Bergen County Mathematics League

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Brief Contest Solutions #2

2013-2014

2-1. Case I: $x \le -2013$; Case II: $-2013 < x \le 0$; Case III: $x > 0$

Case I: $x \le -2013$; $-x+2013 = 1+(-x-2013)$. No solution

Case II: $-2013 < x \le 0$; $-x+2013 = 1+x+2013 \Leftrightarrow x = \boxed{-\frac{1}{2}}$

Case III: $x > 0$; $x+2013 = 1+x+2013$. no solution

2-2. $\frac{1}{(n)(n+1)} = \frac{1}{n} - \frac{1}{n+1}$, so $\frac{1}{1\cdot 2} + \frac{1}{2\cdot 3} + \cdots + \frac{1}{98\cdot 99} = 1 - \frac{1}{2} + \frac{1}{2} - \frac{1}{3} + \cdots + \frac{1}{98} - \frac{1}{99}$

$= 1 - \frac{1}{99} = \boxed{\frac{98}{99}}$

2-3. $\left[\frac{22}{7}\right] = 3$. For $n=6$, $\left[\frac{22}{7}n\right] = 18 = 6\cdot 3$

For $n = \boxed{7}$, $\left[\frac{22}{7}n\right] = 22 = 7\cdot 3 = 21$

2-4. $(x+2)^2 + y^2 = 9+4$

If $x+2 = \pm 3$, $y = \pm 2$

If $x+2 = \pm 2$, $y = \pm 3$

2-5. $1 + 4 + 16 = \boxed{21}$

2-6. By Hero's Formula, Area $= \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{(16)(9)(5)(2)} = 12\sqrt{10}$

$\therefore \pi r^2 = 12\sqrt{10}$

$r = \boxed{\sqrt{\frac{12\sqrt{10}}{\pi}}} = \sqrt[4]{\frac{1440}{\pi^2}}$