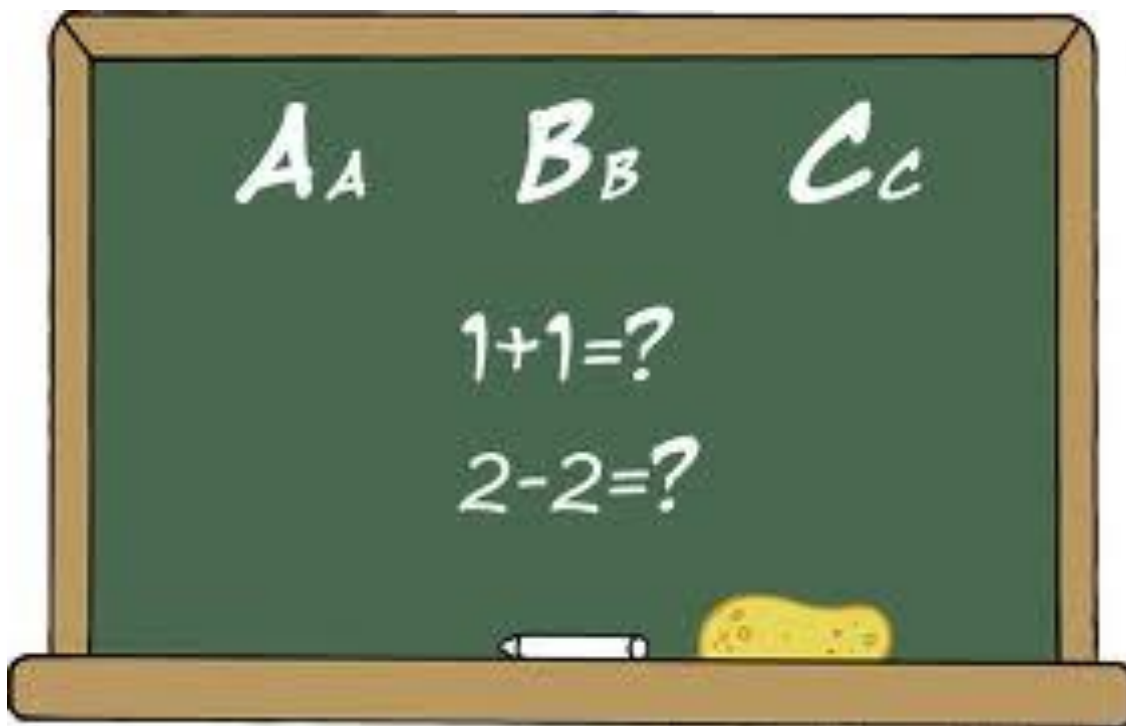


NCLB Paraeducator Competency Test

Study Guide:

MATHEMATICS

EGUSD



NCLB PARAEDUCATOR COMPETENCY TEST Study Guide

Why should you use the NCLB Paraeducator Competency Test Study Guide? The study guide will give you examples of the **most commonly missed questions** on the test, and it will give you the instructions for working through some of the questions. Included with the Study Guide is a worksheet to practice what you've learned.

Here are a few tips to help you succeed on the Competency Test:

- Read all directions and questions carefully and completely.
- Pick the single best answer. All multiple-choice questions have four answer choices. There are no "trick" questions.
- Answer every question. If you get stuck on a question, move on. Complete the rest of the test, and then come back to the questions you skipped. Eliminate the responses that you know are wrong, and pick the best remaining answer. Even if you are unsure, mark a response for every question because you will not be penalized for wrong answers.

If you need additional help, test preparation classes are offered through the Elk Grove Adult and Community Education. For more information, please call 916.686.7717.

We wish you much success as you work through this guide and prepare for the Competency Test.

