

$$15 + 5x = x + 5y$$

$$1/4y + 18 = 21x$$

$$12x + 14 = y$$

Play It Positively or Negatively!

Carole Greenes and Tanner Wolfram

$$2y + 1/3x = 2y$$

$$2x + xy - y = 1/2y$$

$$5 + 1/4x = x - 3$$

$$4x + y = 4 - x$$

$$2 + 3y = 6x$$

$$3y + 8 - 2x = 4x - 7$$

$$2 - 1/3x = 1/2y$$

$$y + x = 4y - x$$

$$3y + 4 = 1/4x + x$$

$$48 - 7x = y - 15x$$

$$2 + 2x = x - 13y$$

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Alge-Grid: What's the a?

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Factor Max

Play It Positively or Negatively!

Carole Greenes

Tanner Wolfram

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Author Bios



Carole Greenes, Ed.D. is Professor Emerita, Mathematics Education at Arizona State University. While at ASU, she served as Associate Vice President for STEM Education, Dean of the School of Educational Innovation and Teacher Preparation, Director of the Practice Research and Innovation in Mathematics Education (PRIME) Center, Director of the Vertically Integrated Projects program that provides research experiences for undergraduate students, and Professor of Mathematics Education in the Ira A. Fulton Schools of Engineering, the College of Liberal Arts and Sciences, and the Mary Lou Fulton Teachers College. Currently, she directs the PRIME Group that develops books of challenge problems and games for students, grades K – 12, and authors Carole’s Corner for the Center for Mathematics and Teaching, Inc. in California. Carole is author of more than 350 books for

students, PreK-12 and college, and teachers; 81 articles; six mathematical musicals; and two histories of mathematics in story and song. She served as editor of the Arizona Association of Teachers of Mathematics journal, *OnCore*, and author of the online monthly free *MATHgazine Senior* (grades 8-12), *MATHgazine Junior* (grades 5-8), *MATHgazine Elementary* (grades 3-5) and *MATHgazine Primary* (grades K-2). In 2003, Greenes was inducted into the Massachusetts Mathematics Educators’ Hall of Fame. In 2011, she received the NCSM Ross Taylor/Glenn Gilbert National Leadership Award in Mathematics Education. In 2016, she received the Copper Apple Award for Leadership in Mathematics in Arizona, and in 2018 she received the National Council of Teachers of Mathematics Lifetime Achievement Award.



Tanner Wolfram is a graduate, Summa cum Laude, from Barrett, The Honors College at Arizona State University. He holds a major in Physics and minors in both Spanish and Chinese. Tanner is co-author of *Play It Positively or Negatively!* (distributed by the Center for Mathematics and Teaching, Inc. as well as by others nationally and internationally), *Pattern Grid-unLocks*, *Alge-Grid: What’s the a?* puzzle books, and senior author of the *Facasumi Puzzle Book*. From Spring 2016 to Fall 2020, Tanner served as Senior Project Assistant in the Practice, Research, and Innovation in Mathematics Education (PRIME) Center at ASU and is now co-Director of the PRIME Group. During his time with the PRIME Center, Tanner assisted with the NSF-funded App Maker Pro (AMP) project, edited and

contributed to eight *MATHadazzle Puzzle Books*, co-authored six articles published by the Arizona Association of Teachers of Mathematics, and co-edited two free monthly online *MATHgazines*. He also co-edited the Fall and Spring (2019, 2020) issues of *OnCore*, the journal of the Arizona Association of Teachers of Mathematics (AATM).

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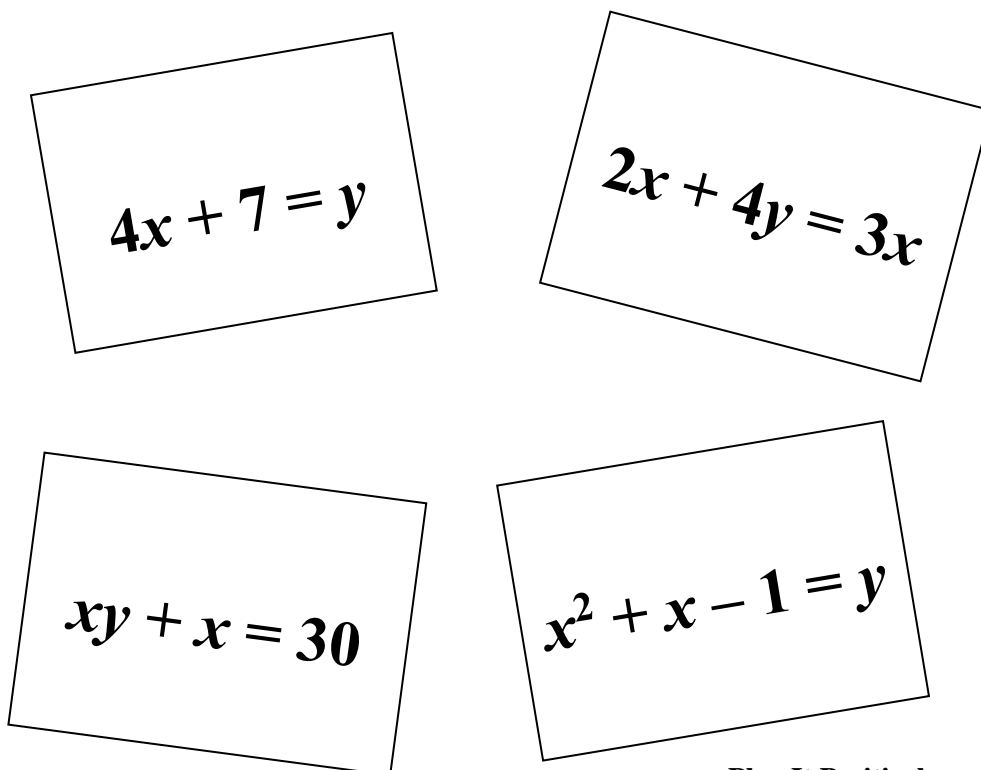
Play It Positively or Negatively!

Play It Positively or Negatively is an equation solving game for 3 – 5 players.

Play begins when the deck of equation cards is mixed and dealt face-down, 10 cards per player. The die (positive or negative) is rolled. Players turn over the top card of their own decks, replace the x with the number on the top of the die, and compute the value of y . The player with the greatest value for y collects all played equation cards and places them in a personal winning pile. When all 10 equation cards have been used, the winner is the player with the greatest number of winning pile cards.

In this booklet, as well as the equation cards and a score pad, two dice patterns are provided. One shows positive values of 1 through 6. The other shows negative values of -1 through -6. Thus, the game can be played positively or negatively!

