IGP

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1. Consider rectangle $ABCD$ with $AB = 6, BC = 8$. Let M be the midpoint of AD and let N be the midpoint of CD. Let BM, BN intersect AC at X, Y. Find XY. *(W1)*
2. Prove $[ABC] = rs$. *(1.5)*
3. Consider $\triangle ABC$ with $AB = 5, BC = 12, AC = 13$. Angle bisector AD and median AE is drawn such that B, C, D, E are collinear. Find $[ADE]$. *(2.2)*
4. Simplify $(1 + x)(1 + x^2)(1 + x^4)(1 + x^8)(1 + x^{16})$. *(3.3)*
5. If $f(x) = \frac{x^2}{x^2-1}$, find $\prod_{n=3}^{50} f(n)$. *(3.6)*
6. Find the number of subsets of $\{1, 2, 3, 4, 5, 6, 7, 8\}$ that are subsets of neither $\{1, 2, 3, 4, 5\}$ nor $\{4, 5, 6, 7, 8\}$. *(4.4)*