1. One number exceeds another by 26. The sum of the numbers is 64. What are the numbers?
   A) 16 and 42  B) 17 and 41  C) 25 and 51  D) 19 and 45  E) NOTA

2. Find b such that \(\frac{4x-b}{x-2} - 3 = 0\) has a solution set given by \(\emptyset\).
   A) 12  B) 20  C) 8  D) 16  E) NOTA

3. Solve for \(x\) if \(2 \cdot 4 - \frac{5}{2}x + 6 = 18\).
   A) \(x = \frac{5}{2}, \frac{11}{2}\)  B) \(x = \pm \frac{3}{2}\)  C) \(x = 1, 3\)  D) \(x = \frac{-5}{2}, \frac{-11}{2}\)  E) NOTA

4. Give the center and radius of the circle described by the equation
   \[x^2 + y^2 - 14x + 18y + 114 = 0\]
   A) \((-9, 7); 4\)  B) \((-7, 9); 16\)  C) \((7, -9); 4\)  D) \((9, -7); 16\)  E) NOTA

5. Given the function \(f(x) = x^2 - 4x + 5\), express the vertex as an ordered pair.
   A) \((-\frac{3}{2}, 2)\)  B) \((-\frac{3}{2}, -2)\)  C) \((2, 1)\)  D) \((1, -\frac{7}{2})\)  E) NOTA

6. Find the inverse of the one-to-one function \(f(x) = \frac{2x+1}{x-3}\).
   A) \(\frac{3x-1}{x+2}\)  B) \(\frac{3x+1}{x-2}\)  C) \(\frac{3x-1}{x+1}\)  D) \(\frac{3x+2}{x-1}\)  E) NOTA

7. Simplify \(-i^2 = 4\).
   A) \(-i\)  B) \(i\)  C) \(-1\)  D) \(1\)  E) NOTA

8. Write an equation for the line passing through the point \((-4, -5)\) and perpendicular to the line given by \(3y - 15x = 21\).
   A) \(y = -\frac{1}{5}x - \frac{9}{5}\)  B) \(y = \frac{1}{5}x - \frac{29}{5}\)  C) \(y = \frac{1}{5}x + \frac{9}{5}\)  D) \(y = 5x + 15\)  E) NOTA

9. Determine the number of possible negative real zeros of the function
   \[h(x) = 4x^{51} + 12x^{44} - 41x^{37} - 99x^{26} + 10x^{11} + 24\]
   A) 2 or 0  B) 1  C) 3 or 1  D) None  E) NOTA
10. Solve for $x$ when $8x^{5/3} - 24 = 0$

A) $\pm \frac{3}{243}$  
B) $\pm \frac{5}{27}$  
C) $\frac{3}{243}$  
D) $\frac{5}{27}$  
E) NOTA

11. During a road trip, Tony drove one-third the distance Lisa drove. Mark drove 24 more miles than Lisa. The total distance they drove on the trip was 507 miles. How many miles did Mark drive?

A) 183  
B) 231  
C) 145  
D) 207  
E) NOTA

12. Simplify \[ \frac{51}{14 + \frac{51}{14 + \frac{51}{14 + \cdots}}} \]

A) $7 + \frac{7}{2}$  
B) $3$  
C) $7 - \frac{7}{2}$  
D) $17$  
E) NOTA

13. Solve $4x^3 + 8x^2 - 3x - 9 = 0$. Then multiply the greatest root by two and sum that result with the remaining root(s).

A) $\frac{1}{2}$  
B) $\frac{3}{2}$  
C) $\frac{1}{2}$  
D) $-3$  
E) NOTA

14. Let $g(x)$ be a function such that $\frac{g(n)}{x(n)} = \frac{g(\frac{1}{n})}{x(\frac{1}{n})}$, $x \neq 0$ for all positive rationals $a$, $x = 0$ between $-5$ and $12$. If $g(7) = 13$, find $g(0)$.

A) 13  
B) Undefined  
C) $\frac{1}{7^n}$  
D) 0  
E) NOTA

15. Find the vertical asymptotes, if any, of the graph of the rational function $\frac{x+1}{x^2-1}$

A) $x = \pm 1$  
B) $x = -1$  
C) $x = 1$  
D) None exist  
E) NOTA

16. Find an nth degree polynomial function with real coefficients that satisfies the following: $n=3; 3$ and $i$ are zeros; $f^2 = 20$

A) $f(x) = 4x^3 - 12x^2 - 4x + 12$  
B) $f(x) = -4x^3 + 12x^2 + 4x - 12$  
C) $f(x) = -4x^3 + 12x^2 - 4x + 12$  
D) $f(x) = 4x^3 - 12x^2 + 4x + 12$  
E) NOTA

