Transitioning through Algebra

By Bob Johnke and Jan Clinard

These tables are designed to help clarify distinctions between remedial and college-level math courses. Because the Mathematics Proficiency Standard states that proficiency may be demonstrated by completing the course just preceding college-level mathematics, the highest level remedial math course must be identified on every Montana campus.

One way to define remedial mathematics follows: Remedial math courses are those with content normally taught from a college-level text entitled "Intermediate Algebra" and courses that prepare students for a course at this level. Students who score below 22 on the math section of the ACT (or concordant scores on similar measures) are placed in these courses, which are not college-level. These remedial courses tend to focus on computation, whereas college-level mathematics courses require that students read and reason for themselves and apply problem-solving skills out of context.

Although the term “Intermediate Algebra” may be used in the context of high school curricula, its meaning may vary from school district to school district. At the college setting, Intermediate Algebra is understood to mean a specific level of mathematics. Most textbooks at this level are titled “Intermediate Algebra.”

Public School Grades	**Public School Label**	**College Names**
5 - 8	Arithmetic	Pre-Algebra, Basic Math, Arithmetic
8 - 9	Algebra I	Beginning or Introductory Algebra
9 - 12	Algebra II	Intermediate Algebra, Algebra for College Students
10 - 12	Algebra III Advanced Math Pre-Calculus	College Algebra

This set of problems illustrates the increasing levels of difficulty, as students move from Pre-Algebra to College Algebra:

SOLVE:

Pre-Algebra $6 + {}^{-}4 =$ ☐ $({}^{-}2)({}^{-}5) - {}^{-}4 =$ ☐

$6^{\square} = 36$ $\square^{3} =$ ☐

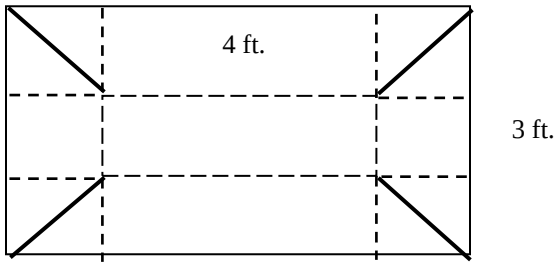
Beginning Algebra $2x + 3 = 11$ $\frac{x}{3} + \frac{x}{4} = 7$

Solve by Cramer's method
$2x + 3y = 17$
$7x - 4y = 16$

Solve factoring and quadratic formula
$X^2 + 3x + 2 = 0$

Intermediate Algebra $\frac{3(4x-5)}{x-2} + \frac{7(6x+7)}{x+5} = 10 + 3x$

A manufacturer wants to make open top boxes from standard 3 feet by 4 feet cardboard sheets by cutting equal diagonal slices from each corner, folding up the sides, then bending and gluing the triangular tabs. What will be the volume of the box if it is made with sides 1 foot



College Algebra Solve by Cramer's method

$$\begin{aligned} 2x + 3y - 3z &= 3 \\ 7x - 4y + 4z &= 25 \\ 13x - 11y + 14z &= 65 \end{aligned}$$

Solve by Determinants

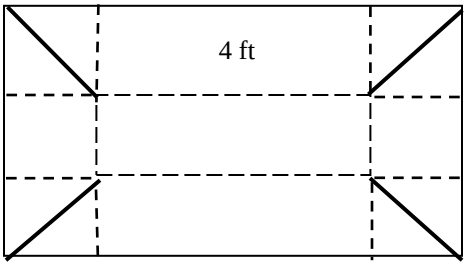
$$\begin{aligned} 2x + 3y - 3z &= 3 \\ 7x - 4y + 4z &= 25 \\ 13x - 11y + 14z &= 65 \end{aligned}$$

Solve by application of the Rational Roots Theorem and Synthetic Division

$120\,x^4 + 58\,x^3 - 191\,x^2 + 12\,x + 36 = 0$

Solve showing major steps and/or an explanation of the solution process.

A manufacturer wants to make open top boxes from standard 3 feet by 4 feet cardboard sheets by cutting equal diagonal slices from each corner, folding up the sides, then bending and gluing the triangular tabs. What is the maximum possible volume of the box. How many lids with at least a 1 inch lip could be made from the same standard



a. Explain why the equation below is likely a particular conic shape (if any) just from the equation coefficients
b. Use algebra to change the given form to the standard center/vertex form of the conic shape if it exists.
c. If the given equation is a form of conic, hand sketch its shape labeling all vertices, centers, foci, minor and major axis, as they exist.

$9\,x^2 - 72\,x + 25\,y^2 - 150\,y + 369 = 225$