1) a) Perform the operation \( i \) and write the result in standard form.
\[
\frac{3i}{(4-5i)^2}
\]

b) \[
\frac{2}{4-5i}
\]

c) Solve using the quadratic formula.
\[
x^2 - 2x + 2 = 0
\]

d) Simplify the complex number \( i \) and write it in standard form.
\[
4i^2 - 2i^3
\]

2) a) Solve and find all solutions
\[
x^4 - 64 = 0
\]

b) \[
x^4 - x^3 + x - 1 = 0
\]

c) \[
\sqrt{x} - \sqrt{x-5} = 1
\]

d) \[
\frac{x}{x^2-4} + \frac{1}{x+2} = 3
\]

e) \[
|2x-1| = 5
\]

f) Four friends plan on buying a motorcycle together and share equally in the cost. By adding a fifth person they will each save \$275. How much is the motorcycle?
3) Solve the inequality and sketch the solution on the real number line.
   a) \(|x-10| \geq 3\)  
   b) \(|2x-3| < 15\)  
   c) \(2x+7 < 3+4x\)  
   d) \(-4 < \frac{2x-3}{3} < 4\)  
   e) \(2|x+10| \geq 9\)

4) Solve the inequality and write the solution in interval notation.
   a) \(\frac{1}{x-3} \leq \frac{9}{4x+3}\)  
   b) \((x+2)^2 < 25\)  
   c) \(-2x^2 + 6x \leq -15\)  
   d) Find the domain of \(x\) in the expression.
       \(\sqrt{4-x^2}\)  
   e) \(\frac{5x}{x^2-9}\)

5) a) Sketch the graph of a line through the indicated point with the indicated slope.
   i) \((2,3)\)  
   a) 0  
   b) \(-2/3\)  
   c) Undefined

   b) Find the equation of a line through the following points.
      \((-3,-2)\) \((1,6)\)

   c) Write an equation going through the point \((0,10)\) that is parallel to the line in Part (b). Do the same for a perpendicular line.
5 a) Find the slope & y-int. of the equation of the line. Sketch a graph of the line.

\[2x + 3y = 9\]

e) Find the slope intercept form of the equation of the line passing through the point \((-2, -5)\) with slope of \(\frac{3}{4}\).

f) Try \#100 (from homework p.184)

6 a) Evaluate the function at the given points

\[f(x) = \sqrt{x^2 + 6} - 3\]

a) \& f(-1)  b) f(3)  c) f(x+1)

b) Find the domain of the following functions.

(i) \(g(x) = \frac{1}{x} - \frac{3}{x+2}\)  (ii) \(g(y) = \sqrt{y-10}\)  (iii) \(g(x) = 1 - 2x^2\)

7 a) Test the following to see if it's a function of \(x\)

\[(c)\]

\[(b)\]

b) Determine the intervals over which the function is increasing, decreasing, or constant. Determine whether the function is even, odd, or neither.

\[f(x) = x^3 - 3x^2 + 2\]

c) Graph the function and determine the intervals for which \(f(x) > 0\).
8) a) Sketch a graph of each function on the same set of axes.
   i) \( f(x) = x^2 \)  
   ii) \( f(x) = x^2 + 3 \)  
   iii) \( f(x) = (x-3)^2 + 1 \)  
   f(x) = -x^2

   b) Describe the transformations that occurs in the function.
   \( f(x) = (x-1)^3 + 2 \)

   c) The shape of \( f(x) = x^3 \), but moved six units to the left, 6 units down, 5 reflected in the y-axis.

9) a) Find (i) \((f+g)(x)\)  (ii) \((f-g)(x)\)  (iii) \((fg)(x)\)  (iv) \((f/g)(x)\)

   What is the domain of \((f/g)(x)\)?

   \( f(x) = \frac{x}{x-5} \)
   \( g(x) = x^2 - 1 \)

   (v) \((f+g)(x-1)\)

b) Find fog and gof. State the domain of each function and composite function.
   \( f(x) = \sqrt{x} \)
   \( g(x) = 2x - 3 \)

10) a) Show that \( f \) and \( g \) are inverses algebraically.
    \( f(x) = 3x + 1 \)
    \( g(x) = \frac{x - 1}{5} \)

b) Find the inverse function of \( f \).
    \( f(x) = x^3 + 1 \)