Solution Tables, for positive and negative values, should be used only when there are disagreements about a “winner’s justification”.



Play It Positively or Negatively! 4

Play It Positively or Negatively!

Math Skills:

- Simplify algebraic expressions.
- Simplify fractions and display in lowest terms.
- Compute with integers and fractions and compare results of computations.
- Follow the Fundamental Order of Operations.

Number of Players:

- 3, 4 or 5.

Materials:

- 52 Equation Cards (Numbered to align with Solution Tables)
- Solution Tables for Positive and Negative Values
- Die with numbers 1 through 6 for Play It with Positives
- Die with numbers -1 through -6 for Play It with Negatives
- Score Pad

Game Play:

- Shuffled cards are dealt face up, 10 to each player. Extra cards are placed aside. Those cards are mixed in for the next game. (Note: Dealers may change for each game.)
- One player rolls the die. (Note: Players take turns rolling the die.)
- All players take the top card from their card piles, replace the x with the number on the top of the die, and compute the value of y .
- The player with the greatest y value, defends the solution, and if all players agree, takes all played equation cards, and puts them in a personal winning pile.
- In the event of a tie, that is y values are the same for two or more players, the die is rolled again, and y values are computed and compared among all players. The player with the greatest y value takes all equation cards.
- The game is over when all equation cards, held by one or more of the players, have been used.
- The winner is the player with the greatest number of cards in the “winning” pile.

Solution Tables

Solution Tables

Equation

**Solutions for Positive
Values of x**

**Solutions for Negative
Values of x**

Card 1

$4x + 7 = y$

$x = 1$	$y = 11$
$x = 2$	$y = 15$
$x = 3$	$y = 19$
$x = 4$	$y = 23$
$x = 5$	$y = 27$
$x = 6$	$y = 31$

$x = -1$	$y = 3$
$x = -2$	$y = -1$
$x = -3$	$y = -5$
$x = -4$	$y = -9$
$x = -5$	$y = -13$
$x = -6$	$y = -17$

Card 2

$2x + 4y = 3x$

$x = 1$	$y = \frac{1}{4}$
$x = 2$	$y = \frac{1}{2}$
$x = 3$	$y = \frac{3}{4}$
$x = 4$	$y = 1$
$x = 5$	$y = 1\frac{1}{4}$
$x = 6$	$y = 1\frac{1}{2}$

$x = -1$	$y = -\frac{1}{4}$
$x = -2$	$y = -\frac{1}{2}$
$x = -3$	$y = -\frac{3}{4}$
$x = -4$	$y = -1$
$x = -5$	$y = -1\frac{1}{4}$
$x = -6$	$y = -1\frac{1}{2}$

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Card 3

$$x^2 + x - 1 = y$$

$x = 1$	$y = 1$
$x = 2$	$y = 5$
$x = 3$	$y = 11$
$x = 4$	$y = 19$
$x = 5$	$y = 29$
$x = 6$	$y = 41$

$x = -1$	$y = -1$
$x = -2$	$y = 1$
$x = -3$	$y = 5$
$x = -4$	$y = 11$
$x = -5$	$y = 19$
$x = -6$	$y = 29$

Card 4

$$xy + x = 30$$

$x = 1$	$y = 29$
$x = 2$	$y = 14$
$x = 3$	$y = 9$
$x = 4$	$y = 6\frac{1}{2}$
$x = 5$	$y = 5$
$x = 6$	$y = 4$

$x = -1$	$y = -31$
$x = -2$	$y = -16$
$x = -3$	$y = -11$
$x = -4$	$y = -8\frac{1}{2}$
$x = -5$	$y = -7$
$x = -6$	$y = -6$

Card 5

$$6x = 5y - 2$$

$x = 1$	$y = 1\frac{3}{5}$
$x = 2$	$y = 2\frac{4}{5}$
$x = 3$	$y = 4$
$x = 4$	$y = 5\frac{1}{5}$
$x = 5$	$y = 6\frac{2}{5}$
$x = 6$	$y = 7\frac{3}{5}$

$x = -1$	$y = -\frac{4}{5}$
$x = -2$	$y = -2$
$x = -3$	$y = -3\frac{1}{5}$
$x = -4$	$y = -4\frac{2}{5}$
$x = -5$	$y = -5\frac{3}{5}$
$x = -6$	$y = -6\frac{4}{5}$

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Card 6

$$3x - 5 = y + 2$$

$x = 1$	$y = -4$
$x = 2$	$y = -1$
$x = 3$	$y = 2$
$x = 4$	$y = 5$
$x = 5$	$y = 8$
$x = 6$	$y = 11$

$x = -1$	$y = -10$
$x = -2$	$y = -13$
$x = -3$	$y = -16$
$x = -4$	$y = -19$
$x = -5$	$y = -22$
$x = -6$	$y = -25$

Card 7

$$2x = y - 1$$

$x = 1$	$y = 3$
$x = 2$	$y = 5$
$x = 3$	$y = 7$
$x = 4$	$y = 9$
$x = 5$	$y = 11$
$x = 6$	$y = 13$

$x = -1$	$y = -1$
$x = -2$	$y = -3$
$x = -3$	$y = -5$
$x = -4$	$y = -7$
$x = -5$	$y = -9$
$x = -6$	$y = -11$

Card 8

$$9x = 6y + 1$$

$x = 1$	$y = 1\frac{1}{3}$
$x = 2$	$y = 2\frac{5}{6}$
$x = 3$	$y = 4\frac{1}{3}$
$x = 4$	$y = 5\frac{5}{6}$
$x = 5$	$y = 7\frac{1}{3}$
$x = 6$	$y = 8\frac{5}{6}$

$x = -1$	$y = -1\frac{2}{3}$
$x = -2$	$y = -3\frac{1}{6}$
$x = -3$	$y = -4\frac{2}{3}$
$x = -4$	$y = -6\frac{1}{6}$
$x = -5$	$y = -7\frac{2}{3}$
$x = -6$	$y = -9\frac{1}{6}$

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Card 9

$x + y = 3y - x$

$x = 1$	$y = 1$
$x = 2$	$y = 2$
$x = 3$	$y = 3$
$x = 4$	$y = 4$
$x = 5$	$y = 5$
$x = 6$	$y = 6$

$x = -1$	$y = -1$
$x = -2$	$y = -2$
$x = -3$	$y = -3$
$x = -4$	$y = -4$
$x = -5$	$y = -5$
$x = -6$	$y = -6$

Card 10

$y + 2x + 1 = 3y - 3$

$x = 1$	$y = 3$
$x = 2$	$y = 4$
$x = 3$	$y = 5$
$x = 4$	$y = 6$
$x = 5$	$y = 7$
$x = 6$	$y = 8$

