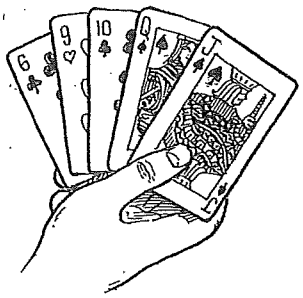
EM

MC +

Avoid



Purpose

Children keep a cumulative total.

Materials

A pack of cards; Ace = 1, Jack = 11, Queen = 12, King = 13.

Organisation

Two to four players.

Aim

To avoid creating a particular total.

Rules

1. At the start of the game a set of numbers to avoid is stated. For example, 'Prime Numbers' or 'multiples of five'.
2. Each player is dealt three cards. The remaining cards are left in a pack, face-down, in the middle of the table.
3. The first player places a card face-up on the table and picks one off the pack to replenish his/her hand to three cards.
4. The second player places another card on the table, next to the original card and a cumulative total is kept.
5. Other players do the same.
6. If a player places a card on the table that takes the cumulative total to a 'poison number', that is, one to avoid, then that player is eliminated for that round. Play continues until one player is left. For example, if multiples of five were chosen as the numbers to avoid and the cumulative total was 22 and a player placed a 3 on the table, making the total 25, then that player would lose.

Variations

1. Instead of avoiding a particular set of numbers, players aim to reach a particular set of numbers.
2. Let red cards represent negative numbers and black cards positive numbers.
3. Play 'blind', that is with the cards in the player's hand face-down on the table so that the player does not know what card is being thrown until it is turned over in the middle of the table.
4. Play cards face-up on the table in front of each player so the other players may see what cards each player is holding. This will encourage the use of different strategies.
5. Set two avoidance totals, eg multiples of three and five.

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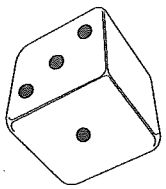
Dice Turnover



x2

Purpose

- Use appropriate mental strategies to multiply numbers.
- Use mental strategies to add numbers.
- Compare whole numbers.

Materials

Two six-faced dice.

Organisation

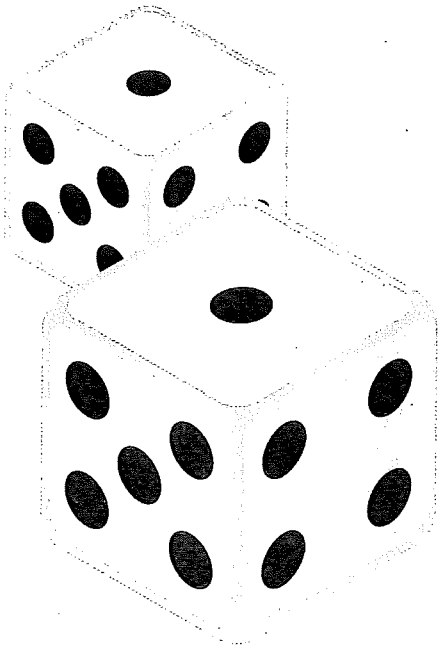
A game for two players.

Aim

To be the player with the *highest* total.

Rules

- Players take turns to roll the two dice.
- The values shown on the top of each dice are multiplied to produce a score.
- Before recording the score, the player has the option of tipping one, or both dice over one turn, so that a different face or faces are showing. Once the dice have been tipped, the player must multiply these values.
- Players keep a cumulative total of scores over five rounds.
- The player with the highest total after five rounds is the winner.



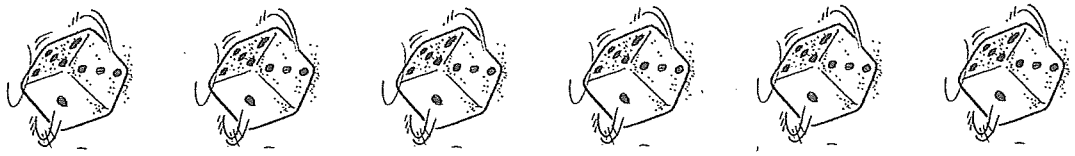
Teacher notes

On each turn the players must complete a series of multiplications to determine the best possible combination with the highest score. Those students who can only recall or work out a limited number of basic table facts can be given a tables grid to assist them with selecting the best possibility.

