

Trinomial Traverse (Algebra, Factoring)

Learning Goal: Practice creating the bx and c term of trinomials of the form ax^2+bx+c .

For each group playing the game, you will need to purchase/find the following:

- Three 1-inch wooden cubes (purchase from a hobby store or online)
- A bunch of “gold” pieces (can be slips of yellow paper, poker chips, marble markers)
- A unique game piece to represent each player (up to 4 players per board)
- Printed game board

Game Setup: Write a binomial on each cube face as indicated below.

Cube 1	Cube 2	Cube 3
$(x+1)$	$(x-1)$	$(x+2)$
$(x+2)$	$(x-2)$	$(x+4)$
$(x+3)$	$(x-3)$	$(x+6)$
$(x+4)$	$(x-4)$	$(x-1)$
$(x+5)$	$(x-5)$	$(x-3)$
$(x+6)$	$(x-6)$	$(x-5)$



Rules of Play:

Each player should begin with their piece on a START square and two pieces of gold. Take turns rolling the set of three binomial dice. On any turn, you may move one space horizontally, vertically, or diagonally, provided you can build a trinomial that has the term of a space you want to move to. You must show the other players which binomials you are combining and announce the whole trinomial that will be created. If there is any possible move, you must take it. If there are no possible moves, then you may stay on the space you already occupied.

Challenges: If you think another player could have moved, but they did not, you may challenge them. If you are correct, you may take a piece of gold from them. If you are not correct, they may take a piece of gold from you.

Chasing down another player to steal their gold: If you land on the square that an opponent occupies, you may steal a piece of gold from them **and** bump them one space (your choice). They will have to follow the directions on that square.

Change the sign of a square: If you find that you're stuck somewhere and can't roll your way out, you may change the sign of a square by trading in one piece of gold.


End of Game: The goal is to accumulate the most gold by the end of the game. The game ends when either (a) some player lands on $0x$, or (b) the end of the game is signaled by the instructor/timekeeper. You must have at least 2 pieces of gold in order to land on $0x$ and trigger the end of the game..If you land on $0x$, you (a) receive 2 additional gold pieces and (b) trigger the end of the game.

What if you have no gold? You will only have to “pay gold” when you have some. If you don't have any, you won't have to pay.

Example gameplay:

The green player has just rolled the following:

$(x + 4)$	$(x - 2)$	$(x - 1)$
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-20 EARN 2 GOLD	1x LOSE 1 GOLD	-3x EA
-2		2x EARN 1 GOLD
3x LOSE 1 GOLD	4x EARN 1 GOLD	-6 E

He or she now has several options:

- Move to the $2x$ space by creating $(x + 4)(x - 2) = x^2 + 2x - 8$.
- Move to the $3x$ space by creating $(x + 4)(x - 1) = x^2 + 3x - 4$.
- Move to the $-3x$ space by creating $(x - 2)(x - 1) = x^2 - 3x + 2$.

Given this range of choices, it would probably be smart to move to the $2x$ space.

Trinomial Traverse

-20 EARN 2 GOLD	1x LOSE 1 GOLD	-15	-3x EARN 1 GOLD	-12	1x	-18 EARN 2 GOLD
-2	-4 START	2x EARN 1 GOLD	11x	5x EARN 1 GOLD	-3 START	3x LOSE 1 GOLD
3x LOSE 1 GOLD	4x EARN 1 GOLD	-6	7x EARN 2 GOLD	-30 LOSE 1 GOLD	-6x EARN 1 GOLD	-4x
-12 EARN 1 GOLD	8x	6x EARN 1 GOLD	2 GOLD REQUIRED FOR ENTRY 0x GAME OVER EARN 2 GOLD	9x EARN 1 GOLD	4x	-6 EARN 1 GOLD
11x	-1x EARN 1 GOLD	-20 LOSE 1 GOLD	-7x EARN 2 GOLD	-3	-12 EARN 1 GOLD	2x LOSE 1 GOLD
-6 LOSE 1 GOLD	15 START	4x EARN 1 GOLD	5x	3x EARN 1 GOLD	-1x START	9
-24 EARN 2 GOLD	-2x	-12	8x EARN 1 GOLD	-10	-4 LOSE 1 GOLD	-15 EARN 2 GOLD