$x = -1$	$y = 1$
$x = -2$	$y = 0$
$x = -3$	$y = -1$
$x = -4$	$y = -2$
$x = -5$	$y = -3$
$x = -6$	$y = -4$

Card 11

$x^3 - y = 5y + 4$

$x = 1$	$y = \frac{1}{2}$
$x = 2$	$y = \frac{2}{3}$
$x = 3$	$y = 3\frac{5}{6}$
$x = 4$	$y = 10$
$x = 5$	$y = 20\frac{1}{6}$
$x = 6$	$y = 35\frac{1}{3}$

$x = -1$	$y = \frac{5}{6}$
$x = -2$	$y = -2$
$x = -3$	$y = -5\frac{1}{6}$
$x = -4$	$y = -11\frac{1}{3}$
$x = -5$	$y = -21\frac{1}{2}$
$x = -6$	$y = -36\frac{2}{3}$

Play It Positively or Negatively! 11

Card 12

$$x^2 + 2y + 1 = 3y + 5$$

$x = 1$	$y = -3$
$x = 2$	$y = 0$
$x = 3$	$y = 5$
$x = 4$	$y = 12$
$x = 5$	$y = 21$
$x = 6$	$y = 32$

$x = -1$	$y = -3$
$x = -2$	$y = 0$
$x = -3$	$y = 5$
$x = -4$	$y = 12$
$x = -5$	$y = 21$
$x = -6$	$y = 32$

Card 13

$$2y - 11 = 3xy + 4$$

$x = 1$	$y = -15$
$x = 2$	$y = -3\frac{3}{4}$
$x = 3$	$y = -2\frac{1}{7}$
$x = 4$	$y = -1\frac{1}{2}$
$x = 5$	$y = -1\frac{2}{13}$
$x = 6$	$y = -\frac{15}{16}$

$x = -1$	$y = 3$
$x = -2$	$y = 1\frac{7}{8}$
$x = -3$	$y = 1\frac{4}{11}$
$x = -4$	$y = 1\frac{1}{14}$
$x = -5$	$y = \frac{15}{17}$
$x = -6$	$y = \frac{3}{4}$

Card 14

$$5x - 1 = 7y + xy$$

$x = 1$	$y = \frac{1}{2}$
$x = 2$	$y = 1$
$x = 3$	$y = 1\frac{2}{5}$
$x = 4$	$y = 1\frac{8}{11}$
$x = 5$	$y = 2$
$x = 6$	$y = 2\frac{3}{13}$

$x = -1$	$y = -1$
$x = -2$	$y = -2\frac{1}{5}$
$x = -3$	$y = -4$
$x = -4$	$y = -7$
$x = -5$	$y = -13$
$x = -6$	$y = -31$

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Card 15

$$3x + 4xy = 7y$$

$x = 1$	$y = 1$
$x = 2$	$y = -6$
$x = 3$	$y = -1\frac{4}{5}$
$x = 4$	$y = -1\frac{1}{3}$
$x = 5$	$y = -1\frac{2}{13}$
$x = 6$	$y = -1\frac{1}{17}$

$x = -1$	$y = -\frac{3}{11}$
$x = -2$	$y = -\frac{2}{5}$
$x = -3$	$y = -\frac{9}{19}$
$x = -4$	$y = -\frac{12}{23}$
$x = -5$	$y = -\frac{5}{9}$
$x = -6$	$y = -\frac{18}{31}$

Card 16

$$\frac{1}{3}x + 2y = 2x$$

$x = 1$	$y = \frac{5}{6}$
$x = 2$	$y = 1\frac{2}{3}$
$x = 3$	$y = 2\frac{1}{2}$
$x = 4$	$y = 3\frac{1}{3}$
$x = 5$	$y = 4\frac{1}{6}$
$x = 6$	$y = 5$

$x = -1$	$y = -\frac{5}{6}$
$x = -2$	$y = -1\frac{2}{3}$
$x = -3$	$y = -2\frac{1}{2}$
$x = -4$	$y = -3\frac{1}{3}$
$x = -5$	$y = -4\frac{1}{6}$
$x = -6$	$y = -5$

Play It Positively or Negatively! 13

Card 17

$$xy = x + 10$$

$x = 1$	$y = 11$	$x = -1$	$y = -9$
$x = 2$	$y = 6$	$x = -2$	$y = -4$
$x = 3$	$y = 4\frac{1}{3}$	$x = -3$	$y = -2\frac{1}{3}$
$x = 4$	$y = 3\frac{1}{2}$	$x = -4$	$y = -1\frac{1}{2}$
$x = 5$	$y = 3$	$x = -5$	$y = -1$
$x = 6$	$y = 2\frac{2}{3}$	$x = -6$	$y = -\frac{2}{3}$

Card 18

$$2x - y = 20 + 4y$$

$x = 1$	$y = -3\frac{3}{5}$	$x = -1$	$y = -4\frac{2}{5}$
$x = 2$	$y = -3\frac{1}{5}$	$x = -2$	$y = -4\frac{4}{5}$
$x = 3$	$y = -2\frac{4}{5}$	$x = -3$	$y = -5\frac{1}{5}$
$x = 4$	$y = -2\frac{2}{5}$	$x = -4$	$y = -5\frac{3}{5}$
$x = 5$	$y = -2$	$x = -5$	$y = -6$
$x = 6$	$y = -1\frac{3}{5}$	$x = -6$	$y = -6\frac{2}{5}$

Play It Positively or Negatively! 14

Card 19

$$3x + y = 4y - 4$$

$x = 1$	$y = 2\frac{1}{3}$	$x = -1$	$y = \frac{1}{3}$
$x = 2$	$y = 3\frac{1}{3}$	$x = -2$	$y = -\frac{2}{3}$
$x = 3$	$y = 4\frac{1}{3}$	$x = -3$	$y = -1\frac{2}{3}$
$x = 4$	$y = 5\frac{1}{3}$	$x = -4$	$y = -2\frac{2}{3}$
$x = 5$	$y = 6\frac{1}{3}$	$x = -5$	$y = -3\frac{2}{3}$
$x = 6$	$y = 7\frac{1}{3}$	$x = -6$	$y = -4\frac{2}{3}$

Card 20

$$4xy + 8 = 48$$

$x = 1$	$y = 10$	$x = -1$	$y = -10$
$x = 2$	$y = 5$	$x = -2$	$y = -5$
$x = 3$	$y = 3\frac{1}{3}$	$x = -3$	$y = -3\frac{1}{3}$
$x = 4$	$y = 2\frac{1}{2}$	$x = -4$	$y = -2\frac{1}{2}$
$x = 5$	$y = 2$	$x = -5$	$y = -2$
$x = 6$	$y = 1\frac{2}{3}$	$x = -6$	$y = -1\frac{2}{3}$

