Answer the problems on separate paper. You do not need to rewrite the problem statements on your answer sheets. Do your own work. Show all relevant steps which lead to your solutions. Attach this question sheet to the front of your answer sheets.

1. (16 pts) Let \( P(-2,1) \) and \( Q(4,3) \) be points in the plane.

   A. Plot \( P \) and \( Q \) on a Cartesian coordinate system
   
   B. Find the distance between \( P \) and \( Q \)

   C. Find the coordinates of the midpoint \( M \) of the line segment \( \overline{PQ} \)

   D. Find the equation of the line passing through \( P \) and \( Q \). Write the equation in standard form.

2. (8 pts) Solve the equation \(|3 - 5y| = 2\).

3. (8pts) Solve algebraically the system of equations \[
\begin{align*}
3x - 4y &= -6 \\
2x + 8y &= 4 
\end{align*}
\]

4. (12 pts) Let \( f(x) = \frac{x^2 - 2x}{x^2 + x} \).

   A. Find the domain of \( f \)

   B. Compute the following functional values or state that the corresponding \( x \)-value is not in the domain of \( f \)

   B1. \( f(-2) \)   B2. \( f(-1) \)   B3. \( f(1) \)

5. (12 pts) Let \( f(x) = 3 + 4x \).

   A. Find the inverse of \( f \)

   B. Sketch the graphs of \( f \) and \( f^{-1} \) on same coordinate system.

6. (6pts) Find the exact value of \( \sin(\cos^{-1} \frac{1}{2}) \).

7. (6pts) Simplify \( \sin(\tan^{-1} x) \)
8. (12pts) Consider the function $f$ defined by the graph to the right. Find each of the following (if they exist). If they do not exist, state so.

A1. $f(-1)$  
A2. $f(1)$  
A3. $f(2)$

B1. $\lim_{x \to -1} f(x)$  
B2. $\lim_{x \to 1} f(x)$  
B3. $\lim_{x \to 2} f(x)$

C1. $\lim_{x \to -1} f(x)$  
C2. $\lim_{x \to 1} f(x)$  
C3. $\lim_{x \to 2} f(x)$

D1. $\lim_{x \to -1} f(x)$  
D2. $\lim_{x \to 1} f(x)$  
D3. $\lim_{x \to 2} f(x)$

9. (24 pts) Algebraically evaluate each of the following limits.

A. $\lim_{x \to 2} \frac{x^2 - 2x - 7}{x - 2}$

B. $\lim_{x \to 0} \frac{\sqrt{x^2 + 1} - 1}{x}$

C. $\lim_{x \to 0} \frac{\sin^2 x}{x \cos x}$