1. Determine the complex conjugates of the following complex numbers: (1pt each)

(a) \( 8 + 5i \) \( 8 + 5i \)  
(b) \( 7 - 5i \) \( 7 + 5i \)

2. Perform the indicated operations (leave answers in standard form): (3pts each)

(a) \( (4 - 3i) + (5 + 2i) \)  
\[ 4 - 3i + 5 + 2i = 9 - i \]

(b) \( (4 - 3i) - (5 + 2i) \)  
\[ 4 - 3i - 5 - 2i = -1 - 5i \]

(c) \( (4 - 3i)(5 + 2i) \)  
\[ 4 - 3i \cdot 5 + 2i = 20 + 8i - 15i - 6i^2 = 20 - 7i \]

(d) \( \frac{4 - 3i}{5 - 2i} \cdot \frac{5 + 2i}{5 + 2i} \)  
\[ \frac{20 - 7i}{29} \]

3. Solve the following linear equations: (3pts each)

(a) \( 5x - 9 = 11x - 3 \)  
\[ 5x - 11x + 9 + 3 = 0 \]
\[ -6x = 6 \]
\[ x = -1 \]

(b) \( 4[2(x + 5) - 7] = 5(x + 3) \)  
\[ 4[2x + 10 - 7] = 5x + 15 \]
\[ 4[2x + 3] = 5x + 15 \]
\[ 8x + 12 = 5x + 15 \]
\[ 3x = 3 \]
\[ x = 1 \]

(c) \( \frac{5x}{4} + 5 = \frac{7x}{4} + 8 \)  
\[ 4\left(\frac{5x}{4} + 5\right) = 4\left(\frac{7x}{4} + 8\right) \]
\[ 5x + 20 = 7x + 32 \]
\[ 2x = 12 \]
\[ x = 6 \]

(d) \( 2(x - 3)(5x + 1) - 8 = (2x - 3)(5x + 2) + 9 \)  
\[ 2(5x^2 + x - 15x - 3 - 5) = 10x^2 - 11x + 6 + 9 \]
\[ 2(5x^2 - 14x - 11) = 10x^2 - 11x + 3 \]
\[ 10x^2 - 28x - 2 = 10x^2 - 11x + 3 \]
\[ -17x = 5 \]
\[ x = -\frac{5}{17} \]
4. Determine \(x\) and \(y\) for the following pairs of points: (2pts each)

(a) \(P_1(5, y) = P_2(x, 3)\)

\[
\begin{align*}
5 &= x \\
y &= 3
\end{align*}
\]

(b) \((5x - 2, 2y - 5) = (3x, y - 7)\)

\[
\begin{align*}
5x - 2 &= 3x - 4 \\
2y - 5 &= y - 7
\end{align*}
\]

5. Determine the **slope**, **distance**, between, and the **midpoint** of the line segment joining the pair of points: (9pts each)

(a) \(P(2, -3)\) and \(Q(5, -7)\)

\[
\begin{align*}
\text{slope} &= \left(\frac{2 - (-3)}{5 - 2}\right) \\
\text{slope} &= \left(\frac{2 + 3}{3}\right) \\
\text{slope} &= \left(\frac{5}{3}\right) \\
\text{midpoint} &= \left(\frac{2 + 5}{2}, \frac{-3 - 7}{2}\right) \\
\text{midpoint} &= \left(\frac{7}{2}, \frac{-10}{2}\right) \\
\text{midpoint} &= \left(\frac{7}{2}, -5\right)
\end{align*}
\]

\[
\begin{align*}
\text{distance} &= \sqrt{(-7 - (-3))^2 + (5 - 2)^2} \\
\text{distance} &= \sqrt{(-4)^2 + 3^2} \\
\text{distance} &= \sqrt{16 + 9} \\
\text{distance} &= \sqrt{25} \\
\text{distance} &= 5
\end{align*}
\]

(b) \((-7, 3)\) and \((-5, 1)\)

\[
\begin{align*}
\text{slope} &= \left(\frac{-7 + (-5)}{-5 - (-7)}\right) \\
\text{slope} &= \left(\frac{-7 - 5}{2}\right) \\
\text{slope} &= \left(\frac{-12}{2}\right) \\
\text{slope} &= (-6)
\end{align*}
\]

\[
\begin{align*}
\text{midpoint} &= \left(\frac{-7 + (-5)}{-5 - (-7)}\right) \\
\text{midpoint} &= \left(\frac{-12}{2}\right) \\
\text{midpoint} &= \left(\frac{-6}{2}\right) \\
\text{midpoint} &= (-3, 1)
\end{align*}
\]

\[
\begin{align*}
\text{distance} &= \sqrt{(-5 - (-7))^2 + (1 - 3)^2} \\
\text{distance} &= \sqrt{2^2 + (-2)^2} \\
\text{distance} &= \sqrt{4 + 4} \\
\text{distance} &= \sqrt{8}
\end{align*}
\]