Play It Positively or Negatively! 15

Card 21

$$(x + 1)^2 - 20 = y$$

$x = 1$	$y = -16$
$x = 2$	$y = -11$
$x = 3$	$y = -4$
$x = 4$	$y = 5$
$x = 5$	$y = 16$
$x = 6$	$y = 29$

$x = -1$	$y = -20$
$x = -2$	$y = -19$
$x = -3$	$y = -16$
$x = -4$	$y = -11$
$x = -5$	$y = -4$
$x = -6$	$y = 5$

Card 22

$$2(x - 1) = y$$

$x = 1$	$y = 0$
$x = 2$	$y = 2$
$x = 3$	$y = 4$
$x = 4$	$y = 6$
$x = 5$	$y = 8$
$x = 6$	$y = 10$

$x = -1$	$y = -4$
$x = -2$	$y = -6$
$x = -3$	$y = -8$
$x = -4$	$y = -10$
$x = -5$	$y = -12$
$x = -6$	$y = -14$

Card 23

$$7y - xy = 3$$

$x = 1$	$y = \frac{1}{2}$
$x = 2$	$y = \frac{3}{5}$
$x = 3$	$y = \frac{3}{4}$
$x = 4$	$y = 1$
$x = 5$	$y = 1\frac{1}{2}$
$x = 6$	$y = 3$

$x = -1$	$y = \frac{3}{8}$
$x = -2$	$y = \frac{1}{3}$
$x = -3$	$y = \frac{3}{10}$
$x = -4$	$y = \frac{3}{11}$
$x = -5$	$y = \frac{1}{4}$
$x = -6$	$y = \frac{3}{13}$

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Card 24

$$\frac{5}{2}x - 2 = y$$

$x = 1$	$y = \frac{1}{2}$
$x = 2$	$y = 3$
$x = 3$	$y = 5\frac{1}{2}$
$x = 4$	$y = 8$
$x = 5$	$y = 10\frac{1}{2}$
$x = 6$	$y = 13$

$x = -1$	$y = -4\frac{1}{2}$
$x = -2$	$y = -7$
$x = -3$	$y = -9\frac{1}{2}$
$x = -4$	$y = -12$
$x = -5$	$y = -14\frac{1}{2}$
$x = -6$	$y = -17$

Card 25

$$15y + 2x = 12y$$

$x = 1$	$y = -\frac{2}{3}$
$x = 2$	$y = -1\frac{1}{3}$
$x = 3$	$y = -2$
$x = 4$	$y = -2\frac{2}{3}$
$x = 5$	$y = -3\frac{1}{3}$
$x = 6$	$y = -4$

$x = -1$	$y = \frac{2}{3}$
$x = -2$	$y = 1\frac{1}{3}$
$x = -3$	$y = 2$
$x = -4$	$y = 2\frac{2}{3}$
$x = -5$	$y = 3\frac{1}{3}$
$x = -6$	$y = 4$

Card 26

$$x^2 - 4y = x - 3y + 1$$

$x = 1$	$y = -1$
$x = 2$	$y = 1$
$x = 3$	$y = 5$
$x = 4$	$y = 11$
$x = 5$	$y = 19$
$x = 6$	$y = 29$

$x = -1$	$y = 1$
$x = -2$	$y = 5$
$x = -3$	$y = 11$
$x = -4$	$y = 19$
$x = -5$	$y = 29$
$x = -6$	$y = 41$

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Card 27

$$\frac{1}{2}y + x = 2x - y$$

$x = 1$	$y = \frac{2}{3}$
$x = 2$	$y = 1\frac{1}{3}$
$x = 3$	$y = 2$
$x = 4$	$y = 2\frac{2}{3}$
$x = 5$	$y = 3\frac{1}{3}$
$x = 6$	$y = 4$

$x = -1$	$y = -\frac{2}{3}$
$x = -2$	$y = -1\frac{1}{3}$
$x = -3$	$y = -2$
$x = -4$	$y = -2\frac{2}{3}$
$x = -5$	$y = -3\frac{1}{3}$
$x = -6$	$y = -4$

Card 28

$$2(y - x) = 4y + 2x$$

$x = 1$	$y = -2$
$x = 2$	$y = -4$
$x = 3$	$y = -6$
$x = 4$	$y = -8$
$x = 5$	$y = -10$
$x = 6$	$y = -12$

$x = -1$	$y = 2$
$x = -2$	$y = 4$
$x = -3$	$y = 6$
$x = -4$	$y = 8$
$x = -5$	$y = 10$
$x = -6$	$y = 12$

Card 29

$$\frac{1}{2}(4x + 2y) = x + 4y$$

$x = 1$	$y = \frac{1}{3}$
$x = 2$	$y = \frac{2}{3}$
$x = 3$	$y = 1$
$x = 4$	$y = 1\frac{1}{3}$
$x = 5$	$y = 1\frac{2}{3}$
$x = 6$	$y = 2$

$x = -1$	$y = -\frac{1}{3}$
$x = -2$	$y = -\frac{2}{3}$
$x = -3$	$y = -1$
$x = -4$	$y = -1\frac{1}{3}$
$x = -5$	$y = -1\frac{2}{3}$
$x = -6$	$y = -2$

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Card 30

$$\frac{1}{5}(x + 15) = y$$

$x = 1$	$y = 3\frac{1}{5}$	$x = -1$	$y = 2\frac{4}{5}$
$x = 2$	$y = 3\frac{2}{5}$	$x = -2$	$y = 2\frac{3}{5}$
$x = 3$	$y = 3\frac{3}{5}$	$x = -3$	$y = 2\frac{2}{5}$
$x = 4$	$y = 3\frac{4}{5}$	$x = -4$	$y = 2\frac{1}{5}$
$x = 5$	$y = 4$	$x = -5$	$y = 2$
$x = 6$	$y = 4\frac{1}{5}$	$x = -6$	$y = 1\frac{4}{5}$

Card 31

$$\frac{1}{2}x + \frac{3}{4} = 2y$$

$x = 1$	$y = \frac{5}{8}$	$x = -1$	$y = \frac{1}{8}$
$x = 2$	$y = \frac{7}{8}$	$x = -2$	$y = -\frac{1}{8}$
$x = 3$	$y = 1\frac{1}{8}$	$x = -3$	$y = -\frac{3}{8}$
$x = 4$	$y = 1\frac{3}{8}$	$x = -4$	$y = -\frac{5}{8}$
$x = 5$	$y = 1\frac{5}{8}$	$x = -5$	$y = -\frac{7}{8}$
$x = 6$	$y = 1\frac{7}{8}$	$x = -6$	$y = -1\frac{1}{8}$

