

**POWERS PRACTICE
EDITION**

MATH DICE®

INSTRUCTIONS

Math Dice® is a fun and flexible game with simple rules that will help you to become more comfortable with mental math. This Powers Practice Edition of the game has specially designed dice that will encourage the use of exponents as you play. Once you're familiar with the basic game play, try out the Alternate Game – Equal or Better, on page 7.

Contents:

- Two 12-Sided Target dice
 - Red (Exponent) Target Die
 - Blue (Base) Target Die
- Three 6-Sided Scoring Dice
- Game-Go Bag

10 to Adult — 2 or More Players

Object: Combine the Scoring Numbers in an equation to match or come closest to a Target Number.

To Play:

1. One player rolls the two 12-sided Target Dice. To establish a Target Number, calculate the power by using the blue die as the BASE and the red die as the EXPONENT.

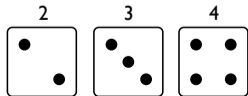
Examples:

- BLUE BASE = 5 and RED EXPONENT = 2
 $5^2 = 25$
- BLUE BASE = 4 and RED EXPONENT = 3
 $4^3 = 64$
- BLUE BASE = 7 and RED EXPONENT = 2
 $7^2 = 49$

(See Exponent Practice Tables starting on page 11.)



2. The next player then rolls the three 6-sided Scoring Dice to establish three Scoring Numbers. In the example below a 2, 3 and 4 are the Scoring Numbers.



3. Using each Scoring Number once, create a math expression that equals the Target Number or comes as close as possible to the Target Number. Depending on the numbers rolled and what you do with them, your answer might be above the Target Number, below the Target Number or you may hit the Target Number exactly.

4. To create your equation, you must use each Scoring Number **once and only once** along with any combination of the following operations: addition, subtraction, multiplication, division, and powers (also known as exponents). You may use the Scoring Numbers and operations in any order.

Here is an example of how a game between two players might look:

In our example (using the Target Number 49 and Scoring Numbers 2, 3, 4), two players might shout out the following...

Player 1 shouts, “62” — $(4^3)-2$

- He is 13 away from the target.

Player 2 shouts “40.5” — $(3^4)/2$

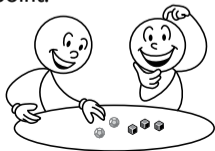
- She is 8.5 away from the target.

Player 1 shouts “48” — $(4^2)\times 3$

- He is 1 away from the target.

Player 2 shouts “49” — $(3+4)^2$

- She hits the target exactly and wins the point.



Scoring & Winning:

1. Your goal is to beat your opponents by getting closer to the Target Number. Once you have an answer you are satisfied with, call it out. The first player to call out an answer claims that number.

2. If the Target Number hasn't been reached, other players have 15 seconds to respond with a new answer that is closer to the Target Number. (The player with the current best answer must remain silent while the other players try for a better answer.)

3. Play continues, with an additional 15 seconds added after each improvement, until one player hits the Target Number exactly, the other players forfeit the point, or the time limit for calculating is reached.

4. The player with the closest number at the end of the point must state the equation he or she used to reach the answer. If it is correct, the point is won. If incorrect, the player with the next closest answer states their equation and wins the point if it is correct.

5. The first player to win four points wins the game. Remember this is a mental math game, no pencil, paper or calculator allowed!

Alternate Game – Equal or Better:

Change the scoring rules so that a player's answer wins the point if it:

- Consists of a new expression of the Scoring Numbers –AND–
- Generates a number that is **equal distance from** or **closer to** the Target Number than the previously established answer.

Players may be able to find several different ways to reach the same Target Number, each point continues until no more valid equations can be found.

EXAMPLE:

Target Number = 64

Scoring Numbers = 2 2 3

Player 1 shouts, “ $64 = (2 \times 2)^3$ ”

- They hit the Target Number exactly and gain the advantage.

Player 2 shouts, “ $64 = (2^2)^3$ ”

- They also hit the Target Number exactly and gain the advantage.

