Is the System Fair?

GAME 1A:

Two people playing against each other take turns removing 3 boxes from a pile of 14 boxes.

The person who removes the last box or boxes wins the game.

Play the game, keeping track of who goes first and who wins. Fill in the following table, using x to represent the number of boxes:

# of Boxes at Start x	# of Boxes Left _____
14	11

GAME 1B:

Two people playing against each other take turns removing 2 boxes from a pile of 14 boxes.

The person who removes the last box or boxes wins the game.

Play the game, keeping track of who goes first and who wins. Fill in the following table, using x to represent the number of boxes:

# of Boxes at Start X	# of Boxes Left _____
14	

GAME 1C:

Two people playing against each other take turns removing 1 box from a pile of 14 boxes.

The person who removes the last box or boxes wins the game.

Play the game, keeping track of who goes first and who wins. Fill in the following table, using x to represent the number of boxes:

# of Boxes at Start X	# of Boxes Left _____
14	

For each game:

1. Explain how Player 1 can win the game.

   Game 1A:

   Game 1B:

   Game 1C:

2. Explain how Player 2 can win the game.

   Game 1A:

   Game 1B:

   Game 1C:

Checkpoint *– Call a teacher to check your work.*

GAME 2:

Two people playing against each other take turns removing either 1, 2, or 3 boxes from a pile of 14 boxes.

The person who removes the last box or boxes wins the game.

Play the game several times, keeping track of who goes first, how many boxes are removed on each turn, and who wins.

1) Is there a way that a player can win the game every time?

2) Does each player have a fair chance of winning the game? What determines the fairness of the game?

” THINK” AND “HINT” CARDS

HINT CARD

If you have 10 boxes, and then remove 2 boxes, you need to subtract 2 from 10.

HINT CARD

The winner is the player that can take the last box or boxes.

THINK CARD

Play the same game, but this time, change the number of total boxes from 14 to another number.