Variations

- Aim for the smallest total after five rounds.
- Change the dice that are used - 10 sided dice.

Squeeze



Purpose

Children will practise comparing and ordering numbers. They will develop place value understanding.

Materials

6, six-faced dice, preferably numbered, paper and pencil.

Organisation

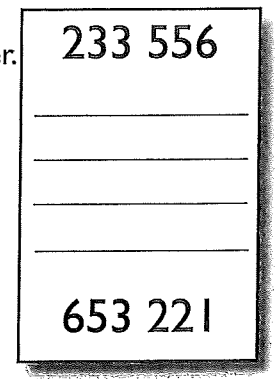
Two or more players. Children enjoy playing this game together rather than against each other. Pairs of children may work together to get as many numbers as they can.

Aim

To squeeze as many numbers, in order, between the largest and smallest number.

Rules

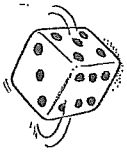
- The first player rolls the six dice and forms the largest possible number using the numbers on the six dice. For example, if the numbers 3, 2, 2, 5, 6 and 1 were shown, the player would form the number 653 221. This number is written at the bottom of a sheet of lined paper.
- The second player then rolls the six dice, makes the smallest possible number and writes that number on the top of the same sheet of paper. For example, if the second player threw 5, 5, 6, 3,3 and 2, the number 233 556 would be written at the top of the page.
- The first player then rolls the dice again and tries to form a number between the two numbers. If the number falls between the two numbers it is written on the paper between the smallest and largest number. If the player cannot form a number between the smallest and largest number he/she is out of the game.



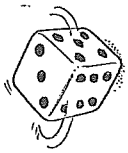
- Play continues with players rolling the dice and forming numbers. Each new number that is formed should be written on the paper in ascending order. If a player writes a number on the paper that is out of order or cannot form numbers between the original two numbers he/she loses.

Variations

- Change the number of dice to cater for different abilities so that smaller or larger numbers are formed.
- Change the dice to ten-faced dice so that more digits are available for use.
- Introduce a rule requiring new numbers to fit between the last number written down and either the smallest or largest number.



Place Value Cover Up



Purpose

Children will develop a better understanding of place value, in particular the multiplicative relationship between places. That is, the 6 in 36 207 is worth 100 x more than the 6 in 41 965.

Materials

Three six-faced dice per pair of players and a game board for each player.

Organisation

Two players.

Aim

To be the player with the most counters occupying cells on the playing board.

Rules

- Player one rolls the three dice to *create a three-digit number.* The dice may be arranged in any order to create the number. For example, 324
- Player one then ***multiplies the three-digit number by 10 or 100*** to form a four or five-digit number.
- Player one then places counters on the appropriate cells on the game board.
- For example, if the original three-digit number was 361 and this number was multiplied by 100, then the player would cover 30 000, 6 000 and 100.

Tens of Thousands	60 000	50 000	40 000	30 000	20 000	10 000
Thousands	6000	5000	4000	3000	2000	1000
Hundreds	600	500	400	300	200	100
Tens	60	50	40	30	20	10
Units	6	5	4	3	2	1

- Player two does the same and covers the appropriate cells on his/her game board.
- Play continues for 6 rolls each. The player with the most cells covered is the winner.

Variations

- The two players could play on a single board. If a number is created that requires the use of that cell, a bump off rule could be allowed, where one player is able to remove the other player's counter.
- Restricting the multiplication to 10 would make the game simpler. One row of the game board would not be utilised. Alternatively four dice could be rolled.
- More places could be represented on the game board and multiplication of powers of ten beyond 10 and 100 allowed. See alternative game board.
- Change the dice from six-faced to ten-faced. An alternative game board is provided for this purpose. The number of dice and the multiplier may be altered as per the suggestions above.

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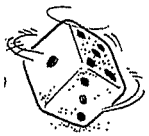


Place Value Cover Up Board
1 - 6 dice

Tens of Thousands	60 000	50 000	40 000	30 000	20 000	10 000
Thousands	6000	5000	4000	3000	2000	1000
Hundreds	600	500	400	300	200	100
Tens	60	50	40	30	20	10
Units	6	5	4	3	2	1

Rounding II

Purpose

Children will need to read, write and say numbers. They will need to identify the place value of the various digits within numbers. Children will practise rounding.