Play It Positively or Negatively! 19

Card 32

$$3x + 5 = 6y - 2$$

$x = 1$	$y = 1\frac{2}{3}$	$x = -1$	$y = \frac{2}{3}$
$x = 2$	$y = 2\frac{1}{6}$	$x = -2$	$y = \frac{1}{6}$
$x = 3$	$y = 2\frac{2}{3}$	$x = -3$	$y = -\frac{1}{3}$
$x = 4$	$y = 3\frac{1}{6}$	$x = -4$	$y = -\frac{5}{6}$
$x = 5$	$y = 3\frac{2}{3}$	$x = -5$	$y = -1\frac{1}{3}$
$x = 6$	$y = 4\frac{1}{6}$	$x = -6$	$y = -1\frac{5}{6}$

Card 33

$$(3^2 + 3) \div 2x = 4y$$

$x = 1$	$y = 1\frac{1}{2}$	$x = -1$	$y = -1\frac{1}{2}$
$x = 2$	$y = \frac{3}{4}$	$x = -2$	$y = -\frac{3}{4}$
$x = 3$	$y = \frac{1}{2}$	$x = -3$	$y = -\frac{1}{2}$
$x = 4$	$y = \frac{3}{8}$	$x = -4$	$y = -\frac{3}{8}$
$x = 5$	$y = \frac{3}{10}$	$x = -5$	$y = -\frac{3}{10}$
$x = 6$	$y = \frac{1}{4}$	$x = -6$	$y = -\frac{1}{4}$

Play It Positively or Negatively! 20

Card 34

$$3x + \frac{1}{3}y = x^2 - y$$

$x = 1$	$y = -1\frac{1}{2}$
$x = 2$	$y = -1\frac{1}{2}$
$x = 3$	$y = 0$
$x = 4$	$y = 3$
$x = 5$	$y = 7\frac{1}{2}$
$x = 6$	$y = 13\frac{1}{2}$

$x = -1$	$y = 3$
$x = -2$	$y = 7\frac{1}{2}$
$x = -3$	$y = 13\frac{1}{2}$
$x = -4$	$y = 21$
$x = -5$	$y = 30$
$x = -6$	$y = 40\frac{1}{2}$

Card 35

$$2x^2 - y = x + 4$$

$x = 1$	$y = -3$
$x = 2$	$y = 2$
$x = 3$	$y = 11$
$x = 4$	$y = 24$
$x = 5$	$y = 41$
$x = 6$	$y = 62$

$x = -1$	$y = -1$
$x = -2$	$y = 6$
$x = -3$	$y = 17$
$x = -4$	$y = 32$
$x = -5$	$y = 51$
$x = -6$	$y = 74$

Play It Positively or Negatively! 21

Card 36

$$x^2 + 2y = 4x - 2$$

$x = 1$	$y = \frac{1}{2}$	$x = -1$	$y = -3\frac{1}{2}$
$x = 2$	$y = 1$	$x = -2$	$y = -7$
$x = 3$	$y = \frac{1}{2}$	$x = -3$	$y = -11\frac{1}{2}$
$x = 4$	$y = -1$	$x = -4$	$y = -17$
$x = 5$	$y = -3\frac{1}{2}$	$x = -5$	$y = -23\frac{1}{2}$
$x = 6$	$y = -7$	$x = -6$	$y = -31$

Card 37

$$8y - 2x^2 = 24$$

$x = 1$	$y = 3\frac{1}{4}$	$x = -1$	$y = 3\frac{1}{4}$
$x = 2$	$y = 4$	$x = -2$	$y = 4$
$x = 3$	$y = 5\frac{1}{4}$	$x = -3$	$y = 5\frac{1}{4}$
$x = 4$	$y = 7$	$x = -4$	$y = 7$
$x = 5$	$y = 9\frac{1}{4}$	$x = -5$	$y = 9\frac{1}{4}$
$x = 6$	$y = 12$	$x = -6$	$y = 12$

Card 38

$$x^2 + y = 3(x + y)$$

$x = 1$	$y = -1$	$x = -1$	$y = 2$
$x = 2$	$y = -1$	$x = -2$	$y = 5$
$x = 3$	$y = 0$	$x = -3$	$y = 9$
$x = 4$	$y = 2$	$x = -4$	$y = 14$
$x = 5$	$y = 5$	$x = -5$	$y = 20$
$x = 6$	$y = 9$	$x = -6$	$y = 27$

Play It Positively or Negatively! 22

Card 39

$$7y - 2x^2 = 3y + 8$$

$x = 1$	$y = 2\frac{1}{2}$
$x = 2$	$y = 4$
$x = 3$	$y = 6\frac{1}{2}$
$x = 4$	$y = 10$
$x = 5$	$y = 14\frac{1}{2}$
$x = 6$	$y = 20$

$x = -1$	$y = 2\frac{1}{2}$
$x = -2$	$y = 4$
$x = -3$	$y = 6\frac{1}{2}$
$x = -4$	$y = 10$
$x = -5$	$y = 14\frac{1}{2}$
$x = -6$	$y = 20$

Card 40

$$\frac{1}{2}y - \frac{5}{6}x = \frac{1}{3}y - 2$$

$x = 1$	$y = -7$
$x = 2$	$y = -2$
$x = 3$	$y = 3$
$x = 4$	$y = 8$
$x = 5$	$y = 13$
$x = 6$	$y = 18$

$x = -1$	$y = -17$
$x = -2$	$y = -22$
$x = -3$	$y = -27$
$x = -4$	$y = -32$
$x = -5$	$y = -37$
$x = -6$	$y = -42$

Card 41

$$2x^2 + 1 + \frac{1}{2}y = 12$$

$x = 1$	$y = 18$
$x = 2$	$y = 6$
$x = 3$	$y = -14$
$x = 4$	$y = -42$
$x = 5$	$y = -78$
$x = 6$	$y = -122$

$x = -1$	$y = 18$
$x = -2$	$y = 6$
$x = -3$	$y = -14$
$x = -4$	$y = -42$
$x = -5$	$y = -78$
$x = -6$	$y = -122$

Play It Positively or Negatively! 23

Card 42

$$2xy + x^2 = xy + 4$$

$x = 1$	$y = 3$
$x = 2$	$y = 0$
$x = 3$	$y = -1\frac{2}{3}$
$x = 4$	$y = -3$
$x = 5$	$y = -4\frac{1}{5}$
$x = 6$	$y = -5\frac{1}{3}$

