Bergen County Mathematics League

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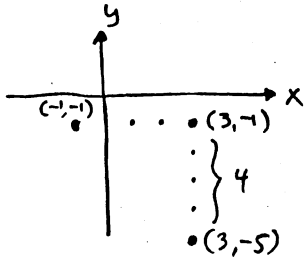
Brief Contest Solutions #3

2013-2014

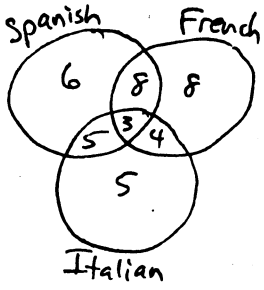
3-1.



side of square = $2(4) = 8$

Area = $8^2 = \boxed{64}$.

3-2.



Start with $S \cap F \cap I = 3$ and work outwards

Total # of people = $\boxed{39}$

3-3. Since $3.14 < \pi < \frac{22}{7}$

$21.98 < 7\pi < 22$, so $n = \boxed{8}$

3-4. $\sqrt{11+6\sqrt{2}} = \sqrt{(3+\sqrt{2})^2} = 3+\sqrt{2}$

$\sqrt{11-6\sqrt{2}} = \sqrt{(3-\sqrt{2})^2} = 3-2\sqrt{2}$

Difference is $2\sqrt{2} \approx \boxed{2.8}$

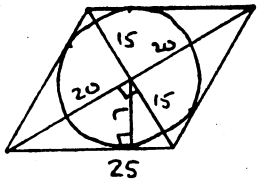
Method II: Squaring, $\left(\sqrt{11+6\sqrt{2}} - \sqrt{11-6\sqrt{2}}\right)^2 = 8$, so $\sqrt{8} \approx 2.8$

3-5. $f(2013) = 2013^5 + 2013^3 + 2013 + 1$

$f(-2013) = -2013^5 - 2013^3 - 2013 + 1$

Sum = $\boxed{2}$

3-6.



$(15)(20) = (25)(r)$, so $r = 12$

and $\pi r^2 = \boxed{144\pi}$