Materials

Three ten-faced dice (or place value dice) per pair of players. A coin shared between players

Organisation

Two – four players.

Aim

To achieve the highest total when five decimal numbers have been added.

Rules

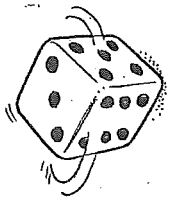
- Players take turns to roll the three dice (or roll one dice three times) to generate a three-digit number with two decimal places. For example, if 2, 3 and 7 were rolled any one of the numbers 2.37, 2.73, 3.27, 3.72, 7.23 or 7.32 could be chosen. This number should be written down.
- Once a number has been chosen each player flips the coin.

  If the coin turns up ***heads*** the number is ***rounded to the nearest tenth***.

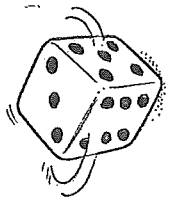
  If the coin turns up ***tails*** the number is ***rounded to the nearest whole number.***
- Play continues for five rounds.
- Players add their five numbers together.
- The player with the highest total is the winner.

Variations

- Use *Place Value Dice* so that there is no choice in the number that is generated.
- Use different coloured dice. Allocate a colour to a place value.



LCM



Purpose

Children will learn to determine the lowest common multiple of two single-digit numbers.

Materials

Two six-faced dice and LCM Board per group of players.
Two different coloured counters.

Organisation

Two – four players

Rules

- The first player rolls the two dice and notes the numbers shown on the top face. For example, if the dice show:

3	4

then the lowest common multiple is 12 and the player should cover 12 on the LCM board.

Whereas if 2, 4 is rolled the LCM is one of the numbers: 4

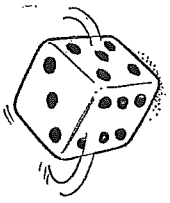
2	4

- The second player does the same. For example, if 5, 2 is rolled, the LCM would be 10.
- If a cell is already covered by an opponent's counter, then the player may remove the counter and replace it with one of his/her own.
- Play continues until one player has captured three cells in a row, either horizontally, vertically or diagonally.
- **Variations**
- Use eight-faced dice. You will need to use a different board [LCM 8].
- Allow two different counters to occupy the same cell.
- Instead of capturing three cells in a row, change to three cells in a 'L' shape or for a longer game four cells in a 'T' shape.

6	2	3	4	5	6
2	6	●	4	10	4
3	10	●	●	15	6
4	4	12	6	20	12
5	3	15	20	6	30
5	1	2	12	30	6

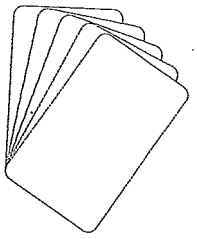
6	2	3	4	5	6
2	6	●	●	●	4
3	10	6	●	15	6
4	4	12	6	20	12
5	3	15	20	6	30
5	1	2	12	30	6

LCM Board 6



6	2	3	4	5	6
2	6	6	4	10	4
3	10	6	12	15	6
4	4	12	6	20	12
5	3	15	20	6	30
5	1	2	12	30	6

Multiple Madness

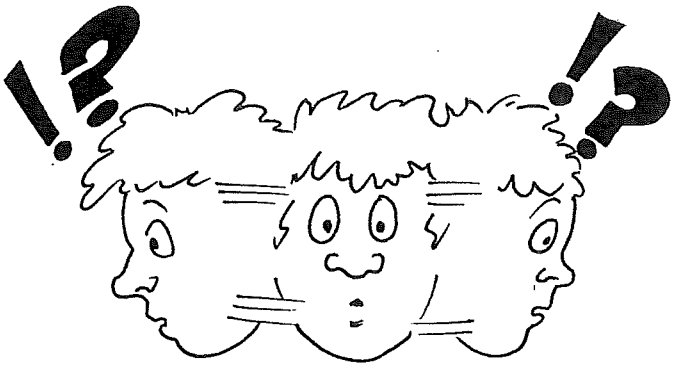


Purpose

- Identify multiples of counting numbers.
- Use appropriate mental strategies to add numbers to keep a running total.

