

The Distributive Property of Multiplication over Addition
 The **distributive property of multiplication over addition**, $a(b + c) = ab + ac$, says that when a number multiplies an indicated sum (addition expression enclosed in parentheses), the result is the same as when the number multiplies each addend in that sum; for example, $6 \times (3 + 5) = 6 \times 3 + 6 \times 5$.

Game Description and Materials

Spin a Step is a timed game (15 minutes) for two players in which they use the distributive property and mental math to multiply two one-digit numbers. Players find products of one-digit factors by following a 4-step procedure in which they decompose the second factor into the sum of two addends (2, 3, and/or 5) and then apply the distributive property.

Game materials include ten Solution Boards, Cards, an Organizing Board on which players organize the Cards, and a Spinner.

The **object of the game** is to complete more Solution Boards than the other player in 20 minutes of play.

Solution Boards

Each Solution Board consists of a multiplication expression, four incomplete solution steps, and spaces on which players place their Cards in order to complete the solution.

- Step 1: Decompose the second factor, using 2, 3, and/or 5.
- Step 2: Remove the parentheses.
- Step 3: Distribute the first factor to both addends.
- Step 4: Add the addends.

Cards

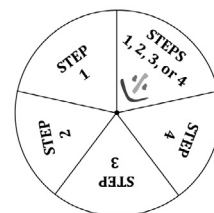
Cards contain the numbers that fit in the boxes on the Solution Boards. The step(s) to which each Card belongs is printed in the upper left corner.

Organizing Board

Before the game begins, players organize the Cards on the Organizing Board. Cards for Steps 1 and 2 (factors 2, 3, and 5) go in the top row. Cards for Steps 3 and 4 go in the bottom row.

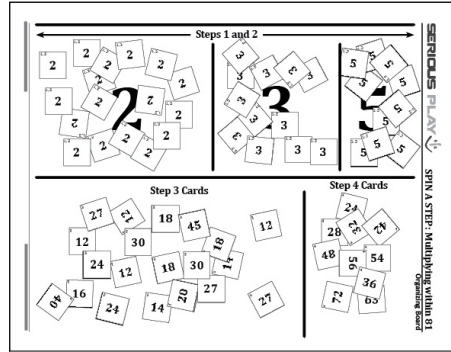
Spinner

The spinner identifies the moves players take.



Getting Ready to Play

Players each take five Solution Boards and place them side by side. They place the organizing board between them. They place the Game Cards face up on the Organizing Board, spreading them out as much as possible so that the numbers are visible. (The small numbers in the upper left corner indicate the step(s) to which each card belongs.)



Let's Play!

The game requires that Game Cards be placed on Solution Boards in solution step order:

- Step 1: Decompose the second factor.
- Step 2: Remove the parentheses.
- Step 3: Distribute the first factor to both addends.
- Step 4: Add the addends.

Distributive Property of Multiplication over Addition
 $a \times (b + c) = a \times b + a \times c$

9 x 7 =

Step 1: Decompose 7.

$$9 \times \left(\overset{1.1}{\boxed{2}} + \overset{1.2}{\boxed{5}} \right) =$$

Step 2: Remove the parentheses.

$$9 \times \overset{2.1}{\boxed{2}} + 9 \times \overset{2.2}{\boxed{5}} =$$

Step 3: Distribute 9 by multiplication to both addends.

$$\overset{3.1}{\boxed{18}} + \overset{3.2}{\boxed{45}} =$$

Step 4: Add the addends.

$$\boxed{63}$$

1. Player 1 spins the spinner. Since the steps on the Solution Boards must be played in order (1, 2, 3, 4), the spinner must land on "Step 1 or 2," "🎲," or "Step 1, 2, 3, or 4" for Player 1 to be able to put Cards in Step 1 on any of his Boards. In that case, Player 1 selects the Card(s) from the Organizing Board and puts them on Step 1 of a Solution Board, completing the entire step in one turn.
2. Player 2 takes a turn, following the same procedure as Player 1.
3. Players alternate turns. When a player completes a Solution Board, he states the multiplication equation (9 x 7 = 63, for example).
4. The winner is the player who, after 15 minutes, has filled more Solution Boards.



Distributive Property of Multiplication over Addition
 $a \times (b + c) = a \times b + a \times c$

$$6 \times 4 =$$

Step 1: Decompose 4, using 2, 3, and/or 5.

$$6 \times (\square + \square) =$$

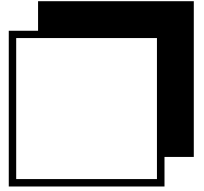
Step 2: Remove the parentheses.

$$6 \times \square + 6 \times \square =$$

Step 3: Distribute 6 by multiplication to both addends

$$\square + \square =$$

Step 4: Add the addends.



