ALGEBRA, A SKILL-ORIENTED APPROACH

CATALOG

All exercises (except those in [intro]), can be adjusted by the user for levels of difficulty. Answers are provided in forms suitable to the classroom situation, i.e., fractions only (where applicable) with positive, rationalized denominators; no decimals.

[intro] Introduction to algebra. This program provides the following exercises:

1. Axioms and postulates.
2. The real number system.
3. Order of operations.
4. Algebraic expressions.
5. A test covering all the areas outlined above. It is recommended this be an "open-book" test; i.e., student notebooks permitted.

[isn] Signed number arithmetic, integers. This program pro- vides the following exercises, (75 line-items, each).

1. Addition, subtraction and mixed, addition and subtraction.
2. Multiplication, division and mixed, multiplication and division.
3. Sequenced operations, 15 items each in addition, subtraction multiplication and division. The last15 items are mixed addition and subtraction.
4. Random mix, all operations.

[eqs1] Linear equations, one variable. Exercises are provided in the five options indicated below:

1. $Ax + B = C$ or $C = Ax + B$
2. $Ax + B = Cx + D$
3. $A(Bx + C) = Dx + E$ or $Dx + E = A(Bx + C)$
4. $A(Bx + C) + D = E + F(G + Hx)$
5. A two-page test with 24 items, sequenced in the same order listed above, and graduated in levels of difficulty.

[xplot] Linear equations in two variables, plotting. These are simple exercises containing nine items each, comprising an introduction to linear equations in two variables. All equations are in the slope-intercept form:

$y = mx + b$

[lineqs] Linear equations, two variables. Options are as listed below:

1. Finding equations given the slopes or y-intercepts and one ordered pair of integers with--

   a. Slopes or y-intercepts given directly.
   b. Slopes or y-intercepts given indirectly.

2. Finding slopes or full equations given two ordered pairs of integers.

3. A two page test with all the options listed above.

[simeqs] Simultaneous equations, two variables. All equations are given in standard form, e.g., Ax + By = C. *Options are as listed below:

1. Plotting two equations, finding "intersection".
2. Finding intersections (solutions) by substitution.
3. Finding intersections by addition and subtraction.
4. Finding intersections by method of matrices.
5. Sequenced mix of all exercises listed above.
6. A two-page test with all the options listed above.

*One further option is offered that generates equations in two, three or four variables. Non-independent sets are sometimes generated. The user must command small "coefficients" to increase this possibility. The program then checks for linear dependence and identifies sets with non-independent equations: no "solutions." Occasionally, these equations are used (at the board) to illustrate the power of the "matrix" method. Discretion is advised.

trifact] Quadratic equations, employing all variations except equations with complex solutions. Options follow:

1. Multiplying binomials and monomials.

2. Factoring trinomials and binomials, (all factorable over the set of integers).

3. Solving factorable quadratic equations.

4. A two-page test with all the options as listed above.

All exercises are offered with the additional options of positive or mixed (positive and negative) quadratic terms, factorable constants, or non-standard equations (where applicable).

[f.eqs] Fractional equations. Five options offered as list below. The last type, (number 5.), results in quadratic equations.

1. $\frac{Ax + B}{C} = \frac{Dx + E}{F}$ or $\frac{C}{Ax + B} = \frac{F}{Dx + E}$

2. $\frac{A}{Bx + C} + D = E$

3. $\frac{}{Bx + C} + Dx = E$

4. $\frac{A}{Bx} + \frac{C}{Dx} = \frac{E}{F}$ or $\frac{A}{Bx} + \frac{C}{Dx} = E$

5. $\frac{A}{Bx + C} + D = Ex + F$

6. A two-page test with all the options listed above.

[eqs1.d] Decimal equations. In the options listed below, all capital letters are decimal constants.

1. $Ax + B = C$ or $C = Ax + B$
2. $Ax + B = Cx + D$
3. $A(Bx + C) = Dx + E$ or $Dx + E = A(Bx + C)$
4. A two page test with all the options listed above.

End of "Standard" Course

It should be recalled that this course is not designed for "at or above" grade-level students. The remaining exercises can be extremely difficult (and therefore discouraging). This is particularly true of the "rationals." They should be used with discretion.

[rfex] Rational fractions, exponentials. In all exercises, exponents may be chosen positive, negative or both.

1. Multiplication, division or mixed, multiplication and division.
2. Addition, subtraction or mixed, addition and subtraction.
3. Line multiply, including "powers to powers."
4. Simplify.
5. Mixed exercises, all types, one page.
6. A two page test with all the options listed above.

[rff] Rational fractions, factorables. Options follow:

1. Addition, subtraction or mixed, addition and subtraction.
2. Multiplication, division or mixed, multiplication and division.
3. Simplify.
4. Sequential mix, all types, one page.
5. A two page test with all the options listed above.

[quad] Quadratic equations, standard forms, with real or complex solutions, user's choice. In the public schools, this subject area is often deferred to advanced algebra.