Materials

- Deck of cards (picture cards removed)



Organisation

A game for 2 – 4 players.

Aim

To collect the most cards.

Rules

- All the cards are dealt.
- Players must not look at their cards.
- The dealer chooses a number from one to ten e.g. three. This becomes the multiple for that round.
- The players then take turns to flip over their top card and place it on a pile in the middle.
- Players must keep a mental running total of the cards (i.e. the values of the cards) added to the pile.
- When the total is a multiple of the chosen number – say three – then the first player to call out 'three three three' collects the cards.
- Other players may challenge whether the result is really divisible by a that number. A calculator may be used to settle disputes. If the player calling out "three three three" was wrong then he/she must place two ofhis/her cards in the centre and play continues until the multiple comes up.
- The winner is the person with the most cards in his/her hand after a set time or the only player with cards left in his/her hand.

Variations

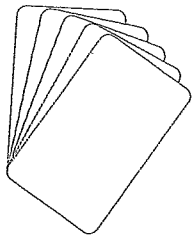
- Use different multiples, e.g. 5, 6.
- Use pairs of multiples, e.g. 2 and 3 or 2 or 3.

Note: it is easier to find multiples of 2 or 3 rather than both together.

Teacher notes

A multiple of a given counting number is any number into which it will divide without a remainder, eg the multiples of 4 are 0, 4, 8, 12, 16, ...

Fast Facts



Purpose

- Recall basic multiplication facts.
- Use known multiplication facts to work out unknown table facts.

Materials

- Deck of playing cards (picture cards removed).
- Aces = one.

Organisation

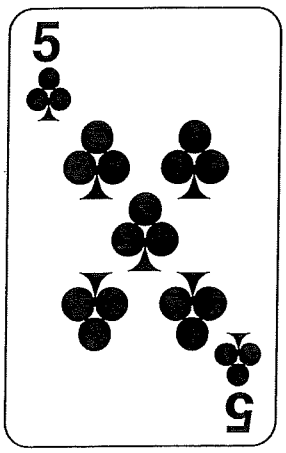
A game for two players.

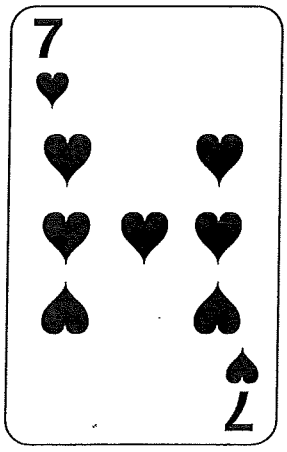
Aim

To win the most cards.

Rules

- Deal out half the cards to each player.
- Both players lay out a card face up. The first to call the product picks up the two cards.
- Ties are settled by leaving the cards on the table. The winner of the next call picks up all of the cards on the table.
- The winner is the player with the most cards once all the cards have been used.

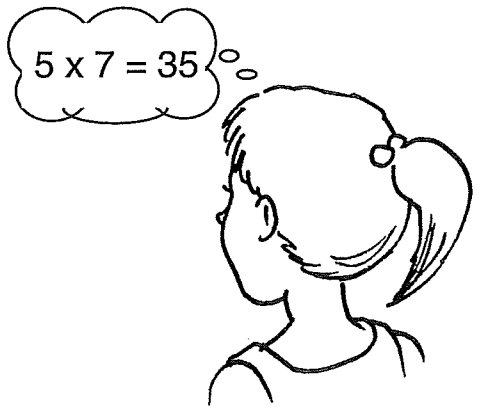




Teacher notes

Provide players with a tables grid so the products called out may be checked.

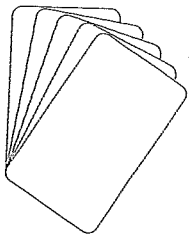
x									



Variations

- Use addition or subtraction.
- Remove cards which are beyond the children's ability e.g. 7, 8, 9.

HiLo



Purpose

- Recall basic multiplication facts.
- Use known multiplication facts to work out unknown table facts.
- Mentally keep a running total.
- Compare whole numbers.

Materials

- Deck of cards (picture cards removed).

Aim

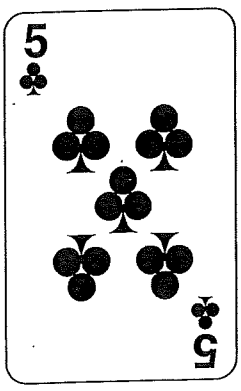
To achieve the highest score.

