This is a take home exam. You may use any of the resources used in class, including homework, your activity manual, and your resource manual. You are expected to work as a group to solve each of the following problems. You should not consult other groups, the internet, tutors, or other friends. You may consult your instructor.

Make certain that everybody in the group participates in each part of each question, and understands the solutions well enough to answer questions about them. Your group need only turn in one set of solutions, but be sure that everyone’s name appears on the exam you turn in.

Take your time and think logically and carefully. Write down anything that you think is relevant and show all of your work. Try to demonstrate as much knowledge and creativity as possible. Explain any claims you make thoroughly. Each problem is worth 10 points. You have until class on Friday, 27 February to complete this exam. Good luck!!

Distributed with this exam is a peer evaluation form. Please give one form to each group member. Each person should fill out the form individually after the group exam has been completed. Be honest but fair in your evaluations. Return the completed forms to me with your individual exam on Friday. Note that filling these out is worth points in your evaluation grade, so be certain to bring them back!

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Total: ______ of 40
1. Recall the activity and homework question involving iterative functions. Use similar techniques to answer the following questions. Be sure to **justify your conclusions or formulas** by showing your work.

You establish two accounts, both with an initial investment of $1,000. On the first day of each month, starting in February, you deposit $50.00 into each account. Account $A$ pays no interest, and account $B$ pays 2% interest, compounded on the last day of each month.

(a) Construct an input/output table for each account where the input is the month of the year, 1-12, and the output is the value of the account at the end of that month.

(b) Construct a graph showing the value of each account at the end of each month. Note the differences and similarities in growth for each account over the course of the year.

(c) Explain how one can use the idea of iteration in calculating these values.

2. Mary is hiking in the mountains. During her hike she encounters several different trails. In each of these situations, described below, sketch a graph representing her speed, and justify your graph.

(a) She jogs down a hill into a dead-end ravine where she must stop.

(b) She jogs down a hill into a valley and then slowly climbs back up the other side.

(c) She walks across level ground and encounters a bees nest, at which point she attempts to run away before she is stung.

(d) She climbs slowly to the peak of a hill, stops to enjoy the view, and then starts to sprint back down, but quickly runs into a tree and knocks herself unconscious.

3. We have looked at several types of polygons in class and in your reading. In this question, we will use some of those same methods to answer questions about one particular type of polygon, a triangle.

(a) If possible, give an example of three side lengths which cannot be used to build a triangle. Justify why these sides cannot form a triangle, or why no such sides exist.

(b) If possible, give an example of two side lengths and an included angle which cannot be used to build a triangle. Justify why these objects cannot form a triangle, or why no such example exists.

(c) If possible, give an example of two angles and an included side length which cannot be used to build a triangle. Justify why these objects cannot form a triangle, or why no such example exists.

(d) If possible, give an example of three angles which cannot be used to build a triangle. Justify why these angles cannot form a triangle, or why no such set of angles exists.

4. Use the facts we have learned about angles, quadrilaterals, and proofs to prove the following theorems.

(a) The quadrilateral formed by joining the midpoints of consecutive sides of any quadrilateral is a parallelogram.

(b) The quadrilateral formed by connecting the midpoints of consecutive sides of a rectangle is a rhombus.