$x = -1$	$y = -3$
$x = -2$	$y = 0$
$x = -3$	$y = 1\frac{2}{3}$
$x = -4$	$y = 3$
$x = -5$	$y = 4\frac{1}{5}$
$x = -6$	$y = 5\frac{1}{3}$

Card 43

$$x - \frac{1}{2}y = \frac{7}{2}x + 3$$

$x = 1$	$y = -11$
$x = 2$	$y = -16$
$x = 3$	$y = -21$
$x = 4$	$y = -26$
$x = 5$	$y = -31$
$x = 6$	$y = -36$

$x = -1$	$y = -1$
$x = -2$	$y = 4$
$x = -3$	$y = 9$
$x = -4$	$y = 14$
$x = -5$	$y = 19$
$x = -6$	$y = 24$

Card 44

$$\frac{20}{5}x - \frac{1}{2}y = xy$$

$x = 1$	$y = 2\frac{2}{3}$
$x = 2$	$y = 3\frac{1}{5}$
$x = 3$	$y = 3\frac{3}{7}$
$x = 4$	$y = 3\frac{5}{9}$
$x = 5$	$y = 3\frac{7}{11}$
$x = 6$	$y = 3\frac{9}{13}$

$x = -1$	$y = 8$
$x = -2$	$y = 5\frac{1}{3}$
$x = -3$	$y = 4\frac{4}{5}$
$x = -4$	$y = 4\frac{4}{7}$
$x = -5$	$y = 4\frac{4}{9}$
$x = -6$	$y = 4\frac{4}{11}$

Play It Positively or Negatively! 24

Card 45

$$x^2 + 5y = 7y + 2$$

$x = 1$	$y = \frac{1}{2}$
$x = 2$	$y = 1$
$x = 3$	$y = 3\frac{1}{2}$
$x = 4$	$y = 7$
$x = 5$	$y = 11\frac{1}{2}$
$x = 6$	$y = 17$

$x = -1$	$y = \frac{1}{2}$
$x = -2$	$y = 1$
$x = -3$	$y = 3\frac{1}{2}$
$x = -4$	$y = 7$
$x = -5$	$y = 11\frac{1}{2}$
$x = -6$	$y = 17$

Card 46

$$\frac{1}{2}x + 4y = \frac{5}{2}y - 3$$

$x = 1$	$y = -2\frac{1}{3}$
$x = 2$	$y = -2\frac{2}{3}$
$x = 3$	$y = -3$
$x = 4$	$y = -3\frac{1}{3}$
$x = 5$	$y = -3\frac{2}{3}$
$x = 6$	$y = -4$

$x = -1$	$y = -1\frac{2}{3}$
$x = -2$	$y = -1\frac{1}{3}$
$x = -3$	$y = -1$
$x = -4$	$y = -\frac{2}{3}$
$x = -5$	$y = -\frac{1}{3}$
$x = -6$	$y = 0$

Card 47

$$3y - x^2 = 4y + 1$$

$x = 1$	$y = -2$
$x = 2$	$y = -5$
$x = 3$	$y = -10$
$x = 4$	$y = -17$
$x = 5$	$y = -26$
$x = 6$	$y = -37$

$x = -1$	$y = -2$
$x = -2$	$y = -5$
$x = -3$	$y = -10$
$x = -4$	$y = -17$
$x = -5$	$y = -26$
$x = -6$	$y = -37$

Play It Positively or Negatively! 25

Card 48

$$\frac{1}{2}y + \frac{1}{3}x = x - \frac{1}{4}y$$

$x = 1$	$y = \frac{8}{9}$	$x = -1$	$y = -\frac{8}{9}$
$x = 2$	$y = 1\frac{7}{9}$	$x = -2$	$y = -1\frac{7}{9}$
$x = 3$	$y = 2\frac{2}{3}$	$x = -3$	$y = -2\frac{2}{3}$
$x = 4$	$y = 3\frac{5}{9}$	$x = -4$	$y = -3\frac{5}{9}$
$x = 5$	$y = 4\frac{4}{9}$	$x = -5$	$y = -4\frac{4}{9}$
$x = 6$	$y = 5\frac{1}{3}$	$x = -6$	$y = -5\frac{1}{3}$

Card 49

$$16 \div 4x = \frac{1}{2}y$$

$x = 1$	$y = 8$	$x = -1$	$y = -8$
$x = 2$	$y = 4$	$x = -2$	$y = -4$
$x = 3$	$y = 2\frac{2}{3}$	$x = -3$	$y = -2\frac{2}{3}$
$x = 4$	$y = 2$	$x = -4$	$y = -2$
$x = 5$	$y = 1\frac{3}{5}$	$x = -5$	$y = -1\frac{3}{5}$
$x = 6$	$y = 1\frac{1}{3}$	$x = -6$	$y = -1\frac{1}{3}$

Card 50

$$\frac{1}{15}x + \frac{4}{15} = \frac{1}{5}y$$

$x = 1$	$y = 1\frac{2}{3}$	$x = -1$	$y = 1$
$x = 2$	$y = 2$	$x = -2$	$y = \frac{2}{3}$
$x = 3$	$y = 2\frac{1}{3}$	$x = -3$	$y = \frac{1}{3}$
$x = 4$	$y = 2\frac{2}{3}$	$x = -4$	$y = 0$
$x = 5$	$y = 3$	$x = -5$	$y = -\frac{1}{3}$
$x = 6$	$y = 3\frac{1}{3}$	$x = -6$	$y = -\frac{2}{3}$

Play It Positively or Negatively! 26

Card 51

$$4x - 2y = 15 - 2x$$

$x = 1$	$y = -4\frac{1}{2}$	$x = -1$	$y = -10\frac{1}{2}$
$x = 2$	$y = -1\frac{1}{2}$	$x = -2$	$y = -13\frac{1}{2}$
$x = 3$	$y = 1\frac{1}{2}$	$x = -3$	$y = -16\frac{1}{2}$
$x = 4$	$y = 4\frac{1}{2}$	$x = -4$	$y = -19\frac{1}{2}$
$x = 5$	$y = 7\frac{1}{2}$	$x = -5$	$y = -22\frac{1}{2}$
$x = 6$	$y = 10\frac{1}{2}$	$x = -6$	$y = -25\frac{1}{2}$

Card 52

$$y \div 2x = \frac{1}{4}$$

$x = 1$	$y = \frac{1}{2}$	$x = -1$	$y = -\frac{1}{2}$
$x = 2$	$y = 1$	$x = -2$	$y = -1$
$x = 3$	$y = 1\frac{1}{2}$	$x = -3$	$y = -1\frac{1}{2}$
$x = 4$	$y = 2$	$x = -4$	$y = -2$
$x = 5$	$y = 2\frac{1}{2}$	$x = -5$	$y = -2\frac{1}{2}$
$x = 6$	$y = 3$	$x = -6$	$y = -3$

Appendix

Templates for Equation Cards

Templates for Positive and Negative Dice

Score Pad Template

Templates for Equation Cards

Copy these equation card pictures.