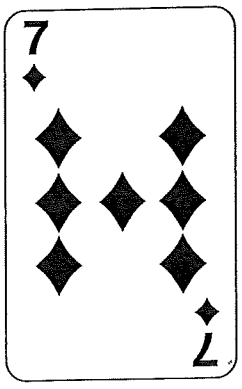
Organisation

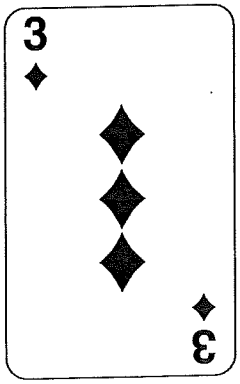
A game for a small group.

Rules

- One player deals out two cards face down and one card face up to each player. (The face up card is the addition card.)
- The dealer then states either **High** or **Low** and turns over his/her cards. These cards are multiplied and the number on the third card is added to the product.
  e.g.





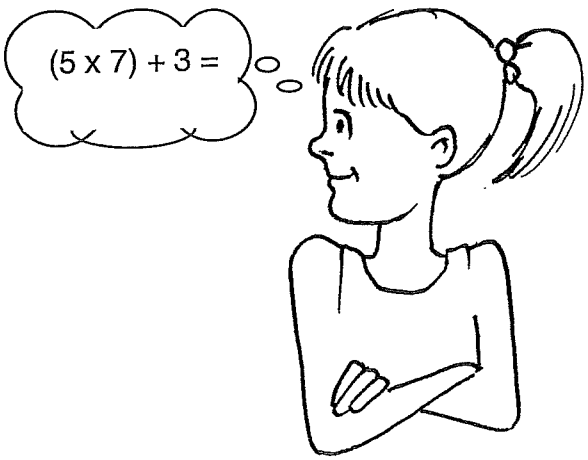


- The other players now turn over their cards and work out their totals. If a player scores less than the dealer, when the call is **Low** then he/she earns a point. If the call was **High** and the player scored less than the dealer then he/she does not score.

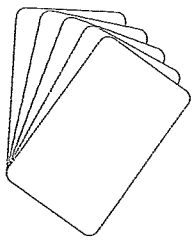
- The winner is the player with the highest score after ten rounds.

Variation

- Remove some of the higher value cards (eg. 7, 8,9) to make the game simpler.



Make My Number



Purpose

- Select appropriate operations to reach a target number.
- Use the ***order of operations*** when calculating.
- Use appropriate mental strategies for the four operations.

Materials

- Deck of playing cards.
  Note: The picture cards all have a value of ten.
- Ace = one or eleven.

Aim

To make a target number using three numbers and different operations.

Organisation

A game for pairs or small groups.

Rules

- The dealer chooses a two-digit target number and deals three cards to each player. The player to the left of the dealer tries to make the target number using his/her three cards and any of the four mathematical operations (addition, subtraction, multiplication or division). If the player cannot make the number, one card is discarded from the hand and another one drawn. Play continues in a clockwise direction.
- The winner is the player who is able to make the target number with his/her three cards.

Sample game: Target number 32

Player 1	J	3	4	10 x 3 + 4	=34
Player 2	9	8	4	9 x 4 – 8	=28
Player 3	Q	8	4	10 x 4 – 8	= 32 (Win)

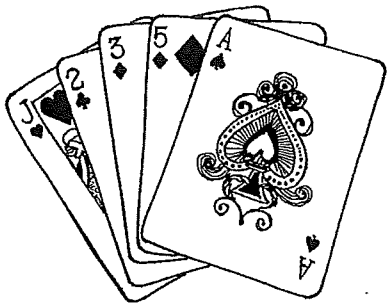
Students could be asked to record the number sentences created for each target number.

Variations

- The size of the target number and/or the operations used can be altered depending on the age of the players.

- Deal out more than three cards.

This game provides an ideal context in which to discuss "rule of order".



Teacher notes

When completing a calculation that involves several different operations the convention is to follow a particular order:

Brackets, Indices,
Multiplication and Division (in the order they appear),
Addition and Subtraction (in the order in which they appear).

