Question 1. What is the following when expressed in simplified form with no negative exponents?

\[
\frac{\sqrt[5]{90x^{27}y^{33}z^{41}k^{39}}}{\sqrt[5]{3x^{15}y^{18}z^{20}k^{11}}}
\]

Answer: \(\frac{2x^8z^3k^{10}}{y^3}\)

Question 2. What is the following expressed in \(a + bi\) form?

\[
\frac{7 + i}{3 - i} + (2 - i)^4 + i^{253}
\]

Answer: \(-5 - 22i\)

Question 3. In the given triangle \(ABC\), angle \(A\) has degree measure 30, angle \(B\) has degree measure 45, and \(AC\) has length 10. What is the length of \(BC\) ?

Answer: \(5\sqrt{2}\)

Question 4. How many minutes are there in the year 2010?

Answer: 525,600

Question 5. What is the least possible degree of a polynomial that has the following graph?

Answer: 5

Question 6. Evaluate

\[
\sum_{k=1}^{2010} (-1)^{k}(2k)
\]

Answer: 2010

Question 7. What value of \(\theta, 0^\circ \leq \theta \leq 180^\circ\) satisfies the equation

\[
sin(30^\circ + \theta) + sin(30^\circ - \theta) = \frac{1}{2}
\]

Answer: 60°

Question 8. What is the smallest value of a positive integer \(N\) that leaves a remainder of 1 when divided by 2, 3, 4, 5, 6, and 7?

Answer: 421
**Question 9.** How many integral solutions satisfy the following conditions?

\[ \left| \frac{x - 3}{2} \right| < 5 \text{ and } \left| \frac{x + 1}{3} \right| \geq 1 \]

Answer: 14

**Question 10.** What is the vertex of the following conic whose $x$-coordinate is the larger?

\[ \frac{(x - 1)^2}{4} + (y + 1)^2 = 1 \]

Answer: (3,-1)

**Question 11.** What is the smallest prime number that is larger than 200?

Answer: 211

**Question 12.** What is the largest area possible when a rectangle is formed from a 360-inch length of non-stretchable cord?

Answer: 8100 Square inches

**Question 13.** In a ten-team baseball region, if every team plays every other team 4 times during the season, how many games must be scheduled?

Answer: 180

**Question 14.** In the given right triangle $GSW$, the height is 50 cm, the line $MA$ is parallel to the base and is 30 cm above the base, and the area of the trapezoid $MAWS$ is 210 square cm. What is the length of the base $SW$?

Answer: 10

**Question 15.** Find the real numbers $A$ and $B$ in the following identity

\[ \sin(4\theta) = 2A \sin \theta \cos^3 \theta + 2B \sin^3 \theta \cos \theta \]

Answer: $A = 2$ and $B = -2$

**Question 16.** Which is the largest number from this list: $\log_2 32$, $\log_e e^2$, $\log_{10} 1000$, $4 \log_{10} 10$, or $5 \log_5 125$?

Answer: $5 \log_5 125$ or 15