Name:	Section:

Math 125 Final Exam, Fall 2021

- The following exam has 4 parts, 19 problems, and 8 pages. Please stop and make sure that your exam has all its pages.
- Please raise your hand if you have any questions or need a restroom break.
- When you have completed your exam, raise your hand and the instructor will collect your exam. DO NOT begin packing up until you have turned your exam in.
- ANY use of cell phones or electronics other than an appropriate calculator will result in you receiving a zero on your final exam.
- ANY cheating (cheat sheets, communicating with classmates, etc.) will result in you receiving a zero on your final exam.

Section 1: Quick problems. Show work to receive partial credit. Make sure you simplify fully and round appropriately.

1. [5]Complete the indicated operation and give your answer in scientific notation. Round appropriately as your final step:

a.
$$1.1 \times 10^{-10} + 3.8 \times 10^{-9}$$

2. [5]Simplify. Express results with positive exponents only:

a.
$$\left(\frac{-4b^5}{by^6}\right)^2$$

3. [7]Perform the indicated operations and simplify. Be sure to write your answer in the correct form:

a.
$$(6x^2 + 6 + 7x) \div (2x + 1)$$

4. [15]Factor each polynomial completely: a. $18x^2 + 9x - 5$

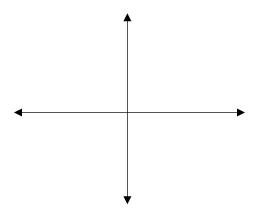
a.
$$18x^2 + 9x - 5$$

b.
$$x^4 - 1$$

c.
$$x^3 + 64$$

Section 2: Graphing and calculations. Show all work to receive credit. Be sure to simplify.

- 5. [9]Considering the following function: $g(x) = \sqrt{5x 4}$
 - a. Find the domain of g(x):
 - b. Graph g(x) and **label** at least three points including the x-intercept:



6. [10] Give the equation in slope-intercept form of the line that is perpendicular to the line y=-3x-2 and passes through the point (2,0):

7. [8]Solve the system of equations:

a.
$$3x - y = 7$$

$$18x + 6y = -18$$

8. [6] If y varies directly with x^2 and y=5 when x=3, find y when x=6. Give an exact answer:

9. [6]Perform the indicated operations, factor, and reduce the following to simplest form. You may leave your answer in factored form:

a.
$$\left(\frac{x^2-25}{x}\right) \div \left(\frac{x+5}{2x^2-14x}\right)$$

10. [24]Solve the following equations for x. Give exact answers: a. $\frac{3}{10x} + \frac{1}{3} = \frac{5}{16x}$

a.
$$\frac{3}{10x} + \frac{1}{3} = \frac{5}{16x}$$

b.
$$K = \frac{ax}{x+b}$$

c.
$$x^2 - 3 = -6x$$

Section 3: Word problems.	Show all work to receive credit.	Be sure to use appropriate rounding and
include units!		

11. [12] The speed of a small plane is 158 mph in still air. With a head wind it makes a routine flight in 2 hours and 15 minutes but the return trip along the same flight path with a tail wind takes 35 minutes less. What is the average wind speed? Round final answer to three significant digits.

12. [12] How many liters of a 28% acid solution must be mixed with a 17% acid solution to produce 10 liters of a 22% acid solution? Round to one decimal place.

13. [12] A squirrel stands on the top of a fence post. On the ground he sees an acorn. If the fence post is 3.15 feet tall and the angle of depression from the squirrel to the acorn is 28.0°, how far is the acorn from the base of the post? Round appropriately.

Section 4: Geometry and Trig. Show all work to receive credit. Round appropriately or as indicated in the problem.

- 14. [10] Find the area of the following:
- a. The area between a circle and an inscribed square where the circle has radius 21cm. Round to three significant digits.

- 15. [12] Given the three parts of a triangle, find the remaining three parts. You may round off the length of sides to three significant digits and round off angles to the nearest 1/10 of a degree.
- a. C=90°, A=42°, c=141 cm

16. [12] Find the area of a regular pentagon with perimeter of 745 feet.

17. [10] Find the measure of the central angle in degrees for a sector of a circle that has a radius of 3.10 inches and an arc length of 0.95 inches. Round to three significant digits.

18. [15] Given a=17.4m, B=29.0°, C = 53.0°, find the three remaining parts of an oblique triangle. You may round off the length of sides to the correct number of significant figures and round off angles to the nearest 1/10 of a degree:

Hint: Law of Sines:
$$\frac{a}{sinA} = \frac{b}{sinB} = \frac{c}{sinC}, \text{ Law of Cosines: } \begin{cases} a^2 = b^2 + c^2 - 2bc(cosA) \\ b^2 = a^2 + c^2 - 2ac(cosB) \\ c^2 = a^2 + b^2 - 2ab(cosC) \end{cases}$$

19. [10]Sketch a graph of f(x) = 3sinx + 1. Be sure to show at least one full period. Label the yintercept and three other points.