Identifying Fractions

How to identify fractions

1. Proper fraction

The top number is smaller than the bottom number

2. Improper fraction

The top number is bigger than or the same as the bottom number

3. Mixed fraction

Has a whole number and a proper fraction

Examples of fractions

Proper fraction

$\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{4}$

Improper fraction

$\frac{3}{3}$ $\frac{5}{3}$ $\frac{4}{3}$

Mixed fraction

$2\frac{1}{2}$ $3\frac{1}{4}$

Raising & Reducing Fractions

- How to raise a fraction

1. Multiply the top number and bottom number by one common number
2. Pick any number you would like

Example: $\frac{1}{2} * 5 = \frac{5}{10}$

- How to reduce a fraction

1. Identify a number than can be divided into both the top and bottom number; it has to be the same number.
2. Divide both the top and bottom number by this number.

Example: $\frac{3}{18} \div 3 = \frac{1}{6}$

Changing Fractions to a Decimal

- STEP 1: Divide the bottom number into the top number

Example: $\frac{3}{4}$

Divide 4 into 3 $4 \overline{)3}$

- STEP 2: Add a decimal point behind the number inside the divisor and put a zero behind it.
- STEP 3: Put a decimal point directly above the decimal point in the divisor.
- STEP 4: Follow regular division rules.

$$\begin{array}{r} .75 \\ 4 \overline{)3.0} \\ \underline{28} \\ 20 \\ \underline{20} \\ 0 \end{array}$$

Changing a Fraction to a Percent

- STEP 1: Follow the rules for changing a fraction into a decimal.
(See Page 4)

Example: $\frac{3}{4} = .75$

- STEP 2: Move the decimal point two spaces to the right of its original place.

$$.75 = 75.$$

↑

- STEP 3: Change the decimal point to a “%” sign.

$$75. \rightarrow 75\%$$

Changing a Percent to a Decimal

To change a percent into a decimal

- STEP 1: Remove the “%” sign and replace it with a decimal point.

Example: 45% → 45.

- STEP 2: Move the decimal two spaces to the left.

45.	.45
↑	↑

Changing a Percent to a Fraction

To change a percent into a fraction

Example: 35% \rightarrow .35

- STEP 1: Find the place value of the number furthest to the right of the decimal point.

$.35$
↑
5 is the number furthest to the right of the decimal point. Its place value is hundredths ($\frac{1}{100}$ or .01)

- STEP 2: The place value becomes the bottom number of the new fraction, and the digits behind the decimal point become the top number.

the digits behind the decimal point
↓
.35 $\frac{35}{100}$
↑
place value

- STEP 3: Reduce the new fraction if possible. (See Page 3)

$$\frac{35}{100} \rightarrow \frac{7}{20}$$

Exponent

- An exponent tells how many times the same number is multiplied by itself.

The number being multiplied is known as the base.

Example: 5^3

- Five (5) is the base, the number that will be multiplied.
- Three (3) is the exponent that tells how many times to multiply the base by itself.

5^3 can also be written as $5 \times 5 \times 5$, which equals 125.

$$5^3 = 125$$

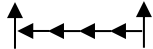
$$5 \times 5 \times 5 = 25 \times 5 = 125$$

Scientific Notation: Whole Numbers

- Scientific notation is a way to easily write large numbers.

Example: 34,987,000

- Put a decimal point at the end of the number.
- Move the decimal point to the left until the value of the number is between one and nine.

$$34,987,000. = 3.4987000$$


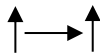
- Count the number of spaces you moved the decimal point; this number becomes your exponent.
- Drop the zeros off the number.
- Write what you have left over and multiply it by 10^7 . Now, the original number is written in scientific notation.

$$34,987,000 = 3.4987 \times 10^7$$

Scientific Notation: Decimals

- Changing a decimal into scientific notation is similar to working with a whole number.

Example: .00053



1. Move your decimal point to the right until the value of the number is between one and nine.
2. Count the number of spaces you moved the decimal point, and that number becomes your exponent.

Example: You moved the decimal point 4 spaces to the right; therefore, the exponent is 4.

3. Put a negative sign in front of your exponent number because your original number was less than 1.
4. Remove all zeros.
5. Write what you have left over the multiply it by 10^{-4} . Now, the original number is written in scientific notation.

$$.00053 \quad 5.3 \times 10^{-4}$$

Order of Operation

- You can use order of operation when you have several operations in one problem.

It tells you what you must do first, second, third, etc.

Step 1: Perform all operations inside the parentheses.

