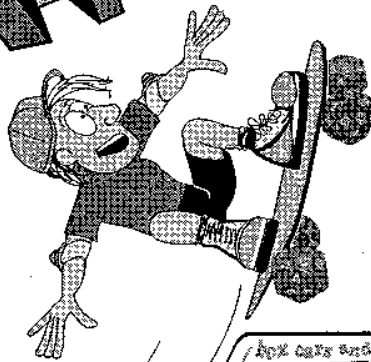


# box cars and one-eyed jacks®

Presents

# RADICAL MATH



Grades 6<sup>th</sup> - 9<sup>th</sup>

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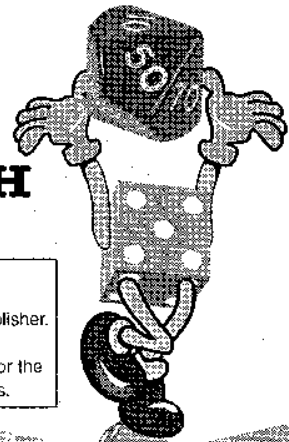
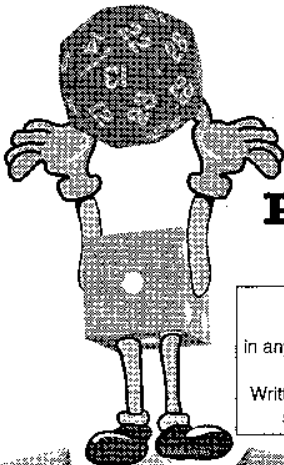
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# ROLL ON... DECIMALS

Roll Number	Ones	Tenths 10ths	Hundredths 100ths	Thousandths 1000ths	Running Total
1	●				
2	●				+ =
3	●				+ =
4	●				+ =
5	●				+ =

difference from whole number (+/-)

# Batters Up!

**Skills:** Place Value to 100 000s, Addition with Expanded Notation

**Equipment:** Cards 0-9, Place Value System die, paper/pencil

**Goal:** Greatest total sum after ten rounds wins

## Getting Started:

Each player builds a number in the 100 000s with their cards

Build in order from 100 000s place to 1s place (Example 230 516)

Each player reads their number to the other players.

One player rolls the PV System die and calls out the place value

Players identify the value at that place value in their number (this is their score for the round) and record their score for that round. Example: **ten thousands** is rolled, 3 is in the 10 000s place, score for that round is 30 000

Play 10 rounds, (rotate roller) then total your score.

## BATTERS UP!

Round	Number	Roll	Value/Points/Score
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Total Score =

# Fractions, Decimals, Percents

1 Whole Number											
		1/1		1.0		100%				2/2	
One Third				One Half				Two Thirds			
1/3		.333		33.3%		2/3		1/2		50%	
One Fourth				One Fifth				Three Fourth			
1/4		.25		25%		3/4		2/5		4/5	
One Sixth				One Seventh				One Eighth			
1/6		.166		16.6%		2/6		3/7		4/7	
1/8		.125		12.5%		2/8		3/8		4/8	
One Ninth				One Tenth				One Eleventh			
1/9		.111		11.1%		2/9		3/10		3/11	
1/10		.1		10%		2/10		4/10		5/10	
1/11		.0909		9%		2/11		4/11		5/11	
One Twelfth				One Thirteenth				One Fourteenth			
1/12		.083		8.3%		2/12		3/12		4/12	
1/13		.077		7.7%		2/13		3/13		4/13	
1/14		.071		7.1%		2/14		3/14		4/14	
1/15		.067		6.7%		2/15		3/15		4/15	
1/16		.062		6.2%		2/16		3/16		4/16	
1/17		.059		5.9%		2/17		3/17		4/17	
1/18		.056		5.6%		2/18		3/18		4/18	
1/19		.053		5.3%		2/19		3/19		4/19	
1/20		.050		5.0%		2/20		3/20		4/20	



# ORDER IN THE COURT

Name: \_\_\_\_\_

Date: \_\_\_\_\_


Reject Rolls



Reject Rolls



Reject Rolls



Reject Rolls



Reject Rolls



Reject Rolls


Use Double-Dice; 6 sided dice; or 1-12 sided dice

Goal: To get as many fractions in a row as possible.

- > Roll dice one at a time (Variation: you may roll five dice at once and race a partner to line them up)
- > Write the fraction into the chain, or put in the reject boxes
- > Points are awarded at the end of 7 rolls. 1 point for each fraction in the chain
- > Use Fraction Circles or Fraction Bars to check accuracy

## COMMIT AND CAPTURE

1.  $\square \times (\square - \square) - \square =$

2.  $\square + \square \times \square \div \square =$

3.  $\square^2 - \square \times \square - \square =$

4.  $\square + \square \div \square \times \square =$

5.  $\square \times (\square + \square) - \square =$

6.  $\square [\square^3 \times (\square - \square)] =$

7.  $\square \div \square + \square \times \square =$

8.  $\square \div \square \times \square - \square =$

# FOOTBALL FACTOR

**Player One**

	Touchdown	Field Goal	Total
1st Quarter			
2nd Quarter			
3rd Quarter			
4th Quarter			
Total Football Score			

