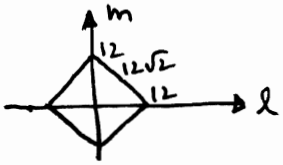
2010-2011

6-1) 

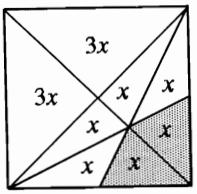
$\boxed{2}$ as seen at the left.

6-2) $f(x)=ax^5+bx^3+cx+5$, so $f(-x)=-(ax^5+bx^3+cx)+5=$
$-[f(x)-5]+5=-f(x)+10$, so $f(-3)=-f(3)+10=-9+10=\boxed{1}$.

6-3) Since $\sin x\cos x=\frac{1}{4}$, $2\sin x\cos x=\sin 2x=2(\frac{1}{4})=\frac{1}{2}$
$\therefore 2x=\frac{\pi}{6}$ is least positive solution,
so $x=\boxed{\frac{\pi}{12}}$

6-4) Let ℓ and m be the x- and y-axis respectively. Then


perimeter is $4(12\sqrt{2})=\boxed{48\sqrt{2}}$.

6-5) 

From the diagram from contest #5, problem 2,
the area is $\frac{8}{12}(900)=\frac{2}{3}(900)=\boxed{600}$.

6-6) By the law of cosines,
$PQ^2=6^2+8^2+2\cdot 6\cdot 8\cdot\frac{\sqrt{3}}{2}=\boxed{100+48\sqrt{3}}$.