



STAR SESSIONS

SAM TEST ARITHMETIC REVIEW

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PURDUE NORTH CENTRAL

Q & A:

Q: What is STAR?

A: STAR stands for Sam Test Arithmetic Review and covers the first 14 problems on the math portion (Form B) of the placement test – also called the PNC Math Assessment.

Q: Why are there 14 arithmetic problems on this test?

A: PNC does not offer a course in computational arithmetic. This part of the test allows a student to show their knowledge of this material.

Q: What happens if a student does poorly on these problems?

A: Since PNC does not offer a Basic Math/Computational arithmetic course, the student is responsible for learning the material on his or her own.

Q: How many questions does a student need correct to pass this section?

A: A student needs 9 or 10 (or more!) correct out of 14 to pass this section.

Q: What kind of problems are on this part of the test?

A: The 14 problems cover the following math topics...

- ❖ Add, subtract, multiply, and divide whole numbers
- ❖ Add, subtract, multiply, and divide fractions and mixed fractions
- ❖ Add, subtract, multiply, and divide integers (negative and positive numbers)
- ❖ Students should also know how to read a graph, follow the order of operations, solve for an unknown (variable), solve a story problem, and simplify exponents

Q: Are students allowed to repeat the placement tests?

A: Yes! Students may repeat the entire Assessment test, or either of the two components (Math and English).

I. Operations with Whole Numbers.

ADD

$$28 + 19 = 47$$

$$52 + 63 + 10009 = 10,124$$

SUBTRACT

$$690 - 538 = 152$$

$$4201 - 3859 = 342$$

MULTIPLY

$$53 \times 18 = 954$$

$$(9)(2) = 18$$

$$5 \bullet 3 = 15$$

DIVIDE

$$14 \div 7 = 2$$

$$24 / 8 = 3$$

$$\frac{81}{9} = \frac{9}{1} = 9$$

Additional problems may be found in any basic math textbook or on the Internet.

Notes _____

II. Operations with Fractions.

ADD

$$\begin{array}{r} \frac{1}{3} \\ + \frac{1}{3} \\ \hline \frac{2}{3} \\ 3 \end{array}$$

$$\begin{array}{r} \frac{1}{2} = \frac{2}{4} \\ + \frac{1}{4} = \frac{1}{4} \\ \hline \frac{3}{4} \end{array}$$

$$\begin{array}{r} \frac{1}{6} = \frac{3}{18} \\ + \frac{1}{9} = \frac{2}{18} \\ \hline \frac{5}{18} \end{array}$$

$$\begin{array}{r} \frac{1}{5} = \frac{7}{35} \\ + \frac{1}{7} = \frac{5}{35} \\ \hline \frac{12}{35} \end{array}$$

SUBTRACT

$$\begin{array}{r} \frac{3}{4} \\ - \frac{1}{4} \\ \hline \frac{2}{4} = \frac{1}{2} \\ 4 \quad 2 \end{array}$$

$$\begin{array}{r} \frac{7}{9} = \frac{7}{9} \\ - \frac{1}{3} = \frac{3}{9} \\ \hline \frac{4}{9} \end{array}$$

$$\begin{array}{r} \frac{5}{6} = \frac{10}{12} \\ - \frac{1}{4} = \frac{3}{12} \\ \hline \frac{7}{12} \end{array}$$

$$\begin{array}{r} \frac{2}{3} = \frac{4}{6} \\ - \frac{1}{2} = \frac{3}{6} \\ \hline \frac{1}{6} \end{array}$$

MULTIPLY

Cancel, and multiply straight across

$$\begin{array}{c} 4 \\ \cancel{8} \end{array} \times \begin{array}{c} \cancel{5}^1 \\ 6_3 \end{array} = \frac{4}{9}$$

DIVIDE

$$\frac{25}{32} \div \frac{5}{8}$$

Invert (flip) and Multiply...

$$\begin{array}{c} 5 \\ \cancel{25} \\ 4 \end{array} \times \begin{array}{c} \cancel{8}^1 \\ \cancel{5}_1 \end{array} = \frac{5}{4}$$

or... $1 \frac{1}{4}$

Things to know about operations with fractions:

- ❖ Numerator: top number of a fraction
- ❖ Denominator: bottom number of a fraction
- ❖ Find least common denominator (add & subtract)
- ❖ Reduce answer to lowest term
- ❖ Canceling (multiply & divide)
- ❖ Invert (flip) & multiply (division)

III. Operations with Mixed Fractions.

ADD

$$\begin{array}{r}
 3 \frac{1}{3} \\
 + 4 \frac{1}{3} \\
 \hline
 7 \frac{2}{3}
 \end{array}
 \qquad
 \begin{array}{r}
 6 \frac{3}{5} = \frac{21}{5} \\
 + 5 \frac{2}{7} = \frac{10}{7} \\
 \hline
 11 \frac{31}{35}
 \end{array}$$