**Player Two**

	Touchdown	Field Goal	Total
1st Quarter			
2nd Quarter			
3rd Quarter			
4th Quarter			
Total Football Score			

**Player One**

	Touchdown	Field Goal	Total
1st Quarter			
2nd Quarter			
3rd Quarter			
4th Quarter			
Total Football Score			

**Player Two**

	Touchdown	Field Goal	Total
1st Quarter			
2nd Quarter			
3rd Quarter			
4th Quarter			
Total Football Score			

# BIG SUMS



**SKILLS:** Problem solving, gathering data, recording data, interpreting data

**PLAYERS:** Students work in groups of 2, 3 or 4

**EQUIPMENT:** 36 regular dice per group, paper and pencil, chart

**ACTIVITY I:** The goal of the activity is to find the sum of 36 dice after they have been rolled.

**TEACHING TIP:** Allow students several rounds to develop their own method of adding the dice. Use **Chart I** to record the methods. Teach the patterns below and show the students how to group the dice.

1	2	6
2	4	7
3	6	8
<u>+4</u>	<u>+8</u>	<u>+9</u>
10	20	30

**THOUGHT PROVOKERS:**

1. What is the most efficient pattern to start with? Why?
2. In which order should we use the patterns to be most efficient? Why?
3. What is the largest sum we could have? What is the smallest?

**ACTIVITY II:** The goal is the same but we are trying to determine the range of possible sums. Use **Chart II** to record the sums that are used.

**THOUGHT PROVOKERS:**

1. What is the estimate for the mean value of the sums?
2. Can anyone give an explanation for the mean?
3. (Challenger) What is the mean sum of 48 dice?

**CHART I:**

	Prediction	Method Used	Actual Sum	+ / - Difference
1.				
2.				
3.				
4.				
5.				

**CHART II:**

150+	141-150	131-140	121-130	111-120	101-110	90-100

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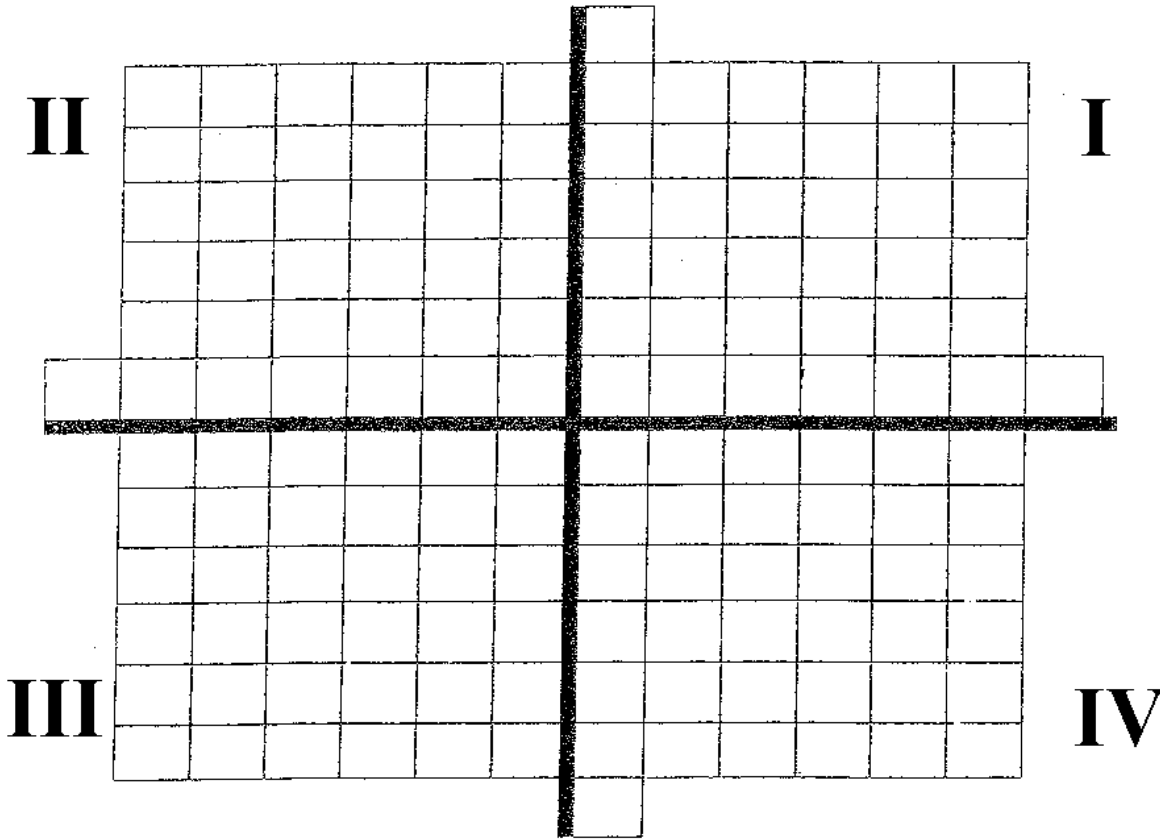
**Hit Target**

**Goal:** To get 3 in a row in each quadrant

**Directions:** Two players on each grid. Players take turns plotting points.

**When it's your turn:**

- Roll the double die.
- Choose the number or numbers to be negative or positive
- Record the Ordered Pair in the Column for the correct quadrant before you plot the point.



