

## The 2020 Sprint

**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. Which answer puts the following numbers in order from smallest to largest:

$$22^{202}, \quad 2020^2, \quad 202^{22}$$

A.  $202^{22}, \quad 2020^2, \quad 22^{202}$

C.  $2020^2, \quad 22^{202}, \quad 202^{22}$

B.  $2020^2, \quad 202^{22}, \quad 22^{202}$

D.  $202^{22}, \quad 2020^2, \quad 202^{22}$

1. \_\_\_\_\_

2. Find the largest prime factor of 2020.

2. \_\_\_\_\_

3. Solve the system of linear equations

$$\begin{cases} \frac{1}{2}x - \frac{3}{2}y = -32 \\ 10x + 5y = 130 \end{cases}$$

Write your answer as an ordered pair  $(x, y)$  or write “none” if no solution exists.

3. \_\_\_\_\_

4. Find all values of  $y$  corresponding to points of intersection of the ellipse  $2x^2 = 16 - y^2$  and  $(y - 4)^2 = 16 - 2x^2$ . If none exist, write “none.”

4. \_\_\_\_\_

5. What is the largest power of 2 that divides  $2^{2020} + 10^{2020}$ ?

5. \_\_\_\_\_

6. Find the remainder when the polynomial  $p(x) = (x - 2)^{2020}$  is divided by  $d(x) = x - 1$ .

6. \_\_\_\_\_

7. Find the sum of the roots of the cubic equation

$$\frac{1}{10}x^3 - 2222x^2 + 2020x - \frac{1}{22} = 0.$$

7. \_\_\_\_\_

## College of Charleston Math Meet 2020

### The 2020 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.