1. A circle is inscribed in a square with area of 108. Find the area of the circle in terms of \( \pi \).

2. How many 2 digit numbers contain at least one three?

3. A circle is given by \( x^2 + y^2 - 4x + 10y - 52 = 0 \). Let \( A \) be the number of units in the circumference and \( B \) the number of square units in the area of the circle. Find the value of \( A + B \) in terms of \( \pi \).

4. The points \((5,7),(3,a+2),(7,11)\) are collinear. Find the value of \( a \).

5. \( 2\sqrt{2} \) is what percent of \( 8\sqrt{3} \)?

6. Find the value of \( x + y \) for the system:
\[
1024^x = 16^{-2y} \\
x + y = -10
\]

7. Solve for the value of \( x \):
\[
\frac{x + 3}{x + 2} + \frac{x - 4}{x - 3} = \frac{x - 2}{x - 3}
\]

8. \( A \) is a 2 by 2 matrix whose entries are the first four prime numbers. What is the largest possible value of the determinant of \( A \)?

9. Find the positive root for \( x^2 + x^3 = 6 \).

10. How many terms in the sequence:
\[
2, -6, 18, -54, ..., -6(3^{12})
\]

11. Find the length of a side of a rhombus whose diagonals are 6 and 8.

12. Solve for the value of \( x \):
\[
\log_4 (x + 2) = 1 \log_4 (3x - 5)
\]

13. The ratio of \( 2x - y \) to \( x + y \) is 2:3. Express the ratio of \( x: y \) as a simplified fraction.

14. If \( x + y = 7, x^2 - y^2 = 21 \), find the value of \( 2x + 3y \).

15. A farmer observed that among the cows and chickens in the barnyard there were 25 heads and 62 legs. How many cows were in the barnyard?

16. Give the largest root of \( 3 + \sqrt{3x + 1} = x \).

17. The measure of \( \angle A \) is nine more than twice the complement of \( \angle A \). Find the supplement of \( \angle A \) in degrees.

18. Find the positive value for \( x \) for which
\[
3 \quad 2x - 3 = -7(x + 3)
\]

19. The sum of all but one of the interior angles of a convex polygon equals \( 2570^\circ \). Find the measure of the remaining angle in degrees.

20. Find the units digit of \( 19^{100} \).

21. Let \( A = \begin{bmatrix} x & 2 \\ 4 & 1 \end{bmatrix} \), \( B = \begin{bmatrix} 4 \\ 2 \end{bmatrix} \). Find the value of \( x \) as a simplified fraction.

22. Evaluate \( (1 - i)^3 \).

23. Find the sum of all integral solutions to the inequality \( |10x - 9| < 208 \).

24. If \( 212 - 124 = 55 \), what base system was used?

25. How many ml of 5% hydrochloric acid should be mixed with 20 ml of 30% hydrochloric acid to obtain a 15% solution?