

Bergen County Mathematics League

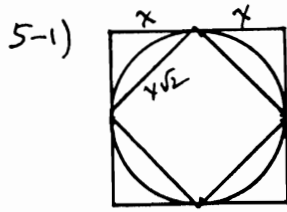
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Brief Contest Solutions #5

2007-2008



$$\frac{\text{area of circumsquare}}{\text{area of insquare}} = \left(\frac{2x}{x\sqrt{2}}\right)^2 = \frac{4}{2} = \frac{2}{1}, \text{ so}$$
 the area of the circumscribed square = $2(60) = \boxed{120}$.

5-2) $\log_x \sqrt{x+12} > 1$ First, since the base is x , $0 < x, x \neq 1$.

If $x > 1$, then $\sqrt{x+12} > x$ If $0 < x < 1$, $\sqrt{x+12} < x$

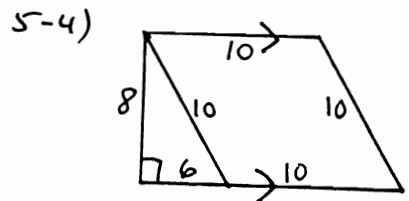
$x+12 > x^2$ $x^2 - x - 12 > 0$

$x^2 - x - 12 < 0$ no solutions

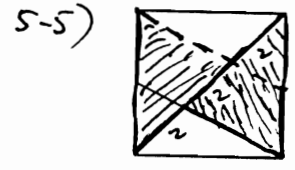
$(x-4)(x+3) < 0$

$\boxed{1 < x < 4}$ or $(1, 4)$

5-3) $0! = 1$ $1! = 1$ $2! = 2$ $3! = 6$ $4! = 24$ $5! = 120$. Whatever we multiply by now, the units' digit remains 0. So the sum has the same units' digit as $0! + 1! + 2! + 3! + 4! = 34$ whose units' digit is $\boxed{4}$.



Area = $\frac{1}{2}(b_1 + b_2)h = 4(26) = \boxed{104}$.



Using the two shaded Δ s and their midlines (aka bimedians) the length of the square's diagonal is 6, so its area = $\frac{d^2}{2} = \frac{6^2}{2} = \boxed{18}$.

5-6) $\sqrt{5x} - \sqrt{2x} = 5-2 \Leftrightarrow \sqrt{x}(\sqrt{5} - \sqrt{2}) = 5-2 = (\sqrt{5} - \sqrt{2})(\sqrt{5} + \sqrt{2})$

Dividing, $\sqrt{x} = \sqrt{5} + \sqrt{2}, \text{ so}$

$x = 5 + 2\sqrt{10} + 2 = \boxed{7 + 2\sqrt{10}}$.