Step 2: Evaluate exponents.

Step 3: Multiply and divide in order from left to right.

Step 4: Add and subtract in order from left to right.

Order of Operation in Action

STEP 1: Perform all operations inside the parentheses, then bring what you haven't done down to the next line.

Example: $10(2+8)+3*2$

STEP 1: $10(10)+3*2=$

STEP 2: Evaluate exponents.

STEP 2: No exponents in this problem.

STEP 3: Multiply and divide from left to right.

STEP 3: $100+6$

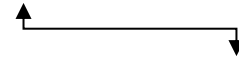
STEP 4: Add and subtract from left to right.

STEP 4: 106 is your answer.

Linear Equation: Addition/Subtraction/Multiplication/Division

STEP 1: Identify the operation that you see.

Example: $x-6=10$



STEP 1: The operation is subtraction.

STEP 2: Do the opposite operation that you see in the equation.

- A. If the operation is subtraction, use addition.
- B. If the operation is addition, use subtraction.
- C. If the operation is multiplication, use division.
- D. If the operation is division, use multiplication.

$$x-6=10$$

+

STEP 2: The opposite operation is addition.

$$x-6=10$$

+6

STEP 3: Use 6.

STEP 3: Use the same number that is on the same side of the equation as the letter (or variable).

$$x-6=10$$

+6 +6

STEP 4: Add 6 to the other side of the equal sign.

STEP 4: Whatever operation you do to one side of the equal sign, you must do to the other side of the equal sign.

$$x-6=10$$

+6 +6

$$x-0=+16$$

STEP 5: Perform the math operation.

- A. The letter (or variable) should now be by itself.

STEP 5: Solve.

$$x=16$$

Linear Equations In Action

Addition/Subtraction/Multiplication/Division

$x - 6 = 10$	This operation is subtraction.
$+6 \quad +6$	The opposite operation is addition. Use 6.
$x = 16$	Add 6 to each side of the equal sign.

$\frac{5a}{5} = \frac{20}{5}$	The operation is multiplication.
$a = 4$	The opposite operation is division. Use 5.
	Divide the value on each side of the equal sign by 5.

$x + 6 = 10$	The operation is addition.
$-6 \quad -6$	The opposite operation is subtraction. Use 6.
$x = 4$	Subtract 6 from each side of the equal sign.

$\frac{n-8}{11}$	This operation is division.
$11\left(\frac{11}{n}\right) = 8 * 11$	The opposite operation is multiplication. Use 11.
$n = 88$	Multiply each side of the equal sign by 11.

Solving Proportions

$$\frac{8}{n} = \frac{4}{6}$$

STEP 1: Cross multiply the problem.

STEP 2: Identify the operation.

STEP 3: Do the opposite operation.

STEP 4: Use the number that is on the same side of the equation as the letter (or variable).

STEP 5: Perform the same operation on both sides of the equal sign.

STEP 6: Solve

$$\frac{8}{n} \times \frac{4}{6}$$

STEP 1: Multiply $4 \times n = 4n$
Multiply $8 \times 6 = 48$

STEP 2: The operation is multiplication.

STEP 3: The opposite operation is division.

$$\frac{4n}{4} = 48$$

STEP 4: Use 4 since it is next to the letter n.

