TA Diagnostic Study Topics

Below is a list of various topics on the TA Diagnostic Exam, which cover the Math Corps curriculum. Applicants are given 1-hour to complete the exam.

Studying for the Diagnostic is HIGHLY RECOMMENDED.

**Integers**
- Writing in English
  - Write the number 45,007,081 in English
- Adding/Subtracting
  - Add: \(-5 + 9 = 4\)

**Fractions**
- Number bars
  - Represent the number by dividing and shading the number bar.
    \[
    \frac{3}{8} = \boxed{\text{-------------}}
    \]
- Comparing fractions
  - Circle the number that is greater:
    \[
    \frac{4}{5} \text{ or } \frac{7}{20}
    \]
- Converting to equivalent fractions
  - Convert \(\frac{3}{8}\) to 24ths
- Arranging numbers < 1 in order
  - Arrange the numbers in order, with the smallest on the left.
    \[
    \frac{5}{14}, \frac{7}{9}, \frac{3}{4}, \frac{3}{14}
    \]
- Simplifying numbers by factoring out a “1”
  - Simplify: \(\frac{10}{25}\)
- Adding/Subtracting
  - Add: \(\frac{4}{5} + \frac{2}{11}\)
- Multiplication/Division
  - Multiply, writing your answer in simplest terms:
    \[
    \frac{4\times10}{15\times11}
    \]
  - Divide: \(\frac{5}{8} \div \frac{1}{3}\)

**Fractions (continued)**
- Finding a fraction of a number
  - Find \(\frac{4}{7}\) of 56.
- Mixed Numbers
  - Convert mixed to fraction
    - Convert \(\frac{2}{3}\) to a fraction: \(\frac{6}{2} = \frac{3}{3}\)
  - Placing on a number line
    - Place \(\frac{13}{3}\) on a number line.

**Decimals**
- Converting from decimal to fraction
  - Write 7.0219 as a fraction or mixed number.
- Recognizing equal decimals
  - Circle all of the numbers that equal .54:
    A) .504  B) .054  C) .540  D) 54000  E) 5.4
- Estimating with multiplication
  - Circle the number below that best approximates the product 30.210 × 11.98716:
    A) 36.1  B) 361.2  C) 3.612.1  D) 36,121.1
- Converting fractions to decimals
  - Convert the number \(\frac{7}{11}\) to a decimal
- Arranging in order
  - Arrange the numbers in order, with the smallest on the left:
    \[.176, 1.74879, 1.76, 1.76\]
- Rounding to nearest place value
  - Round off .8451 to the nearest:
    a) whole number
    b) tenth
    c) thousandth
- Scientific Notation
  - The scientific notation for a number is \(7.01 \times 10^5\). What is the number?
Percents
- Comparing fractions and percents
  Circle the number that is greater:
  25% or \( \frac{1}{9} \)
- Converting fractions to percent
  Convert: \( \frac{7}{10} \) to percent
- Finding a percentage of a number
  What is 4% of $150?

Exponents/Square Roots
- Placing square roots on a number line
  Place \( \sqrt{20} \) on a number line.
- Evaluating roots higher than 2
  Find: a) \( \sqrt[4]{10000} \) b) \( \sqrt[5]{-1} \)

Algebra
- Real numbers vs. Not real numbers
  Which of the following are not real numbers?
  Circle your answer(s):
  A) \( \frac{5}{0} \)  B) \( \sqrt{13} \)  C) \( \frac{0}{7} \)  D) \( \frac{0}{0} \)  E) \( \sqrt{-9} \)
- Evaluating polynomials
  Evaluate \( 2x^2 - x(1 - y) \),
  when \( x = 3 \) and \( y = -2 \).
- Simplifying by adding like terms
  Simplify completely:
  \( -2x^2y^3 + 4y + 5x^2y^3 + y + x^3 + x^3 + x^4 \)
- Subtracting like terms
  Subtract: \( -3ab^4 - 7ab^4 \)
- Multiplying & Simplifying Expressions
  Multiply and simplify completely:
  \( \left(3x^6y^4\right)^{\frac{1}{2}} \left(4xy^2\right) \)