Leave backsides blank.

Cut out the cards.

Tape the cards to cardboard or to the backs of playing cards. This will enable shuffling and dealing.

Card 1

$$4x + 7 = y$$

Card 2

$$2x + 4y = 3x$$

Card 3

$$x^2 + x - 1 = y$$

Card 4

$$xy + x = 30$$

Card 5

$$6x = 5y - 2$$

Card 6

$$3x - 5 = y + 2$$

Card 7

$$2x = y - 1$$

Card 8

$$9x = 6y + 1$$

Card 9

$$x + y = 3y - x$$

Card 10

$$y + 2x + 1 = 3y - 3$$

Card 11

$$x^3 - y = 5y + 4$$

Card 12

$$x^2 + 2y + 1 = 3y + 5$$

Card 13

$$2y - 11 = 3xy + 4$$

Card 14

$$5x - 1 = 7y + xy$$

Card 15

$$3x + 4xy = 7y$$

Card 16

$$\frac{1}{3}x + 2y = 2x$$

Card 17

$$xy = x + 10$$

Card 18

$$2x - y = 20 + 4y$$

Card 19

$$3x + y = 4y - 4$$

Card 20

$$4xy + 8 = 48$$

Card 21

$$(x + 1)^2 - 20 = y$$

Card 22

$$2(x - 1) = y$$

Card 23

$$7y - xy = 3$$

Card 24

$$\frac{5}{2}x - 2 = y$$

Card 25

$$15y + 2x = 12y$$

Card 26

$$x^2 - 4y = x - 3y + 1$$

Card 27

$$\frac{1}{2}y + x = 2x - y$$

Card 28

$$2(y - x) = 4y + 2x$$

Card 29

$$\frac{1}{2}(4x + 2y) = x + 4y$$

Card 30

$$\frac{1}{5}(x + 15) = y$$

Card 31

$$\frac{1}{2}x + \frac{3}{4} = 2y$$

Card 32

$$3x + 5 = 6y - 2$$

Card 33

$$(3^2 + 3) \div 2x = 4y$$

Card 34

$$3x + \frac{1}{3}y = x^2 - y$$

Card 35

$$2x^2 - y = x + 4$$

Card 36

$$x^2 + 2y = 4x - 2$$

Card 37

$$8y - 2x^2 = 24$$

Card 38

$$x^2 + y = 3(x + y)$$

Card 39

$$7y - 2x^2 = 3y + 8$$

Card 40

$$\frac{1}{2}y - \frac{5}{6}x = \frac{1}{3}y - 2$$

Card 41

$$2x^2 + 1 + \frac{1}{2}y = 12$$

Card 42

$$2xy + x^2 = xy + 4$$

Card 43

$$x - \frac{1}{2}y = \frac{7}{2}x + 3$$

Card 44

$$\frac{20}{5}x - \frac{1}{2}y = xy$$

Card 45

$$x^2 + 5y = 7y + 2$$

Card 46

$$\frac{1}{2}x + 4y = \frac{5}{2}y - 3$$

Card 47

$$3y - x^2 = 4y + 1$$

Card 48

$$\frac{1}{2}y + \frac{1}{3}x = x - \frac{1}{4}y$$

Card 49

$$16 \div 4x = \frac{1}{2}y$$

Card 50

$$\frac{1}{15}x + \frac{4}{15} = \frac{1}{5}y$$

Card 51

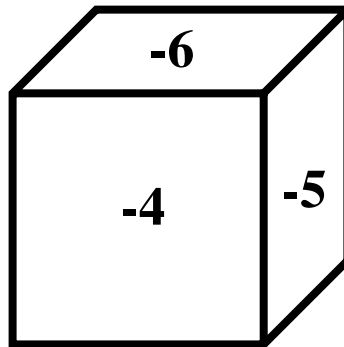
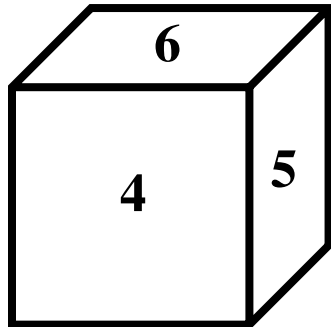
$$4x - 2y = 15 - 2x$$

