1. In the arrow-shaped polygon [see figure], the angles at vertices $A, C, D, E$ and $F$ are right angles, $BC = FG = 5$, $CD = FE = 20$, $DE = 10$, and $AB = AG$. The area of the polygon is closest to
(A) 288  (B) 291  (C) 294
(D) 297  (E) 300

2. The integers 1, 2, 3, 4 are arranged in a $2 \times 2$ matrix $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$. The probability that the determinant, $ad - bc$, is even is
(a) $\frac{1}{3}$  (b) $\frac{2}{5}$  (c) $\frac{1}{2}$  (d) $\frac{2}{3}$  (e) $\frac{4}{5}$

3. Each day Walter gets $3 for doing his chores or $5 for doing them exceptionally well. After 10 days of doing his chores daily, Walter has received a total of $36. On how many days did Walter do them exceptionally well?
(A) 3  (B) 4  (C) 5  (D) 6  (E) 7

4. What is the sum of the digits of the decimal form of the product $2^{1999} \cdot 5^{2001}$?
(A) 2  (B) 4  (C) 5  (D) 7  (E) 10
5. The ratio of the radii of two concentric circles is 1:3. If $\overline{AC}$ is a
diameter of the larger circle, $\overline{BC}$ is a chord of the
larger circle that is tangent to the smaller circle, and
$AB = 12$, then the radius of the larger circle is
(A) 13     (B) 18     (C) 21     (D) 24     (E) 26

6. In how many ways can 5 dollars be paid in dimes and quarters?
   (a) 25     (b) 24     (c) 10     (d) 11     (e) None of these

7. Renzo rolls a fair regular octahedral die marked with the numbers 1 through 8. Then
Nick rolls a fair six-sided die. What is the probability that the product of the two rolls is a
multiple of 3?
   (a) $\frac{1}{12}$     (b) $\frac{1}{3}$     (c) $\frac{1}{2}$     (d) $\frac{7}{12}$     (e) $\frac{2}{3}$

8. Let $f$ be a linear function with the properties that $f(1) \leq f(2)$, $f(3) \geq f(4)$,
   and $f(5) = 5$. Which of the following statements is true?
   (A) $f(0) < 0$     (B) $f(0) = 0$     (C) $f(1) < f(0) < f(-1)$
   (D) $f(0) = 5$     (E) $f(0) > 5$

9. For how many values of $k$ is $12^{12}$ the least common multiple of the positive integers
   $6^k$, $8^k$, and $k$?
10. Find all positive integers $x$ and $y$ such that $x^2 = y^2 + 77$.

11. In how many ways can 7 people be divided into two teams, with each team having at least one member?
   (a) 72   (b) 32   (c) 144   (d) 48   (e) 63

12. Point $P$ is 9 units from the center of a circle of radius 15. How many different chords of the circle contain $P$ and have integer lengths?
   (A) 11   (B) 12   (C) 13   (D) 14   (E) 29

13. Part of an “$n$-pointed regular star” is shown. It is a simple closed polygon in which all $2n$ edges are congruent, angles $A_1, A_2, \ldots, A_n$ are congruent and angles $B_1, B_2, \ldots, B_n$ are congruent. If the acute angle at $A_1$ is 10° less than the acute angle at $B_1$, then $n =
   (A) 12   (B) 18   (C) 24   (D) 36   (E) 60