Player 1:				Player 2:			
Quadrant I	Quadrant II	Quadrant III	Quadrant IV	Quadrant I	Quadrant II	Quadrant III	Quadrant IV

# HUNDRED BOARD TIC TAC TOE

<b>LEVEL:</b>	Grade 1 and up
<b>SKILLS:</b>	Identification of place value 1 - 100
<b>PLAYERS:</b>	2
<b>EQUIPMENT:</b>	Hundred Board, two 10-sided dice or cards (Ace=1)-9, bingo chips (1 colour per player)

**GETTING STARTED:** Players select a colour of marker. The goal of the game is for players to get three bingo chips of their own colour in a row, either horizontally, vertically or diagonally. Player one rolls the dice and makes a two-digit number (ie., roll 4 and 7 and verbalizes "4 tens, 7 ones, : forty-seven", OR "7 tens, 4 ones, : seventy-four"). Player then covers the two corresponding spaces on the Hundred Board. Player two then takes their turn, rolling the dice and covering both of their numbers, remembering to verbalize the tens and ones place value to their opponent. Players continue to alternate turns trying to get TIC TAC TOE - THREE IN A ROW. When this happens the player removes their markers and counts 2 points for each marker (6 points for three in a row).

**CAPTURING AN OPPONENT'S SPACE:** If a player rolls a two-digit number that is occupied by their opponent then that player removes their opponent's marker and replaces it with one of their own. Each captured marker is worth 5 points.

**ROLLING YOUR OWN SPACE:** If a player rolls a one or two-digit number that they already occupy, they may roll again to get a new number.

Players continue to alternate turns for a set period of time. At the end of play, the player with the most points is the winner.

## Grade 4-9 Variation: 100 Board Wipe Out

Roll 5 dice, then using  $+$   $-$   $\times$   $\div$  (and exponents if you wish) make a math sentence that = one of the numbers on the 100 board. Using the same roll, make a new math sentence to = another number on the 100 board. Keep going until you can no longer make any more math sentences to = any other number on the 100 board. Roll the 5 dice again and continue. How many rolls will it take for you to clear the board?

## COMBO FIVE

**LEVEL:** Grade 3 and up  
**SKILLS:** Mixed operations (+, -, x, ÷), problem solving  
**PLAYERS:** Teams of 2 vs. 2  
**EQUIPMENT:** One 20-sided die, cards Ace - King (Ace = 1, Jack = 11, Queen = 12, King = 0)

**GETTING STARTED:** Both teams take five cards and place them face up. The goal of the game is to equal the rolled target number each round. To begin, one team rolls the target number for the round. This number will be used by both teams. Teams now begin finding combinations that equal the target number rolled - all operations may be used. A single card cannot be taken off. Teams may take off two, three, four or five card combinations. Teams may also take off a two card and a separate three card combination or two, two card combinations leaving one card behind for the next round. Each card may only be used once in any combination (ie., in the following example 4 can only be used once and not again in a second combination).

**EXAMPLE:** Cards drawn are as follows:

Team One	4	9	7	2	11
Team Two	2	3	8	10	5

Target rolled = 11

Team One made the following combinations and removed the cards as follows:

$$9 + 2 = 11 \text{ and } 4 + 7 = 11$$

leaving behind the 11 card as it was not used in any combination.

Team Two made the following combinations and removed the cards as follows:

$$(2 \times 3) + 5 = 11$$

leaving behind the 8 and 10 cards.

## SWEET 16

"A REAL FAVOURITE"

**LEVEL:** Grade 4 and up  
**SKILLS:** mixed operations, problem solving  
**PLAYERS:** 1 (solitaire) or whole class in cooperative teams  
**EQUIPMENT:** 1 thirty-sided die, cards (Ace = 1) · K, Jack = 11, Queen = 12, King = 0

**GETTING STARTED:** All teams build a four x four grid with sixteen random cards, face up.

The goal of the game is for each team to remove all the cards from their grid. All cards remaining at the end of a round equal their face value score AGAINST the team, (ie. 4 and 3 left - score against = 7). The lowest and best possible score per round is zero.

To begin play the teacher rolls a target number for the first round with the die. This number will be used by all cooperative teams. Teams now begin finding combinations that equal the target number rolled - all operations may be used. Players may take off two, three, four or five card combinations.

**EXAMPLE:** Grid was randomly drawn as follows:

King	4	10	2
Jack	3	9	7
6	Ace (1)	8	6
5	4	10	2