In the third game, an unfair situation could be created by giving each student a different number of points from 1 to 25. The daily points plus any winnings minus the cost factor would be added to the initial number of points. The winner of the game would be the first person to score 100 points. Again, if there were more than one winner, the bonus points would be divided equally among the winners. This game would seem to be the most interesting of the games since it probably mirrors life most closely. Most people do not have equal assets to begin the game of life, and it might be interesting to observe the strategies developed by the students in an unfair game.

Of course the instructor should feel free to assign any number to the daily points, to the winnings, and to the cost factor. The only real requirement is that the chance of winning is very small and the payoff is large. Some adjustments should be made in each person's total of test points after the game is played so that the unfairness of the game does not affect the student's grade.

In a cryptarithm each letter represents a digit, and different letters represent different digits. Try these created by Miami University elementary education majors:

<table>
<thead>
<tr>
<th>SUM</th>
<th>PAY</th>
<th>SAD</th>
<th>HOW</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAN</td>
<td>THE</td>
<td>DAD</td>
<td>ARE</td>
</tr>
<tr>
<td>WIN</td>
<td>MAN</td>
<td>CRY</td>
<td>YOU</td>
</tr>
</tbody>
</table>

Amy Feucht  
Stacey Stewart  
Janean Tarala  
Kelly Branum

This highly mechanical procedure for factoring the sum and difference of two cubes may be just what some of your "spit-backers" need to succeed. When rational approaches fail (and they often do in strongly algorithmic subjects like algebra) then a slick "plug-and-chug" technique like this can get a kid through a test.

**FACTORIZING THE SUM AND DIFFERENCE OF TWO CUBES**

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Usually in an Algebra II course students learn how to factor the sum and difference of two cubes. A typical approach is just to present the following rules:

\[
a^3 + b^3 = (a + b)(a^2 - ab + b^2) \\
\]

\[
a^3 - b^3 = (a - b)(a^2 + ab + b^2) \\
\]

What follows is a detailed example of an alternative approach which I have used successfully with my students.

**EXAMPLE 1:** Factor \(x^3 + 8\)

\[x^3 + 8\]

\[x 	imes x 	imes 2 \times 2 \times 2\]

Step 1: List each perfect cube of the binomial as a product of repeated factors

\[(+)(-+)(-+)
\]

Step 2: Set up the binomial times the trinomial with the appropriate signs

\[(x+2)(-+)
\]

Step 3: Fill in the terms of the binomial, one factor from each group in Step 1.

\[x(2)(2)
\]

Step 4: Fill in the terms of the trinomial by grouping the factors in Step 1 into three pairs from left to right.

\[(x+2)(x^2-2x+4)
\]

The following examples show how well this method works even as the cubed terms become more complex.
EXAMPLE 2: Factor $125x^3 - y^{27}$

\[5x \cdot 5x \cdot 5x \quad y^9 \cdot y^9 \cdot y^9\]

\[(5x - y^9)(25x^2 + 5xy^8 + y^{18})\]

EXAMPLE 3: Factor $27x^6 + 64y^{12}$

\[3x^2 \cdot 3x^2 \cdot 3x^2 \quad 4y^3z^4 \cdot 4y^3z^4 \cdot 4y^3z^4\]

\[(3x^2 + 4y^3z^4)(9x^4 - 12x^2y^3z^4 + 16y^6z^8)\]

Readers are invited to describe their method, mechanical or otherwise, for factoring the sum and difference of two cubes.

This game may be an on-going review and reinforcement activity or a one-day extravaganza. You may adjust the basics to meet any need that arises.

MATERIALS:

Transparency of game board. Outline should be permanent, lettering done in washable colors. (This game board will be projected onto a magnetic chalkboard.)

Dot Stickers. In four colors.

Tokens. Make from colored, laminated poster board to which you attach a magnetic peel-and-stick strip. Tokens are laminated so the dot stickers can be removed at game's end and tokens are clean for the next game.

Die. Use an ordinary die, or cut a cube from household sponge and mark it with permanent marker.

Number Cards. 2 x 2 laminated cards. Numbers are drawn to determine which text or worksheet problem is to be solved, so make as many as needed.

Problems. Use those from the textbook or from worksheets.

PLAY:

1. Before play, mark game board to show hazard and bonus squares. (For example, a game board used for reviewing decimal operations might look like the board in Figure 1. Colored "Dot Spots" (corner squares) may be marked with operation signs; then, when a team lands on one of these "Spots", the team's problem would involve that operation.)

2. Divide the group into teams. (The number of teams depends entirely on the teacher and the size of the class. Our class game...