The CUNY Assessment Test in Mathematics
Sample Problems*

The CUNY Assessment Test in Mathematics is an untimed, multiple-choice, computer-based test composed of four sections: numerical skills/pre-algebra, algebra, college algebra, and trigonometry. Students' need for mathematics remediation is based on results of the first two sections of the test: numerical skills/pre-algebra and algebra. Students must achieve scaled scores of 30 or more on each of these two sections to demonstrate minimum proficiency. Some colleges require students to achieve higher scores before they can register for credit-bearing mathematics courses.

The test covers progressively advanced topics with placement into more advanced mathematics or mathematics-related courses based on results of the last three sections of the test. Minimum scores for these sections are set by the individual colleges based on their requirements and curricula.

Students are not permitted to use calculators while taking the test.

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1. NUMERICAL SKILLS/PREALGEBRA

Content areas from which items are drawn: basic operations with integers, fractions, and decimals; exponents, square roots, and scientific notation; ratio and proportion; percentages; averages (means, medians, modes); conversions between fractions and decimals; multiples and factors of integers; absolute values of numbers; order concepts (greater than, less than); estimation skills; number theory; counting problems and simple probability; range.

Averages: means, medians, and modes

1. What is the average (arithmetic mean) of 8, 7, 7, 5, 3, 2, and 2?

   A. $3\frac{4}{7}$ B. $4\frac{5}{6}$ C. $4\frac{6}{7}$ D. 5   E. $6\frac{4}{5}$

Basic operations with decimals

2. Ben is making wooden toys for the next arts and crafts sale. Each toy costs Ben $1.80 to make. If he sells the toys for $3.00 each, how many will he have to sell to make a profit of exactly $36.00?

   A. 12   B. 20   C. 30   D. 60   E. 108

Basic operations with fractions

3. How many yards of material from a 24-yard length of cloth remain after 3 pieces, each 3 1/2 yards long, and 5 pieces, each 2 1/4 yards long, are removed?

   A. $2\frac{1}{4}$ B. $4\frac{1}{4}$ C. $4\frac{5}{6}$ D. $10\frac{1}{4}$ E. $10\frac{5}{6}$

Percentages

4. Phillip charged $400 worth of goods on his credit card. On his first bill, he was not charged any interest, and he made a payment of $20. He then charged another $18 worth of goods. On his second bill a month later, he was charged 2% interest on his entire unpaid balance. How much interest was Phillip charged on his second bill?

   A. $8.76   B. $7.96   C. $7.60   D. $7.24   E. $6.63

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2. ALGEBRA

The algebra section comprises topics from three major mathematics curricular areas:

Elementary Algebra: substituting values into algebraic equations, setting up equations for given situations, basic operations with polynomials, factoring of polynomials, solving polynomial equations by factoring, formula manipulation and field axioms, linear equations in one variable, exponents and radicals, linear inequalities in one variable.

Intermediate Algebra: rational expressions, exponents and radicals, systems of linear equations in two variables, quadratic equations, absolute value equations and inequalities.

Coordinate Geometry: linear equations in two variables, distnace formulas in the plane, graphing conics (circle, parabola, etc.), graphing parallel lines, graphing perpendicular lines, graphing relations in the plane, graphing systems of equations and rational functions, midpoint formulas.

Elementary Algebra: linear equations in one variable

1. A student has earned scores of 87, 81, and 88 on the first 3 of 4 tests. If the student wants an average (arithmetic mean) of exactly 87, what score must she earn on the fourth test?

   A. 85   B. 86   C. 87   D. 92   E. 93

Elementary Algebra: basic operations with polynomials

2. Which of the following expressions represents the product of 3 less that twice x and 2 more than the quantity 3 times x?

   A. $-6x^2 + 25x + 6$ B. $6x^2 + 5x + 6$ C. $6x^2 - 5x + 6$

   D. $6x^2 - 5x - 6$ E. $6x^2 - 13x - 6$

Elementary Algebra: substituting values into algebraic expressions

3. If $x = -1$ and $y = 2$, what is the value of the expression $2x^3 - 3xy$?

   A. 8   B. 4   C. -1 D. -4 E. -8

Intermediate Algebra: rational expressions

4. For all $r \neq \pm 2$, $\dfrac{r^2 - 5r + 6}{r^2 - 4} = $?

   A. $\dfrac{r-3}{r+2}$ B. $\dfrac{r-2}{r+2}$ C. $\dfrac{r-2}{r+3}$ D. $\dfrac{r+3}{r-2}$ E. $\dfrac{r+3}{r+2}$

Coordinate Geometry: linear equations in two variables

5. What is the equation of the line that contains the points with (x, y) coordinates $(-3, 7)$ and $(5, -1)$?

   A. $y = 3x - 2$ B. $y = x + 10$ C. $y = -x + 4$

   D. $y = -\frac{1}{3}x + 8$ E. $y = -\frac{3}{2}x + \frac{11}{4}$

3. COLLEGE ALGEBRA

Content Areas: functions, exponents, complex numbers, arithmetic and geometric sequences and series, factorials, matrices (basic operations, equations, and determinants), systems of linear equations in three or more variables, logic and proof techniques, roots of polynomials.

Complex Numbers

1. For $i = \sqrt{-1}$, if $3i(2 + 5i) = x + 6i$, then $x = $?

   A. -15 B. 5   C. $5i$ D. $15i$ E. $27i$

Functions

2. If $f(4) = 0$ and $f(6) = 6$, which of the following could represent $f(x)$?

   A. $\frac{2}{3}x - 4$ B. $x + 2$ C. $x - 4$ D. $\frac{3}{2}x + 6$ E. $3x - 12$

4. TRIGONOMETRY

Content Areas: trigonometric functions and identities, right-triangle trigonometry, trigonometric equations and inequalities, graphs of trigonometric functions, special angles (multiples of 30 and 45 degrees), polar coordinates.
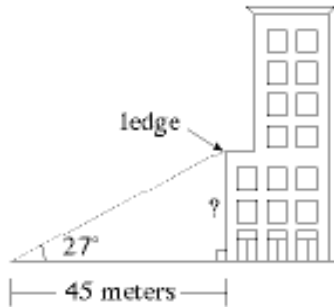
Trigonometric Functions and Identities

1. Which of the following is equivalent to $\dfrac{1-\cos^2\theta}{\cos^2\theta}$?

    A. $\sec^2\theta$ B. $(\csc^2\theta)-1$ C. $\tan^2\theta$ D. $\sin^2\theta$ E. $-\dfrac{1}{\sin^2\theta}$

Right-Triangle Trigonometry

2. From a point on the ground the angle of elevation to a ledge on a building is 27°, and the distance to the base of the building is 45 meters. How many meters high is the ledge?

    A. $\dfrac{45}{\sin 27^{\circ}}$

    B. $\dfrac{45}{\tan 27^{\circ}}$

    C. $45 \sin 27^{\circ}$

    D. $45 \cos 27^{\circ}$

    E. $45 \tan 27^{\circ}$

Answers

Numerical Skills/PreAlgebra

  1. C   2. C   3. A   4. B

Algebra

  1. D   2. D   3. B   4. A   5. C

College Algebra

  1. A   2. E

Trigonometry

  1. C   2. E