Diagnostic Test for Precalculus Skills
No calculators, 30 minutes

1. A box has a square base and a closed top. Express its surface area in terms of the side of the base $x$ and the height $h$.

2. Find the distance between points $(-2, 1)$ and $(3, -1)$.

3. Find the area of the rectangle pictured below.

4. Factor $81a^4 - 16b^8$ completely.
5. Find the domain of \( f(x) = \frac{1}{\sqrt{x^2 - 9}} \).

6. Solve \( \log_3(x+1) = 2 \).

7. Simplify \( 8^{-1/3} \cdot 9^{1/2} \).

8. Find the x-intercept(s) of \( f(x) = \frac{2x^2 - 3x + 1}{x - 1} \).
9. If \( g(x) = \frac{2x+1}{x-2} \), find \( g(a+3) \).

10. Solve \( \frac{1}{x} \geq 5 \).

11. Find the center of the ellipse \( 4x^2 - 8x + y^2 = 3 \).

12. The length of a certain rectangle is 3 meters more than twice its width. If the perimeter of the rectangle is 90 meters, find the width of the rectangle.
13. Solve \( \cos 2x = 0 \), for \( -\pi \leq x \leq 2\pi \).

14. If \( f(x) = \cos 2x \), evaluate \( f(\pi/6) \).

15. Simplify \( \sin \theta \tan \theta \csc^2 \theta \).