• You are allowed to use a scientific calculator with no graphing capabilities.
• Complete all questions.
• Show all your work.
• You have 50 minutes to complete the exam.

GOOD LUCK!
1. (8 points) Find the equation of the circle with center \((-3, -8)\) and area \(36\pi\).

2. (8 points) Find a number \(k\) so that the line through the points \((-3, k)\) and \((4, 8)\) is parallel to the line through the points \((6, 4)\) and \((2, -5)\).
3. (8 points) Let

\[ f(x) = \begin{cases} 
-\frac{1}{3}x, & \text{if } -3 \leq x \leq 0 \\
x, & \text{if } 0 \leq x \leq 1 \\
1, & \text{if } 1 \leq x \leq 3 
\end{cases} \]

(a) Draw the graph of \( f(x) \) and state the domain and range.

(b) Draw the graph of \( h(x) = -2f(x + 1) \) and state the domain and range.
4. (8 points) Suppose \( f(x) \) is a linear function. Then \( f(x) = mx + b \), for some real numbers \( m \) and \( b \). Suppose \( f(3x) = 3f(x) \) and \( f(x + 2) = f(x) + 2 \). Find \( m \) and \( b \).

5. (8 points) A lakefront runs east-west. A man in a rowboat is 5 miles due north of a point \( A \) on the shore. He wishes to get to \( C \), 5 miles due east of \( A \). He will row in a straight line to a point \( B \) between \( A \) and \( C \) and walk the rest of the way. He rows 3 miles per hour and walks 4 miles per hour. Let \( x \) be the distance between \( B \) and \( C \). Find a function \( T(x) \) that gives the total time of the trip in terms of \( x \).
6. (10 points) A farmer with 800 feet of fencing wants to enclose a rectangular area and then divide it into five pens with fencing parallel to two opposite sides of the rectangle.

(a) In terms of $x$ and $y$, how much fencing will the farmer use?

(b) Assuming the farmer uses all 800 feet of fencing, find an expression for $y$ in terms of $x$.

(c) Find the maximum total area the farmer can enclose.