Player 1 shouts, “ $64 = (2^{2 \times 3})$ ”

- They also hit the Target Number exactly and gain the advantage.

Player 2 shouts, “ $64 = (2^3)^2$ ”

- They also hit the Target Number exactly and gain the advantage.

Player 1 has no further answer.

Player 2 wins the Point.

NOTE:

Rearranging numbers according to the Commutative or Associative Property is not a valid difference. For Example, $2^{(3 \times 2)} = 64$ is not considered a different answer than $2^{(2 \times 3)} = 64$, since all that was done here was to rearrange the order of the operation.

Before you start, check out the Exponent Practice Tables starting on page 11 for hitting various Target Numbers.

Math Dice Powers and the Flexibility of Numbers:

Numbers are incredible. As you play Math Dice® Powers and your skills improve, you will come to discover patterns and relationships that will astound you. Really! Math Dice Powers focuses on the use of exponents, though of course you still need to use all the mathematical operations available to you. Exponents are the most amazing part of Math Dice, as well as the most fun. To get you started, we've developed Exponent Practice Tables which display various Target Numbers and the ways to reach each number. Study this table to get a leg up on your competition!

A	Exponent Practice Table		
EXAMPLE	TARGET NUMBER	SAMPLE EXPRESSIONS	
1	4	2^2 $(2^3) - 4$	2×2 $(3^2) - 5$
2	8	2^3 $(2^2) + 4$	$2 \times 2 \times 2$ $(3^2) - 1$
3	9	3^2 $(2^2) + 5$ $(2^3) + 1$	3×3 $(4^2) - 7$
4	27	3^3 $(5^2) + 2$	$3 \times 3 \times 3$ $(2^5) - 5$

B Exponent Practice Table			
EXAMPLE	TARGET NUMBER	SAMPLE EXPRESSIONS	
5	16	4^2	2^4
		4×4	$(3^2) + 7$
			$(2^6) / 4$
6	64	4^3	$4 \times 4 \times 4$
		2^6	8^2
7	25	5^2	5×5
		$(3^3) - 2$	$(2^5) - 7$
8	125	5^3	$5 \times 5 \times 5$
		$(2^7) - 3$	$(11^2) + 4$

C Exponent Practice Table			
EXAMPLE	TARGET NUMBER	SAMPLE EXPRESSIONS	
9	36	6^2	6×6
		$(2^5) + 4$	$(3^2) \times 4$
10	216	6^3	$6 \times 6 \times 6$
		$(6^4) / 6$	
11	49	7^2	7×7
12	343	7^3	$7 \times 7 \times 7$
13	512	8^3	$8 \times 8 \times 8$
		$2^{(3 \times 3)}$	2^9
14	81	9^2	3^4

D	Exponent Practice Table		
EXAMPLE	TARGET NUMBER	SAMPLE EXPRESSIONS	
15	729	9^3	3^6
16	100	10^2	$(5^2) \times 4$
17	1000	10^3	$10 \times 10 \times 10$
18	121	11^2 $(5^3) - 4$	11×11 $(2^7) - 7$
19	1331	11^3	$11 \times 11 \times 11$
20	144	12^2 $(6^2) \times 4$	12×12
21	1728	12^3	$12 \times 12 \times 12$

Where It Started:

Math Dice® was invented by Sam Ritchie as a “Design a Game” math workshop project for his sixth grade class. Now a software engineer at Twitter, Ritchie continues to seek out new, innovative ways to inspire thinkers through game play. He’s recently used his programming expertise to create the mobile App for ThinkFun’s Rush Hour game... and a Math Dice App is coming soon! Sam hopes that Math Dice will make math more fun and accessible for kids around the world!

ThinkFun's Mission is to Ignite Your Mind!®

ThinkFun® is the world's leader in addictively fun games that stretch and sharpen your mind. From lighting up young minds to creating fun for the whole family, ThinkFun's innovative games and mobile apps make you think while they make you smile.

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