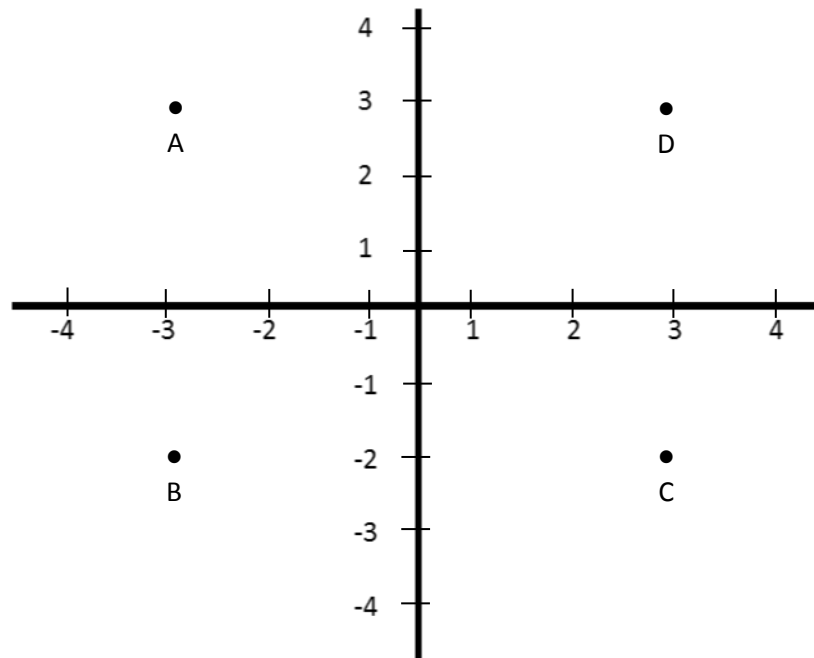
$$\frac{4n}{4} = \frac{48}{4}$$

STEP 5: Divide by 4 on both sides of the equal sign.

STEP 6: Solve

$$n = 12$$

Graphing



- To find points on a graph, treat both the x and y axis as a number line.
- Look for the x-axis number first on the number line that runs from left to right.
 1. If it's a negative number, move left of zero.
 2. If it's a positive number, move right of zero.
- Look for the y-axis number on the number line that runs up and down.
 1. If it's a negative number, move down from zero.
 2. If it's a positive number, move up from zero.

Example: Find point A.

- It is 3 spaces left of zero.

The x-axis number will be a negative (-3).

- It is 3 spaces above zero.

The y-axis number will be a positive (3).

(-3, 3)

Rate of Speed, Distance & Time

- To solve any motion problem, break it down into a formula.

$$\text{Distance} = \text{rate} \times \text{time} \longrightarrow d=rt$$

- STEP 1: Identify the distance.
- STEP 2: Identify the rate.
- STEP 3: Identify the time.
- STEP 4: Fill in the information.
- STEP 5: Solve for the letter (or variable).

The letter will stay for the portion of the formula that is missing.

Rate

Carol drove 320 miles in 4 hours. What was her average speed?

($d=rt$)

STEP 1: distance = 320 miles

STEP 2: rate = ?

STEP 3: time = 4

Therefore we need to solve for rate.

$$\text{STEP 4: } \frac{320}{4} = \frac{(4)r}{4}$$

$$\text{STEP 5: } 80 = r$$

Jeff drives for 4 hours at 45 mph. How far does he travel? ($d=rt$)

STEP 1: distance = ?

STEP 2: rate = 45 mph

STEP 3: time = 4

Therefore we need to solve for distance.

$$\text{STEP 4: } d=45(4)$$

$$\text{STEP 5: } d=180 = r$$

David flew from New York to Des Moines. He covered 1200 miles at an average speed of 400 mph. How long did the trip take? ($d=rt$)

STEP 1: distance = 1200 miles

STEP 2: rate = 400 mph

STEP 3: time = ?

Therefore we need to solve for time.

$$\text{STEP 4: } \frac{1200}{400} = \frac{400t}{400}$$

$$\text{STEP 5: } 3=t$$

Practice Sheet

DIRECTIONS: Solve the following word problems

1. Al bought a used car for \$5,400. He put down \$1,620. What percent of the total cost was his down payment?
2. Last year, a basketball team won 45% of its games. The team played 60 games. How many games did the team win?
3. Katie buys a dress at \$24.65, a belt for \$6.85, and a scarf for \$3.70. How much did she pay all together including sales tax (6%)?
4. Twelve apples cost \$1.00. How much do 15 apples cost?
5. Jim's car gets 36 miles to a gallon of gas. How much gas will he use to travel 99 miles?
6. One U.S. dollar equals 85¢ in Cayman Islands currency. What would \$15.13 in Cayman Island currency be in U.S. currency?

DIRECTIONS: Write these numerals in scientific notation:

7. .00000417 _____
8. 218,000 _____
9. 3,247,600,000 _____
10. .000015 _____

DIRECTIONS: Solve the following equations for the letter.

