LARSON—MATH 255–HOMEWORK WORKSHEET h10
Problems, Graphs, Investigations

1. Create a Cocalc/Sage Cloud account.

   (a) Start the Chrome browser.

   (b) Go to `http://cocalc.com`

   (c) You should see an existing Project for our class. Click on that.

   (d) Click "New", then "Sage Worksheet", then call it **h10**.

   (e) For each problem number, label it in the SAGE cell where the work is. So for Problem 1, the first line of the cell should be `#Problem 1`.

2. For any positive integer n we can compute the n^{th} Fibonacci number F_n and also the number of digits that number has. Define a function `fibonacci_digits(n)` that takes a positive integer n as input and outputs the number of digits of F_n.

3. Make a scatter plot of the points (n, `fibonacci_digits(n)`) for positive integers n up to 5000 (so that we get to at least 1000 digits.

4. Guess a function that approximates this scatter plot and draw it on the same axis.

5. On the previous homework you defined a function `solutions(p)` that finds the number of right triangles with integer length sides, $\{a, b, c\}$, and perimeter p. Now make a scatter plot to visualize the number of solutions for perimeters p between $p = 100$ and $p = 150$.

6. The sum of the reciprocals of the positive integers

$$\sum_{n=1}^{\infty} \frac{1}{n}$$

   diverges (that is, the sum goes to infinity). Find the smallest integer m so that $\sum_{n=1}^{m} \frac{1}{n}$ is at least 5.

Getting your homework recorded

When you are done,...

(a) Click the "Make pdf" (Adobe symbol) icon and make a pdf of this worksheet. (If CoCalc hangs, click the printer icon, then "Open", then print or make a pdf using your browser).

(b) Send me an email with an informative header like "Math 255 - h10 worksheet attached" (so that it will be properly recorded).