17. Given: $f(x) = x^2 + 2x + 1$

$g(x) = 3xf(x)$

$h(x) = 2g(x - 1)$

Evaluate: $h(-7)$

A) 646  
B) 2256  
C) 1938  
D) 2011  
E) NOTA
18. Solve for \( x \) if \( 7^{2x+1} = 3^{x+2} \)

A) \( \frac{2 \ln 7 - \ln 3}{2 \ln 7 - \ln 3} \)  
B) \( \frac{\ln 7 - 2 \ln 3}{2 \ln 7 - \ln 3} \)  
C) \( \frac{2 \ln 7 - \ln 3}{2 \ln 3 - \ln 7} \)  
D) \( \frac{2 \ln 3 - \ln 7}{\ln 3 - 2 \ln 7} \)  
E) NOTA

19. A factor of \( m^3 p^3 + m^2 p^2 n q + n^2 q^2 m p - n q m^2 p^2 - p m n^2 q^2 - n^3 q^3 \) is

A) \( m n - p q \)  
B) \( m p + n q \)  
C) \( m^2 p^2 - m p n q + p^2 q^2 \)  
D) \( m^2 n^2 + m n p q + p^2 q^2 \)  
E) NOTA

20. The sum of the coefficients in the expansion of \( 2x + y^5 \) is

A) 242  
B) 243  
C) 64  
D) 32  
E) NOTA

21. The half-life of a certain medication in the bloodstream is 21 hours. How long will it take for the medication to decay to 92\% of the original dose? (Round your answer to one decimal place)

A) 6.6 hours  
B) 9.7 hours  
C) 5.2 hours  
D) 2.5 hours  
E) NOTA

22. Find the minimum distance between any point on the graph of \( f(x) = x^3 - 2x^2 - 4x + 8 \) and the point \((2,-1)\).

A) \( 2 \frac{1}{2} \)  
B) \( \frac{1}{2} \)  
C) 1  
D) \( \sqrt{3} \)  
E) NOTA

23. Evaluate \( x^2 - x \) for the value of \( x \) satisfying \( 2x - 9 + 9 = 2x - 9 \). \( 9 - x \)

A) 8  
B) 56  
C) 64  
D) 6  
E) NOTA

24. Suppose you arrived at FGCU at 7am today and were given a gift bag which contained a wristwatch. Instead of showing hours 1 through 12, the hours 1 through 10 were evenly distributed around the circumference of the face. Yet when gifted to you, the time was accurately indicated by this strange watch. Suppose further that the next FGCU invitational is exactly 365 days from the time you arrived this morning (7am). What time will your new watch read when you arrive next year? (Assume the watch remains in perfect working order for the entire year)

A) 6  
B) 7  
C) 8  
D) 3  
E) NOTA

25) Solve and then find the product of the two values of \( x \) that satisfy \( 20x^2 + 23x + 6 = 0 \)

A) \( \frac{1}{20} \)  
B) \( -\frac{1}{20} \)  
C) \( \frac{3}{10} \)  
D) \( -\frac{3}{10} \)  
E) NOTA

26) Find a possible sum of the infinite geometric series where \( x_2 = 324 \) and \( x_6 = 4 \)

A) 1456  
B) -729  
C) 486  
D) -486  
E) NOTA
27) Write the partial fraction decomposition of \( \frac{9x+21}{x^2+2x-15} \)

A) \( \frac{6}{x+5} + \frac{3}{x-3} \)  
B) \( \frac{6}{x+5} + \frac{3}{x-3} \)  
C) \( \frac{3}{x-3} - \frac{6}{x+5} \)  
D) \( \frac{6}{x-3} - \frac{3}{x+5} \)  
E) NOTA

28) A man pays $1.43 for some apples and pears. If pears cost 17 cents each, and apples cost 15 cents each, how many of each did he buy?

A) 5 pears and 6 apples  
B) 3 pears and 7 apples  
C) 4 pears and 6 apples  
D) 5 pears and 4 apples  
E) NOTA

29) What is the perpendicular distance to the origin from the line defined by \( ax - by = 1 \)?

A) 1  
B) \( a^2 + b^2 \frac{1}{2} \)  
C) \( a^2 + b^2 \frac{3}{2} \)  
D) \( \frac{1}{a^2+b^2} \frac{1}{2} \)  
E) NOTA

30) 0.954 can be expressed in the form \( \frac{a}{b} \) where \( a \) and \( b \) are relatively prime. Find \( a + b \).

A) \( \frac{945}{990} \)  
B) \( \frac{954}{990} \)  
C) \( \frac{189}{110} \)  
D) \( \frac{106}{110} \)  
E) NOTA