11. $x + 11 = 23$

12. $x + 3 = 6\frac{1}{2}$

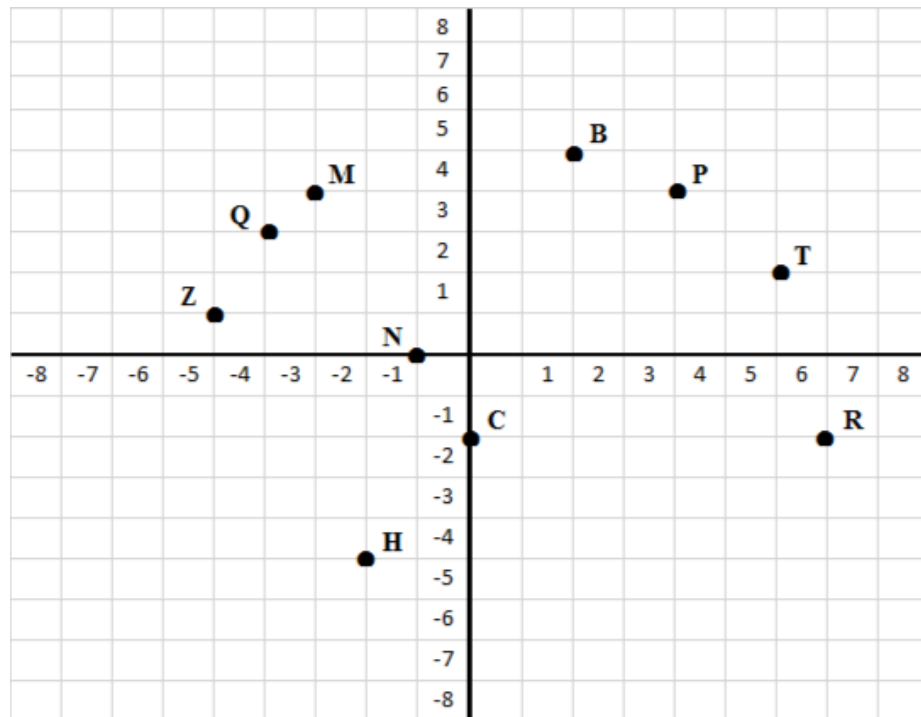
DIRECTIONS: Simplify each expression using the order of operations:

13. $2 + 9(8 - 1)$

14. $32 - 16 \div 4$

15. $6(8-7) + 4 * 1$

DIRECTIONS: Answer question 16 using the graph below:



16. Give the ordered for the following points:

a. Point M

b. Point R

c. Point H

d. Point T

Practice Answer Sheet

DIRECTIONS: Solve the following word problems

- Al bought a used car for \$5,400. He put down \$1,620. What percent of the total cost was his down payment?
 - The money put down is the part (1,620)
 - The total amount of the car is your whole (5,400)
 - $1,620 \div 5,400 = .30$
 - Move the decimal to the right two spaces (to change into % format)
 - **ANSWER:** 30%
- Last year, a basketball team won 45% of its games. The team played 60 games. How many games did the team win?
 - The rate is 45%
 - The total amount of games is your whole (60)
 - Multiply both numbers together
 - Change the % into a decimal (move to the left two spots = .45)
 - $.45 \times 60 = 27$
 - **ANSWER:** 27 games won
- Katie buys a dress at \$24.65, a belt for \$6.85, and a scarf for \$3.70. How much did she pay all together including sales tax (6%)?
 - Add up all prices = 35.20
 - Multiply your subtotal by 6%
 - Change your rate into a decimal (move to the left two spots = .06)
 - $.06 \times 35.20 = 2.112$ (make this into dollars = 2.11)—this is new tax in dollars
 - Now add your tax in dollars to your sub total
 - $2.11 + 35.20 = 37.31$
 - **ANSWER:** total amount she paid is \$37.31
- Twelve apples cost \$1.00. How much do 15 apples cost?
 - $\frac{1}{12} \times \frac{n}{15} = \frac{15}{12n}$
 - Use ratio formula and let "n" represent the unknown amount.
 - Cross multiply $12 \times n = 12n$; $1 \times 15 = 15$
 - Divide 15 by 12 = 1.25
 - **ANSWER:** \$1.25

