1. Find $x + y$ if $x - y = 29$ and $\sqrt{x} + \sqrt{y} = 29$

A. 421 B. 481 C. 841 D. 870 E. 1684

2. Consider the function $g(x) = ax^4 + bx^3 + cx^2 + dx + e$ whose graph is obtained by shifting the graph of the function $f(x) = 2x^4 + 4x^3 + 26x^2 - 60x + 81$ three units to the left. Find $a + b + c + d + e$.

A. 305 B. 840 C. 855 D. 995 E. 1025

3. George writes down a 3-digit number N with three different nonzero digits and then rearranges the digits to form another 3-digit number M with no digit in its original place. If M + N = 1092, find $|M - N|$.

A. 162 B. 378 C. 432 D. 612 E. 738

4. Let $P(x) = Ax^5 + Bx^4 + Cx^3 + Cx^2 + Bx + A$ be a fifth-degree polynomial with integer coefficients where $A > 0$ and the greatest common factor of A, B, and C is 1. If $\sqrt{7}$ is a zero of P(x), find A + B + C.

A. -50 B. -36 C. 0 D. 36 E. 50

5. Three people (X, Y, Z) are in a room with you. One is a knight (knights always tell the truth), one is a knave (knaves always lie), and the other is a spy (spies may either lie or tell the truth). X says, "Z is the knave." Y says, "X is the knight." Z says, "I am the spy." Which of the following correctly identifies all three people?

A.	B.	C.	D.	E.
X is the knave.	X is the spy.	X is the knight.	X is the knight	X is the knave.
Y is the knight.	Y is the knave.	Y is the knave.	Y is the spy.	Y is the spy.
Z is the spy.	Z is the knight.	Z is the spy.	Z is the knave.	Z is the knight.

6. Suppose there are three light bulbs that are turned off. When a button is pushed, a random bulb is selected and then changed: if the bulb was off when the button was pushed, the bulb turns on, and if the bulb was on when the button was pushed, the bulb turns off. What is the probability that there is at least one bulb on after 4 button pushes?

A. 7/27 B. 4/9 C. 5/9 D. 20/27 E. 8/9

7. Given the system $\begin{cases} x^3 + y = 1739 \\ x + y^3 = 1343 \end{cases}$, find $x + y$ if x and y are both positive integers.

A. 20 B. 21 C. 22 D. 23 E. 24

8. $\{a_n\}$ is a sequence defined by $a_n = f(n)$ where $f(n)$ is a 3rd degree polynomial function. If the first four terms are $a_0 = 1$, $a_1 = 2$, $a_2 = 3$, and $a_3 = 5$, find a_{12}.

A. 144 B. 177 C. 233 D. 300 E. 377

9. A circle with center P is inscribed in ΔABC with right angle A. such that the circle is tangent to all 3 sides of ABC. Segment BP is extended until it intersects AC at point M. If the length of leg AB is 1050 and the length of leg AC is 1728, the length of segment AM can be written in lowest terms as p/q where p and q are relatively prime positive integers. Determine $p + q$.

A. 425 B. 473 C. 475 D. 4725 E. 4733

10. Over the weekend, Omar, Paula, Quentin, Rosa, Sam, and Thieu each packed several gift bags; they packed 91, 92, 93, 94, 95, and 96 bags, respectively. Each of them packed k times as many bags on Saturday as on Sunday, where k was a different whole number between 1 and 6 inclusive for each of them. Who packed three times as many bags on Saturday as on Sunday?

A. Thieu B. Paula C. Quentin D. Rosa E. Sam