Pre-Calculus

Instructions: Write the exact answer to each question in the corresponding blank. Remember that the winners in this event are those participants who answer the most questions correctly *in a row* beginning with the first question. So, try to get as far as you can without making a mistake!

1. Given that $i = \sqrt{-1}$, calculate the value of i^{2020}.

1. _____

2. Find the domain of the function $f(x) = \dfrac{1}{\sqrt{x^2-2}}$ and write it in interval notation.

2. _____

3. Solve the equation $\left|\dfrac{x^2-2x-4}{x+1}\right| = x+4$ for x.

3. _____

4. Find θ in radians, where $0 \le \theta < \frac{\pi}{2}$ and

$$\frac{2\tan(\theta)}{1+\tan^2\theta} = \frac{\sqrt{2}}{2}$$

4. _____

5. Find all real numbers t satisfying

$$\ln\left(\frac{t}{2}\right) - 2\ln\left(t^3\right) - 4\ln(2) = 0.$$

5. _____

6. Find all values of x in radians, where $0 \le x < 2\pi$, and

$$25^{\log_5(\cot x)} = 1$$

6. _____

7. Find all values of A in radians with $0 \le A < 2\pi$ satisfying

$$\frac{1}{2}\sin(2A) - \cos A + \sin A = 1$$

7. _____

College of Charleston Math Meet 2020

Pre-Calculus Timed Sprint

Name (please print): _____

School: _____

The grading for the Timed Sprints is unusual! Your grade will be the number of questions answered correctly, starting with the first question, before you make a mistake. For example, if you only answer questions 1-4 correctly and questions 7-13 correctly, your grade will be a "4" since you did not get question 5 right. You will have a limited amount of time to work on the sprint. Your paper will be collected at the end of this period.

By my signature below I certify that all of the work completed on this sprint is my own.