SUBTRACT

$$\begin{array}{r}
 8 \frac{3}{5} \\
 - 3 \frac{2}{5} \\
 \hline
 5 \frac{1}{5}
 \end{array}
 \qquad
 \begin{array}{r}
 4 \frac{1}{10} = 3 \frac{11}{10} \\
 - 2 \frac{7}{10} = 2 \frac{7}{10} \\
 \hline
 1 \frac{4}{10} = 1 \frac{2}{5}
 \end{array}$$

Borrow from the whole number of the mixed fraction

MULTIPLY

$$3 \frac{5}{9} \times 3 \frac{6}{16}$$

Change to an improper fraction

Multiply straight across

$$\begin{array}{r}
 2 \\
 \hline
 3 \frac{5}{9} \\
 1
 \end{array}
 \times
 \begin{array}{r}
 6 \\
 \hline
 3 \frac{6}{16} \\
 1
 \end{array}
 =
 \frac{12}{1} = 12$$

Things to know about operations with mixed fractions:

- ❖ Proper fraction $1 \frac{3}{4}$ to improper fraction $\frac{7}{4}$
- ❖ Improper $\frac{7}{4}$ to proper $1 \frac{3}{4}$
- ❖ Borrow in mixed fraction subtraction

DIVIDE

$$2 \frac{8}{11} \div 2 \frac{4}{33}$$

Change to an improper fraction

$$\frac{30}{11} \div \frac{70}{33}$$

Invert and multiply

$$\begin{array}{r}
 3 \\
 \hline
 \frac{30}{11} \\
 1
 \end{array}
 \times
 \begin{array}{r}
 3 \\
 \hline
 \frac{33}{70} \\
 7
 \end{array}
 =
 \frac{9}{7} \text{ or } 1 \frac{2}{7}$$

Notes

IV. Operations with Integers: Negative and Positive Numbers.

ADD

$$3 + 2 = 5$$

$$(-3) + 2 = (-1)$$

$$3 + (-2) = 1$$

$$(-3) + (-2) = (-5)$$

SUBTRACT

$$6 - 4 = 2$$

$$(-6) - 4 = (-10)$$

$$6 - (-4) = 10$$

$$(-6) - (-4) = (-2)$$

Notes _____

MULTIPLY

$$3 \times 2 = 6$$

$$(-3) \times 2 = (-6)$$

$$3 \times (-2) = (-6)$$

$$(-3) \times (-2) = 6$$

DIVIDE

$$12 \div 4 = 3$$

$$(-12) \div 4 = (-3)$$

$$12 \div (-4) = (-3)$$

$$(-12) \div (-4) = 3$$

FRACTIONS

(A Form of Division)

$$\frac{-3}{4} = \frac{3}{-4} = -\frac{3}{4} \qquad \frac{-3}{-4} = \frac{3}{4}$$

V. Exponents

$$3^2 = 3 \times 3 = 9 \qquad 2^4 = 2 \times 2 \times 2 \times 2 = 16$$

Notes _____

VI. Solve for the Variable.

$$\begin{array}{r} 3 + y = 12 \\ -3 \quad -3 \end{array}$$

Subtract
3 from
both
sides

$$y = 9$$

$$\begin{array}{r} 9 - x = 6 \\ -9 \quad -9 \end{array}$$

$$\frac{-x}{-1} = \frac{-3}{-1} \quad \text{Factor out a } (-1)$$

$$x = 3$$

$$\begin{array}{r} y - 4 = 1 \\ +4 \quad +4 \end{array}$$

$$y = 5$$

$$8x = 16$$

$$\begin{array}{r} \frac{8x}{8} = \frac{16}{8} \\ x = 2 \end{array}$$

$$12 \div y = 6$$

$$\begin{array}{r} \cancel{y} \frac{12}{y} = 6 \quad \cancel{y} \quad \text{Multiply both} \\ \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \text{sides by "y"} \end{array}$$

$$12 = 6y$$

$$\frac{12}{6} = \frac{6y}{6}$$

$$2 = y$$

$$x \div 4 = 5$$

$$x = 20$$

VII. Order of Operations

1. Work inside parenthesis first

- () Parenthesis
- [] Brackets
- { } Braces

2. Simplify exponents

3. Multiply or divide in order

$$\begin{array}{r} 3 \times 4 \div 2 \\ 12 \div 2 \\ = 6 \end{array}$$

4. Add or Subtract in order

$$\begin{array}{r} 5 - 2 + 7 \\ 3 + 7 \\ = 10 \end{array}$$

Order of Operations...

Please **P**arenthesis

Excuse **E**xponents

My **M**ultiplication

Dear **D**ivision

Aunt **A**ddition

Sally **S**ubtraction