Test 2  Last Name:  ID:

1 (2.6.57) (8 points) Solve the inequality, and express the solutions in terms of intervals whenever possible. \( \frac{x + 1}{2x - 3} \geq 2 \).

2 (2.7.31) (10 points) Solve the inequality, and express the solutions in terms of intervals whenever possible. \( \frac{1}{4} |x - 5x| + 2 \geq 1 \).

3 (2.5.44) (8 points) Solve the equation \( 2x^{-3/3} - 7x^{-1/3} - 15 = 0 \).

4 (2.4.45) (8 points) Find the solutions of the equation \( 4x^2 + x + 3 = 0 \).

5 (3.1.9) (10 points) Given \( A(4, -3), B(6, 2) \) (a) Find the distance \( d(A, B) \) between \( A \) and \( B \). (b) Find the midpoint of the segment \( AB \).

6 (3.2.55) (12 points) Find the center and the radius of the circle with the given equation \( x^2 + y^2 - 2x - 8y + 19 = 0 \).

7 (3.3.29) (12 points) Find a general form of an equation of the line through the point \( A(7, -3) \) that is perpendicular to the line \( 2x - 5y = 8 \).

8 (3.4.45) (10 points) If a linear function \( f \) satisfies the condition: \( f(-3) = 1 \) and \( f(3) = 2 \), find \( f(x) \).

9 (3.5.39) (10 points) The graph of a function \( f \) with domain \([0, 4]\) is shown in the figure. Sketch the graph of the given equations. (a) \( y = f(x + 3) \), (c) \( y = f(x) + 3 \), (e) \( y = -3f(x) \), (g) \( y = f(-x/2) \), (i) \( y = -f(x + 2) - 3 \).

10 (3.6.9) (10 points) Express \( f(x) = -3x^2 - 6x - 5 \) in the form \( a(x-h)^2 + k \).

11 (3.6.27) (10 points) Find the standard equation of a parabola that has a vertical axis and satisfies the given conditions: Vertex \((0, -2)\), passing through \((3, 25)\).

12 (3.7.7) (12 points) Given \( f(x) = \frac{2x}{x+1} \) and \( g(x) = \frac{x}{x+5} \). Find (a) \( (f + g)(x) \), (b) \( (f/g)(x) \), and \( (f/g)(x) \). (b) Find their domains.

13 (3.4.41) (10 points) Simplify the difference quotient \( \frac{f(x + h) - f(x)}{h} \) if \( h \neq 0 \), where \( f(x) = x^2 + 5 \).