0. Write your name, PID, section number and TA’s name on your blue book. No calculators or other electronic devices are permitted. You should not need any notes for this test. Remember to mute or turn off your phone. You should show enough working to convince us that you did the problems yourself. This also allows us to determine the cause of any errors you might make, and grade accordingly. Try to do each problem on one page. If you do the problems out of order, make sure your answers are easy to find.

1. Find the radius, center and circumference of the circle defined by \(x^2 - 8x + y^2 + 2y = -14\).

2. Solve the following equation for \(x\):
   \[|x - 3| + |x - 4| = 1.\]
   Write your answer as an interval, a union of intervals, or a finite list of \(x\) values.

3. (a) Find the equation of the line passing through the points \((3, -7)\) and \((5, -15)\). Write your answer in the form \(y = mx + b\).
   
   (b) Find a number \(t\) such that \((t, 2t)\) belongs to the line from part (a).
   
   (c) What would be the slope of a line perpendicular to the line from part (a)?

4. For each of the following equations, is there a function \(f\) such that every solution \((x, y)\) of the equation satisfies \(y = f(x)\)? If so, give a formula for the function and write its domain as an interval or union of intervals.
   
   (a) \(y = x^2\)  
   (b) \(y^2 = x\)  
   (c) \(|y| = x\)  
   (d) \(xy = 1\)

5. Define a function \(f\) by \(f(x) = x^2\), and let \(g\) be given by \(g(x) = 2f\left(\frac{x}{2} + 3\right)\).
   
   (a) Give a list of transformations (shifts or stretches, either vertical or horizontal) which take the graph of \(f\) to the graph of \(g\).
   
   (b) Define functions \(h\) and \(k\) so that \(g = h \circ f \circ k\).
   
   (c) Sketch the graph of \(g\), labeling where it meets the \(x\)-axis and the \(y\)-axis.

6. Define a function \(f\) by \(f(x) = \sqrt{x - 2} + 3\). For (a), (b), (e) and (f), write your answer as an interval or union of intervals.
   
   (a) What is the domain of \(f\)?
   
   (b) What is the range of \(f\)?
   
   (c) What is \(f^{-1}(3)\)?
   
   (d) Find a formula expressing \(f^{-1}(y)\) in terms of the number \(y\).
   
   (e) What is the domain of \(f^{-1}\)?
   
   (f) What is the range of \(f^{-1}\)?