Samples to Success

ILLINOIS STATE BOARD OF EDUCATION

Sample items provide valuable insight into how students engage with different texts, tasks, and contexts by highlighting the types of opportunities they need for success in the classroom. These items offer a shared reference point for understanding proficiency expectations, complementing the assessment's role in measuring learning. Analyzing items alongside performance data can enable educators to gain a deeper understanding of students' strengths and areas for growth. Students thrive in environments rich with diverse materials, challenges that vary in task type, and multiple avenues for demonstrating understanding. High-quality instruction, aligned with the learning goals, is the most effective way to support students' growth and prepare them for success.
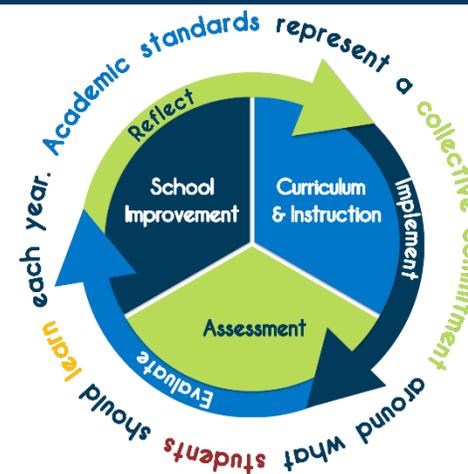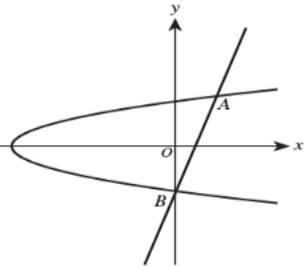
MATHEMATICS HIGH SCHOOL ALGEBRA

The sample questions included in this rubric are a blend of those typical of the ACT and others that are suitable for classroom instruction, aimed at reinforcing and developing the skills assessed on the ACT. The algebra content focuses on a student's ability to solve, graph, and model multiple types of expressions. Students will employ many forms of equations, including but not limited to linear, polynomial, radical, and exponential relationships. The student will find solutions to systems of equations, even when represented by simple matrices, and apply their knowledge to applications. This document contains ACT items and includes excerpts from ACT alignment guides: © ACT Education Corp.

Algebra			
Below Proficient	**Approaching Proficient**	**Proficient**	**Above Proficient**
The expression $(x^6)^3$ is equivalent to: A. x^9 B. x^{18} C. x^{216} D. $3x^3$ E. $3x^5$	The expression $(4c - 3d)(3c + d)$ is equivalent to: A. $12c^2 - 13cd - 3d^2$ B. $12c^2 - 13cd + 3d^2$ C. $12c^2 - 5cd - 3d^2$ D. $12c^2 - 5cd + 3d^2$ E. $12c^2 - 3d^2$	Consider the line $3x - 4y = 6$ in the standard (x, y) coordinate plane. For the point on this line with x-coordinate equal to 3, what is the y-coordinate? A. $-\frac{15}{4}$ B. $-\frac{3}{4}$ C. $\frac{3}{4}$ D. $\frac{6}{5}$ E. $\frac{15}{4}$	The number a is a positive integer greater than 1. The number b is a negative integer. The number a^b is: A. zero. B. positive. C. negative. D. irrational. E. an integer.

Below Proficient	Approaching Proficient	Proficient	Above Proficient
For what value of x is the equation $2^{2x+7} = 2^{15}$ true?	Mary throws a stone from the edge of a cliff. While the stone is in flight, the equation $$h = 300 - 30t - 16t^2$$ gives the height above the ground, h feet, of the stone at any given time t seconds after being thrown. What is the height, in feet, of the stone exactly 3 seconds after Mary throws the stone?	The ABC Book Club charges a $40 monthly fee, plus $2 per book read in that month. The Easy Book Club charges a $35 monthly fee, plus $3 per book read in that month. For each club, how many books must be read in 1 month for the total charges from each club to be equal?	The graphs of $y^2 = x + 8$ and $y = 3x - 3$ are shown in the standard (x, y) coordinate plane below. The 2 graphs intersect at points A and B. The solution of which of the following equations gives the x-coordinate of the point A.
A. 2			
B. 4	A. 66	A. 1	
C. 11	B. 114	B. 4	A. $\sqrt{3x - 3} = -\sqrt{x + 8}$
D. 16	C. 162	C. 5	B. $\sqrt{3x - 3} = \sqrt{x + 8}$
E. 44	D. 246	D. 6	C. $9x^2 - 9 = x + 8$
	E. 354	E. 75	D. $3x - 3 = -\sqrt{x + 8}$
			E. $3x - 3 = \sqrt{x + 8}$

Algebra

Below Proficient	Approaching Proficient	Proficient	Above Proficient
Which of the following expressions is equivalent to $-4x^3 - 12x^3 + 9x^2$?	In scientific notation, $670{,}000{,}000 + 700{,}000{,}000 = ?$	In the standard (x, y) coordinate plane, what is the slope of the line given by the equation $4x = 7y + 5$?	You are given the following system of equations: $$y = x^2$$ $$rx + sy = t$$

Below Proficient

Which of the following expressions is equivalent to $-4x^3 - 12x^3 + 9x^2$?

A. x^8

B. $-7x^8$

C. $-8x^3 + 9x^2$

D. $-16x^3 + 9x^2$

E. $-16x^6 + 9x^2$

Approaching Proficient

In scientific notation, $670{,}000{,}000 + 700{,}000{,}000 = ?$

A. 1.37×10^{-9}

B. 1.37×10^{-7}

C. 1.37×10^8

D. 1.37×10^9

E. 1.37×10^{15}

Proficient

In the standard (x, y) coordinate plane, what is the slope of the line given by the equation $4x = 7y + 5$?

A. $-\frac{4}{7}$

B. $\frac{4}{7}$

C. $\frac{7}{4}$

D. 4

E. 7

Above Proficient

You are given the following system of equations:
$$y = x^2$$
$$rx + sy = t$$

where r, s, and t are integers. For which of the following will there be more than one (x, y) solution, with real-number coordinates, for the system?

A. $r^2 + 4st > 0$

B. $s^2 + 4rt > 0$

C. $r^2 - 4st < 0$

D. $s^2 - 4rt < 0$

E. $s^2 + 4rt < 0$