The acronym BIMDAS may assist students to remember the order of operations.

MU

MC ÷

Division Deck

Purpose

Children will practise division with single-digit divisors.

Materials

A deck of playing cards, with all the Aces, picture cards, tens and Jokers removed. The deck is separated into one pack of cards 2 – 9 and the rest of the deck in a second pack.

Organisation

Two to four players.

Aim

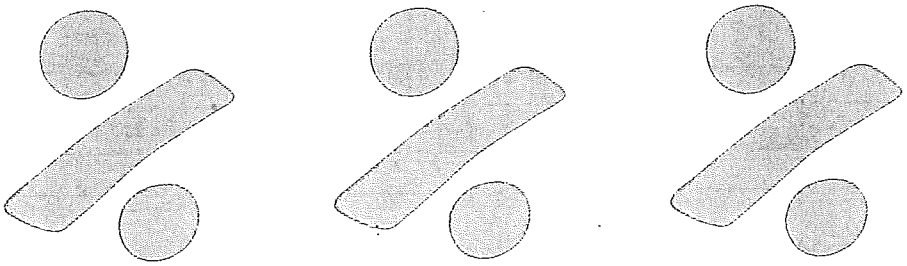
To be the first player with the most points.

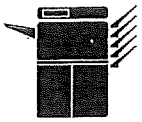
Rules

1. The cards are separated into two packs. One pack consists of eight cards, 2, 3, 4, 5, 6, 7, 8 and 9 and the second pack contains all of the remaining cards (Aces, picture cards and Jokers removed).
2. The first player draws two cards from the large pack and one card from the small pack. The single card represents the divisor (eg 6). The two cards (eg 4 and 7) are arranged to form a two-digit number (47 or 74). The player performs the division calculation. The remainder represents the number of points won. For example, 47 ÷ 6 = 7 r 5, so the player would win 5 points, whereas 74 ÷ 6 = 12 r 2. The better choice would be to form the two digit number 47 as more points are won.
3. The two cards are placed into a discard pile and the single card is returned to the small pack. The small pack is shuffled ready for the next player.
4. The next player draws two cards from the large pack and one from the small pack and forms a division calculation in order that the size of the remainder is as large as possible.
5. Play continues until the large pack is exhausted, or after a set number of rounds, eg 5, or when a set total is reached.
6. The winner is the player with the most points.

Variations

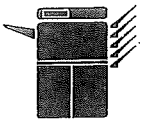
1. The divisors may be altered by removing the larger numbers from the small pack (eg remove the 7, 8 and 9). Removing higher numbered cards from the large pack will mean that the calculations should be simpler.
2. For longer games, the discard pile may be turned over and shuffled so that play may continue for more rounds.





Division Deck: Check Sheets

No	÷2	r	÷3	r	÷4	r	÷5	r	÷6	r	÷7	r	÷8	r	÷9	r
22	11	0	7	1	5	2	4	2	3	4	3	1	2	6	2	4
23	11	1	7	2	5	3	4	3	3	5	3	2	2	7	2	5
24	12	0	8	0	6	0	4	4	4	0	3	3	3	0	2	6
25	12	1	8	1	6	1	5	0	4	1	3	4	3	1	2	7
26	13	0	8	2	6	2	5	1	4	2	3	5	3	2	2	8
27	13	1	9	0	6	3	5	2	4	3	3	6	3	3	3	0
28	14	0	9	1	7	0	5	3	4	4	4	0	3	4	3	1
29	14	1	9	2	7	1	5	4	4	5	4	1	3	5	3	2
32	16	0	10	2	8	0	6	2	5	2	4	4	4	0	3	5
33	16	1	11	0	8	1	6	3	5	3	4	5	4	1	3	6
34	17	0	11	1	8	2	6	4	5	4	4	6	4	2	3	7
35	17	1	11	2	8	3	7	0	5	5	5	0	4	3	3	8
36	18	0	12	0	9	0	7	1	6	0	5	1	4	4	4	0
37	18	1	12	1	9	1	7	2	6	1	5	2	4	5	4	1
38	19	0	12	2	9	2	7	3	6	2	5	3	4	6	4	2
39	19	1	13	0	9	3	7	4	6	3	5	4	4	7	4	3
42	21	0	14	0	10	2	8	2	7	0	6	0	5	2	4	6
43	21	1	14	1	10	3	8	3	7	1	6	1	5	3	4	7
44	22	0	14	2	11	0	8	4	7	2	6	2	5	4	4	8
45	22	1	15	0	11	1	9	0	7	3	6	3	5	5	5	0
46	23	0	15	1	11	2	9	1	7	4	6	4	5	6	5	1
47	23	1	15	2	11	3	9	2	7	5	6	5	5	7	5	2
48	24	0	16	0	12	0	9	3	8	0	6	6	6	0	5	3
49	24	1	16	1	12	1	9	4	8	1	7	0	6	1	5	4
52	26	0	17	1	13	0	10	2	8	4	7	3	6	4	5	7
53	26	1	17	2	13	1	10	3	8	5	7	4	6	5	5	8
54	27	0	18	0	13	2	10	4	9	0	7	5	6	6	6	0
55	27	1	18	1	13	3	11	0	9	1	7	6	6	7	6	1
56	28	0	18	2	14	0	11	1	9	2	8	0	7	0	6	2
57	28	1	19	0	14	1	11	2	9	3	8	1	7	1	6	3
58	29	0	19	1	14	2	11	3	9	4	8	2	7	2	6	4
59	29	1	19	2	14	3	11	4	9	5	8	3	7	3	6	5