6. Determine the value of the indicated variable for the following functions. (3pts each)

(a) \(f(x) = 3x + 2\) for \(x = -1, 0, 1\)

\[
\begin{align*}
f(-1) &= 3(-1) + 2 \\
&= -3 + 2 \\
&= -1
\end{align*}
\]

\[
\begin{align*}
f(0) &= 3(0) + 2 \\
&= 0 + 2 \\
&= 2
\end{align*}
\]

\[
\begin{align*}
f(1) &= 3(1) + 2 \\
&= 3 + 2 \\
&= 5
\end{align*}
\]

(b) \(g(x) = 3x^2 - 5x + 4\) for \(x = -1, 0, 1\)

\[
\begin{align*}
g(-1) &= 3(-1)^2 - 5(-1) + 4 \\
&= 3 + 5 + 4 \\
&= 12
\end{align*}
\]

\[
\begin{align*}
g(0) &= 3(0)^2 - 5(0) + 4 \\
&= 0 + 0 + 4 \\
&= 4
\end{align*}
\]

\[
\begin{align*}
g(1) &= 3(1)^2 - 5(1) + 4 \\
&= 3 - 5 + 4 \\
&= 2
\end{align*}
\]
7. Given the function \( f(x) = 7x - 2 \) determine the value of x for which \( f(x) = 5 \) (2pts)

\[
5 = 7x - 2 \quad \Rightarrow \quad x = 1 \\
-7x = -7
\]

8. Graph the following linear functions: (3pts each)

(a) \( f(x) = 3x - 2 \)

(b) \( 3x + 5y = 15 \)

9. If \( 7 - 5i \) is one solution of a quadratic equation, what is the other one? (2pts)

\( 7 - 5i \rightarrow 7 + 5i \)

10. Why don’t the correspondences represented in the following figures represent a function? (2pts each)

11. Identify which of the following sets, represents a function: (2pts each) Yes or No

(a) \{ (2,2), (3,3), (4,5), (5, -1), (6,7), (7,7) \}  \quad \text{Yes}

(b) \{ (-3,8), (-2,10), (0,0), (1,7), (-3, -2), (4,7) \}  \quad \text{Not}

12. Identity the domain and range of the following functions: (2pts each)

(a) \{ (20, F), (36, F), (23, D), (25, B), (21, B) \}  \\
\text{Domain:} 20, 36, 23, 25, 21  \\
\text{Range:} F, F, D, B, F

(b) 
\text{Domain: } 1, 2, 3, 4, 5, 6  \\
\text{Range: } 9, 10, 12, 13, 15
13. Give the lines \( L_1 \) with slope \( m_1 \) and the line \( L_2 \) with slope \( m_2 \), respectively, what is the relationship of their slopes (2pts each)

(a) if \( L_1 \) and \( L_2 \) are parallel
\[ m_1 = m_2 \]
(b) if \( L_1 \) and \( L_2 \) are perpendicular
\[ m_1 m_2 = -1 \]

14. If the slope of the line \( L_1 \) is \( -\frac{3}{8} \), then what is the slope of the line \( L_2 \) (2pts each)

(a) if \( L_1 \) and \( L_2 \) are parallel
\[ \frac{-3}{8} \]
(b) if \( L_1 \) and \( L_2 \) are perpendicular
\[ \frac{-8}{3} \]

15. Solve each of the following inequalities: (3pts each)

(a) \( 11x - 8 \leq 7x + 4 \)
\[ 11x - 7x - 8 + 8 \leq 7x - 7x + 4 + 8 \]
\[ 4x \leq 12 \]
\[ x \leq 3 \]

(b) \(-6x + 2 \leq 3x - 7 \)
\[ -6x - 3x + 2 - 2 \leq 3x - 3x - 7 - 2 \]
\[ -9x \leq -9 \]
\[ \frac{-9x}{-9} \geq \frac{-9}{-9} \]
\[ x \geq 1 \]

(c) \(-3 \leq 2x + 3 < 13 \)
\[ -3 - 3 \leq 2x + 3 - 3 < 13 - 3 \]
\[ -6 \leq 2x < 10 \]
\[ \frac{-6}{2} \leq \frac{2x}{2} < \frac{10}{2} \]
\[ -3 \leq x < 5 \]

(d) \( 2 < \frac{3x - 1}{4} < 5 \)
\[ 2 \cdot 4 < \frac{3x - 1}{4} \cdot 4 < 5 \cdot 4 \]
\[ 8 < 3x - 1 < 20 \]
\[ 9 < 3x < 21 \]
\[ 3 < x < 7 \]

16. Solve the following absolute value equations: (3pts each)

(a) \( |3x - 5| = 7 \)
\[ 3x - 5 = 7 \] or \[ 3x - 5 = -7 \]
\[ 3x = 12 \] or \[ 3x = -2 \]
\[ x = 4 \] or \[ x = -\frac{2}{3} \]

(b) \( 5|x - 1| = 4|x - 1| + 6 \)
\[ 5|x - 1| - 4|x - 1| = 6 \]
\[ |x - 1| = 6 \]
\[ x - 1 = 6 \] or \[ x - 1 = -6 \]
\[ x = 7 \] or \[ x = -5 \]