

**Instructions:** You must show all work to receive credit. Unless the problem states otherwise you should do the work by hand and check by calculator, and report exact values (no decimals). Use proper notation for your answers and be sure to answer all part of each question.

Part I. After answering these questions, you will submit your answers to the online exam form in Canvas. After submitting your answers, include the work for these questions to the Exam #1, Part 2 dropbox along with your written answers for Part II.

1. Consider the set of numbers below. For each indicated number type below, list the elements in the set that are of that type. Use correct set notation for your response. If no numbers are of that type in the set, write NONE. (25 points)

$$\left\{ -13, \frac{4}{5}, 21.68, -|-9|, 0, \sqrt{10}, 4, \frac{1}{\pi}, 2^3, \frac{\sqrt{36}}{3}, 0.\overline{01}, 4.424424442 \dots, 10\,000 \right\}$$

*Handwritten notes:  $\frac{4}{5} = 2$  (with arrow pointing to  $\frac{\sqrt{36}}{3}$ ),  $\frac{1}{\pi}$  (with arrow pointing to  $\frac{1}{\pi}$ )*

- a. Irrational numbers (I):

$$\left\{ \sqrt{10}, \frac{1}{\pi}, 4.424424442 \dots \right\}$$

- b. Rational numbers (Q):

$$\left\{ -13, \frac{4}{5}, 21.68, -|-9|, 0, 4, 2^3, \frac{\sqrt{36}}{3}, 0.\overline{01}, 10\,000 \right\}$$

- c. Natural Numbers (N):

$$\left\{ 4, 2^3, \frac{\sqrt{36}}{3}, 10\,000 \right\}$$

- d. Integers (Z):

$$\left\{ -13, -|-9|, 0, 4, 2^3, \frac{\sqrt{36}}{3}, 10\,000 \right\}$$

- e. Are there any numbers in this set which are not real?

no

2. Write *eighteen million, one hundred two thousand, seven hundred eighty-three* as a number. (5 points)

18,102,783

3. Round the number 481,628 to the nearest: (5 points each)

a. Thousand  $482,000$

b. Hundred  $481,600$

4. Perform the following mathematical computations without a calculator. (8 points each)

a.  $1,256 + 15,247 + 498 + 6,808 =$

$$23,809$$

b.  $1,002 - 103 - 65 =$

$$834$$

c.  $65,031 \times 1,256 =$

$$81,678,936$$

d.  $1125 \div 15 =$

$$75$$

5. Simplify the expression  $3(1 + 9 \cdot 6) - 4^2$  using order of operations. (8 points)

$$3(1 + 54) - 16 = 3(55) - 16 = 165 - 16 = 149$$

6. Evaluate the following expressions. If the expression cannot be evaluated write "undefined". (4 points each)

a.  $(-4)^2$   $16$

b.  $-5^2$   $-25$

c.  $\frac{0}{9}$   $0$

d.  $\frac{8}{0}$  undefined

7. Evaluate the following expressions. (10 points each)

a.  $\frac{(-3)^2 + 6(3-8)}{2 \cdot 3 + 11} = \frac{9 + 6(5)}{6 + 11} = \frac{9 - 30}{17} = \frac{-21}{17}$

b.  $-3^3 + 5^2 \div |4 - 9| = -27 + 25 \div |4 - 9| = -27 + 25 \div |-5| = -27 + 25 \div 5 = -27 + 5 = -22$

c.  $\left(\frac{1 - (-4)^3}{5^2 - 6 \cdot 2}\right)^2 = \left(\frac{1 + 64}{25 - 12}\right)^2 = \left(\frac{65}{13}\right)^2 = 5^2 = 25$

8. Evaluate the following expression. (Reminder: You need to show work to earn all points.) (12 points)

$$\frac{5}{6} \left[ \frac{4}{3} \div \left( \frac{8}{9} - \frac{5}{3} \right) - 2 \right] =$$

$$\frac{5}{6} \left[ \frac{4}{3} \div \left( \frac{8}{9} - \frac{15}{9} \right) - 2 \right] =$$

$$\frac{5}{6} \left[ \frac{4}{3} \div \left( -\frac{7}{9} \right) - 2 \right] =$$

$$\frac{5}{6} \left[ \frac{4}{3} \cdot \frac{9^3}{-7} - 2 \right] = \frac{5}{6} \left[ -\frac{12}{7} - \frac{14}{7} \right] =$$

$$\frac{5}{6} \left[ -\frac{26}{7} \right] = \frac{-65}{21}$$

9. Estimate the square roots and round to two decimal places. (3 points each)

a.  $\sqrt{53}$

$$7.28$$

b.  $\sqrt{47}$

$$6.86$$

10. Perform the following operations. (5 points each)

a.  $5.75 + 8.46$

$$= 14.21$$

b.  $(-3.35)(-12.7)$

$$= 42.545$$

c.  $9 \div 0.045$

$$= 200$$

11. Each workday last week, Yoshie kept track of the number of minutes she had to wait for the bus. She waited 3, 0, 8, 1, and 8 minutes. Find the mean (average). (6 points)

$$\frac{3+0+8+1+8}{5} = \frac{20}{5} = 4 \text{ minutes}$$

12. Calculate the following problems. (5 points each)

a. 16% of 125

$$20$$

b. 80% of 12,478.43

$$= 9,982.744$$

c. 65 is what percent of 517?

approx. 12.6%

d. 0.20 is what percent of 89.50?

0.22% approx.

13. Twenty people in a small town responded to a survey about land usage. If this represents 6.5% of the population, how many people are there in the town? (6 points)

20 is 6.5% of what number?

approx. 308 people

14. The tax rate in Allegheny County is 7% while the rate in Westmoreland County is 6%. If an automobile costs \$16,990, how much tax would you have to pay in each county? (8 points)

Allegheny \$ 1,189.30

Westmoreland \$ 1,019.40

Part II. Submit your written answers to these questions into the Exam #1, Part 2 dropbox.

15. Write -12.5632 in words. (5 points)

negative twelve and five thousand six hundred thirty-two  
ten thousandths

16. Place the following numbers on the number line below in order of smallest to largest. (You don't need to worry about "spacing", but the order does matter. You may wish to convert fractions to decimal equivalents to find relationship with nearby numbers.) (16 points)

$$\left\{ \cancel{-3}, \cancel{\pi}, \cancel{-\frac{13}{4}}, \cancel{\frac{22}{7}}, \cancel{3.14}, \cancel{-\frac{1359}{500}}, \cancel{0}, \cancel{\frac{62}{63}} \right\}$$