Division Deck: Check Sheets

No	÷2	r	÷3	r	÷4	r	÷5	r	÷6	r	÷7	r	÷8	r	÷9	r
62	31	0	20	2	15	2	12	2	10	2	8	6	7	6	6	8
63	31	1	21	0	15	3	12	3	10	3	9	0	7	7	7	0
64	32	0	21	1	16	0	12	4	10	4	9	1	8	0	7	1
65	32	1	21	2	16	1	13	0	10	5	9	2	8	1	7	2
66	33	0	22	0	16	2	13	1	11	0	9	3	8	2	7	3
67	33	1	22	1	16	3	13	2	11	1	9	4	8	3	7	4
68	34	0	22	2	17	0	13	3	11	2	9	5	8	4	7	5
69	34	1	23	0	17	1	13	4	11	3	9	6	8	5	7	6
72	36	0	24	0	18	0	14	2	12	0	10	2	9	0	8	0
73	36	1	24	1	18	1	14	3	12	1	10	3	9	1	8	1
74	37	0	24	2	18	2	14	4	12	2	10	4	9	2	8	2
75	37	1	25	0	18	3	15	0	12	3	10	5	9	3	8	3
76	38	0	25	1	19	0	15	1	12	4	10	6	9	4	8	4
77	38	1	25	2	19	1	15	2	12	5	11	0	9	5	8	5
78	39	0	26	0	19	2	15	3	13	0	11	1	9	6	8	6
79	39	1	26	1	19	3	15	4	13	1	11	2	9	7	8	7
82	41	0	27	1	20	2	16	2	13	4	11	5	10	2	9	1
83	41	1	27	2	20	3	16	3	13	5	11	6	10	3	9	2
84	42	0	28	0	21	0	16	4	14	0	12	0	10	4	9	3
85	42	1	28	1	21	1	17	0	14	1	12	1	10	5	9	4
86	43	0	28	2	21	2	17	1	14	2	12	2	10	6	9	5
87	43	1	29	0	21	3	17	2	14	3	12	3	10	7	9	6
88	44	0	29	1	22	0	17	3	14	4	12	4	11	0	9	7
89	44	1	29	2	22	1	17	4	14	5	12	5	11	1	9	8
92	46	0	30	2	23	0	18	2	15	2	13	1	11	4	10	2
93	46	1	31	0	23	1	18	3	15	3	13	2	11	5	10	3
94	47	0	31	1	23	2	18	4	15	4	13	3	11	6	10	4
95	47	1	31	2	23	3	19	0	15	5	13	4	11	7	10	5
96	48	0	32	0	24	0	19	1	16	0	13	5	12	0	10	6
97	48	1	32	1	24	1	19	2	16	1	13	6	12	1	10	7
98	49	0	32	2	24	2	19	3	16	2	14	0	12	2	10	8
99	49	1	33	0	24	3	19	4	16	3	14	1	12	3	11	0