THE MATH CORPS AT CLEVELAND STATE UNIVERSITY

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
o   Writing in English

> Write the number 45,007,081 in English

o   Adding/Subtracting

> Add: $-5+9=$

Fractions
o   Number bars

> Represent the number by dividing and shading the number bar. $\frac{3}{8} =$ ☐

o   Comparing fractions

> Circle the number that is greater:
> $\frac{4}{5}$ or $\frac{7}{20}$

o   Converting to equivalent fractions

> Convert $\frac{3}{8}$ to 24ths

o   Arranging numbers < 1 in order

> Arrange the numbers in order, with the smallest on the left.
> $\frac{5}{14}, \frac{7}{9}, \frac{3}{14}, \frac{4}{5}$

o   Simplifying numbers by factoring out a "1"

> Simplify: $\frac{10}{25}$

o   Adding/Subtracting

> Add: $\frac{4}{5} + \frac{2}{11}$

o   Multiplication/Division

> Multiply, writing your answer in simplest terms:
> $\frac{4}{15} \cdot \frac{10}{11}$

> Divide: $\frac{5}{8} \div \frac{1}{3}$

Fractions (continued)
o   Finding a fraction of a number

> Find $\frac{4}{7}$ of 56.

Mixed Numbers
o   Convert mixed to fraction

> Convert $6\frac{2}{3}$ to a fraction: $6\frac{2}{3} = \frac{}{3}$

o   Placing on a number line

> Place $\frac{13}{3}$ on a number line.

Decimals
o   Converting from decimal to fraction

> Write 7.0219 as a fraction or mixed number.

o   Recognizing equal decimals

> Circle all of the numbers that equal .54:
> A) .504   B) .054   C) .540   D) 54000   E) 5.4

o   Estimating with multiplication

> Circle the number below that best approximates the product 30.201×11.98716:
> A) 36.1   B) 361.2   C) 3,612.1   D) 36,121.1

o   Converting fractions to decimals

> Convert the number $\frac{7}{11}$ to a decimal

o   Arranging in order

> Arrange the numbers in order, with the smallest on the left:
> .176, 1.74879, 1.76, $1.\overline{76}$

o   Rounding to nearest place value

> Round off .8451 to the nearest:
> a)   whole number
> b)   tenth
> c)   thousandth

o   Scientific Notation

> The scientific notation for a number is 7.01×10^5. What is the number?

Percents

o Comparing fractions and percents

> Circle the number that is greater:
>
> 25% or $\dfrac{1}{9}$

o Converting fractions to percent

> Convert: $\dfrac{7}{10}$ to percent

o Finding a percentage of a number

> What is 4% of $150?

Exponents/Square Roots

o Placing square roots on a number line

> Place $\sqrt{20}$ on a number line.

o Evaluating roots higher than 2

> Find: a) $\sqrt[4]{10000}$ b) $\sqrt[5]{-1}$

Algebra

o Real numbers vs. Not real numbers

> Which of the following are not real numbers?
> Circle your answer(s):
>
> A) $\dfrac{5}{0}$ B) $\sqrt{13}$ C) $\dfrac{0}{7}$ D) $\dfrac{0}{0}$ E) $\sqrt{-9}$

o Evaluating polynomials

> Evaluate $2x^2 - x(1-y)$,
> when $x = 3$ and $y = -2$.

o Simplifying by adding like terms

> Simplify completely:
>
> $-2x^2 y^3 + 4y + 5x^2 y^3 + y + x^3 + x^3 + x^4$

o Subtracting like terms

> Subtract: $-3ab^4 - 7ab^4$

o Multiplying & Simplifying Expressions

> Multiply and simplify completely:
>
> $\left(3x^6 y^4\right)^2 \left(4xy^2\right)$

Algebra (continued)

o Distributive Law

> Multiply and simplify completely:
>
> $(3x - y + 5)(x - 3)$

o Simplifying by factoring

> Factor completely: $9x^2 yz + 12x^3 y^4 z^2 - xyz$

o Simplifying algebraic fractions

> Simplify completely: $\dfrac{a^8 b^3}{a^2 b^5}$

o Simplifying rational expressions

> Simplify $\dfrac{4x - 8x^2}{4x}$

o Solving equations

> Solve: $6x - 5 = 2(x + 3)$

o Dividing rational expressions

> Divide and simplify completely: $\dfrac{x}{y+1} \div \dfrac{y}{x^2}$