5. Jim's car gets 36 miles to a gallon of gas. How much gas will he use to travel 99 miles?

$$\frac{1}{36} \times \frac{n}{99}$$

- Follow the same format as in the above problem.
- $99n \div 36 = 2.75$
- **ANSWER:** 2.75 gallons

6. One U.S. dollar equals 85¢ in Cayman Islands currency. What would \$15.13 in Cayman Island currency be in U.S. currency?

$$\frac{1}{.85} \times \frac{n}{15.13}$$

- Follow the same format as in the above problem
- $15.13 \div .85n = 17.8$
- **ANSWER:** \$17.80 in U.S. Currency

DIRECTIONS: Write these numerals in scientific notation:

7. .00000417	<u>4.17 x 10⁻⁶</u>
8. 218,000	<u>2.18 x 10⁵</u>
9. 3,247,600,000	<u>3.2476 x 10⁹</u>
10. .000015	<u>1.5 x 10⁻⁵</u>

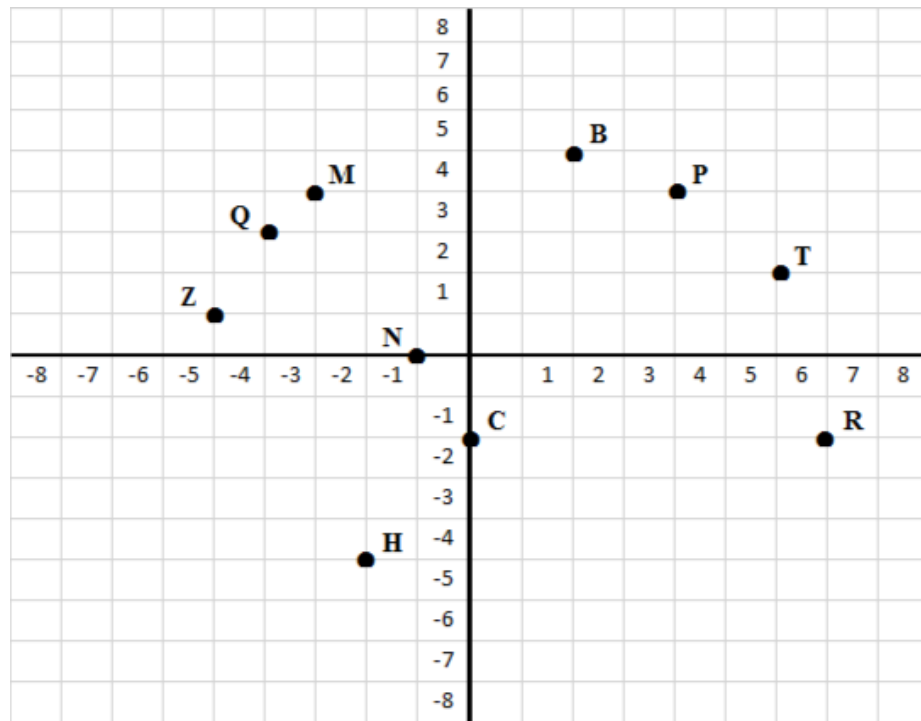
DIRECTIONS: Solve the following equations for the letter.

11. $x + 11 = 23$	<u>$x = 12$</u>	➤ Subtract 11 from both sides of the equal sign.
12. $x + 3 = 6\frac{1}{2}$	<u>$x = 3\frac{1}{2}$</u>	➤ Subtract 3 from both sides of the equal sign.

DIRECTIONS: Simplify each expression using the order of operations:

13. $2 + 9(8 - 1)$	<u>65</u>
14. $32 - 16 \div 4$	<u>28</u>
15. $6(8-7) + 4 * 1$	<u>10</u>

DIRECTIONS: Answer question 16 using the graph below:



16. Give the ordered for the following points:
- Point M (-3,4)
 - Point R (7, -2)
 - Point H (-2, -5)
 - Point T (6, 2)