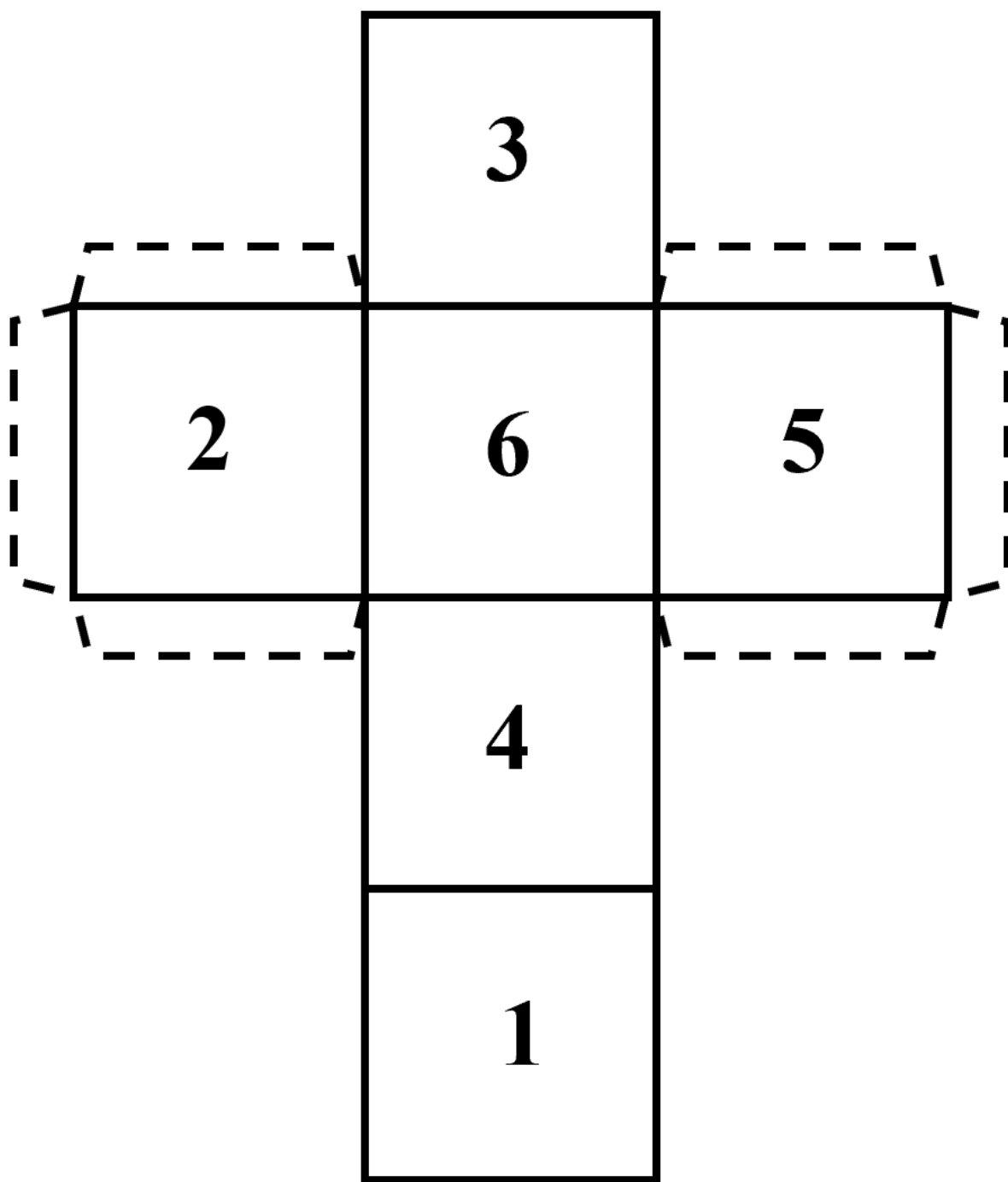
Card 52

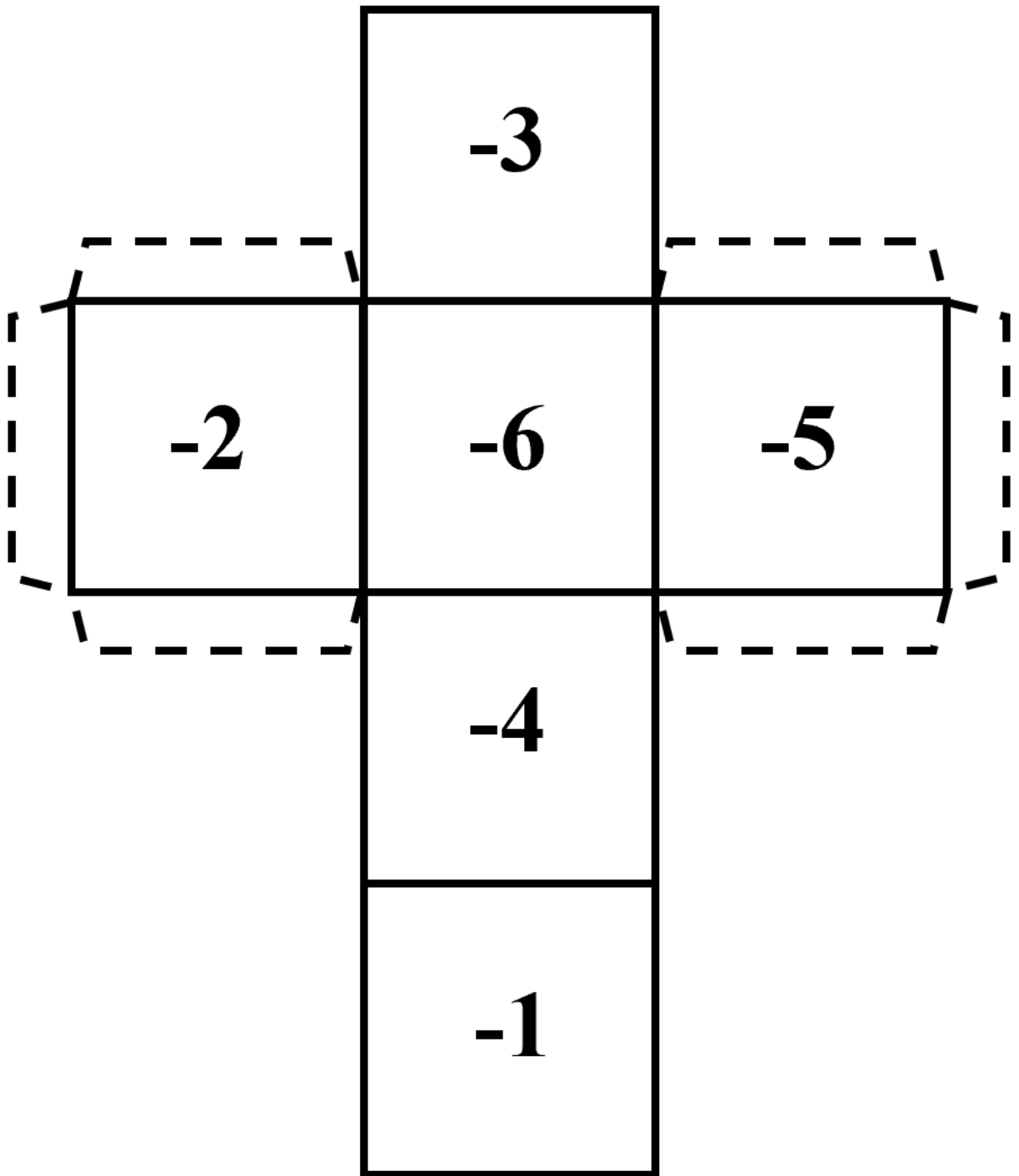
$$y \div 2x = \frac{1}{4}$$

Templates for Positive and Negative Dice

Duplicate the pictures of the dice. Cut out pictures including dotted flaps. Fold along sides to form a cube. Tape the dotted flaps to connect faces of the cube.







Play It

Score Pad

Player Names

$$42 - 2x = 2y + 34$$

$$6y + 3x = 13 - 3y$$

$$14y - 30 = x$$

$$13 + 1/2y = 4x$$

$$3y + 9 = 1/2x$$

$$14 + x = 1/3y - 3$$

$$y - 2xy = 12 + 3x$$

$$4xy - 1/2x = 2xy + 47$$

$$xy - 11x = 7y - 6$$

$$19 - 3y = 4x - y$$

$$y - 12 = 12x - 6$$

$$9y + 2x = 22$$

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$$54 + 3y = 1/2x - 2y$$