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Distributive Property of Multiplication over Addition
 $a \times (b + c) = a \times b + a \times c$

$$8 \times 7 =$$

Step 1: Decompose 7, using 2, 3, and/or 5.

$$8 \times (\square + \square) =$$

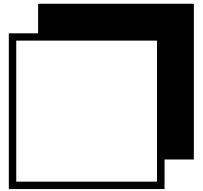
Step 2: Remove the parentheses.

$$8 \times \square + 8 \times \square =$$

Step 3: Distribute 8 by multiplication to both addends.

$$\square + \square =$$

Step 4: Add the addends.



Distributive Property of Multiplication over Addition
 $a \times (b + c) = a \times b + a \times c$

$$9 \times 8 =$$

Step 1: Decompose 8, using 2, 3, and/or 5.

$$9 \times (\square + \square) =$$

Step 2: Remove the parentheses.

$$9 \times \square + 9 \times \square =$$

Step 3: Distribute 9 by multiplication to both addends.

$$\square + \square =$$

Step 4: Add the addends.



Distributive Property of Multiplication over Addition
 $a \times (b + c) = a \times b + a \times c$

$$9 \times 4 =$$

Step 1: Decompose 4, using 2, 3, and/or 5.

$$9 \times (\square + \square) =$$

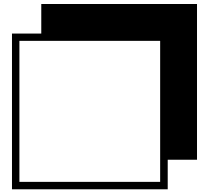
Step 2: Remove the parentheses.

$$9 \times \square + 9 \times \square =$$

Step 3: Distribute 9 by multiplication to both addends.

$$\square + \square =$$

Step 4: Add the addends.



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Distributive Property of Multiplication over Addition
 $a \times (b + c) = a \times b + a \times c$

$$9 \times 7 =$$

Step 1: Decompose 7, using 2, 3, and/or 5.

$$9 \times (\square + \square) =$$

Step 2: Remove the parentheses.

$$9 \times \square + 9 \times \square =$$

Step 3: Distribute 9 by multiplication to both addends.

$$\square + \square =$$

Step 4: Add the addends.



Distributive Property of Multiplication over Addition
 $a \times (b + c) = a \times b + a \times c$

$$9 \times 6 =$$

Step 1: Decompose 6, using 2, 3, and/or 5.

$$9 \times (\square + \square) =$$

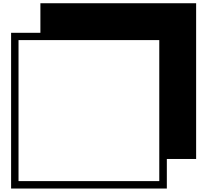
Step 2: Remove the parentheses.

$$9 \times \square + 9 \times \square =$$

Step 3: Distribute 9 by multiplication to both addends.

$$\square + \square =$$

Step 4: Add the addends.



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Distributive Property of Multiplication over Addition
 $a \times (b + c) = a \times b + a \times c$

$$8 \times 6 =$$

Step 1: Decompose 6, using 2, 3, and/or 5.

$$8 \times (\square + \square) =$$

Step 2: Remove the parentheses.

$$8 \times \square + 8 \times \square =$$

Step 3: Distribute 8 by multiplication to both addends.

$$\square + \square =$$

Step 4: Add the addends.



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Distributive Property of Multiplication over Addition
 $a \times (b + c) = a \times b + a \times c$

$$7 \times 4 =$$

Step 1: Decompose 4, using 2, 3, and/or 5.

$$7 \times (\square + \square) =$$

Step 2: Remove the parentheses.

$$7 \times \square + 7 \times \square =$$

Step 3: Distribute 7 by multiplication to both addends..

$$\square + \square =$$

Step 4: Add the addends



Distributive Property of Multiplication over Addition
 $a \times (b + c) = a \times b + a \times c$

$$4 \times 8 =$$

Step 1: Decompose 8, using 2, 3, and/or 5.

$$4 \times (\square + \square) =$$

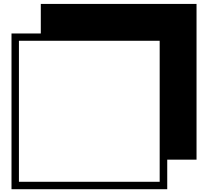
Step 2: Remove the parentheses.

$$4 \times \square + 4 \times \square =$$

Step 3: Distribute 4 by multiplication to both addends.

$$\square + \square =$$

Step 4: Add the addends.



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Distributive Property of Multiplication over Addition
 $a \times (b + c) = a \times b + a \times c$

$$6 \times 7 =$$

Step 1: Decompose 7, using 2, 3, and/or 5.

$$6 \times (\square + \square) =$$

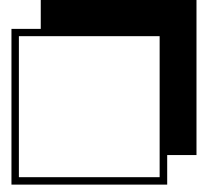
Step 2: Remove the parentheses.

$$6 \times \square + 6 \times \square =$$

Step 3: Distribute 6 by multiplication to both addends.

$$\square + \square =$$

Step 4: Add the addends.

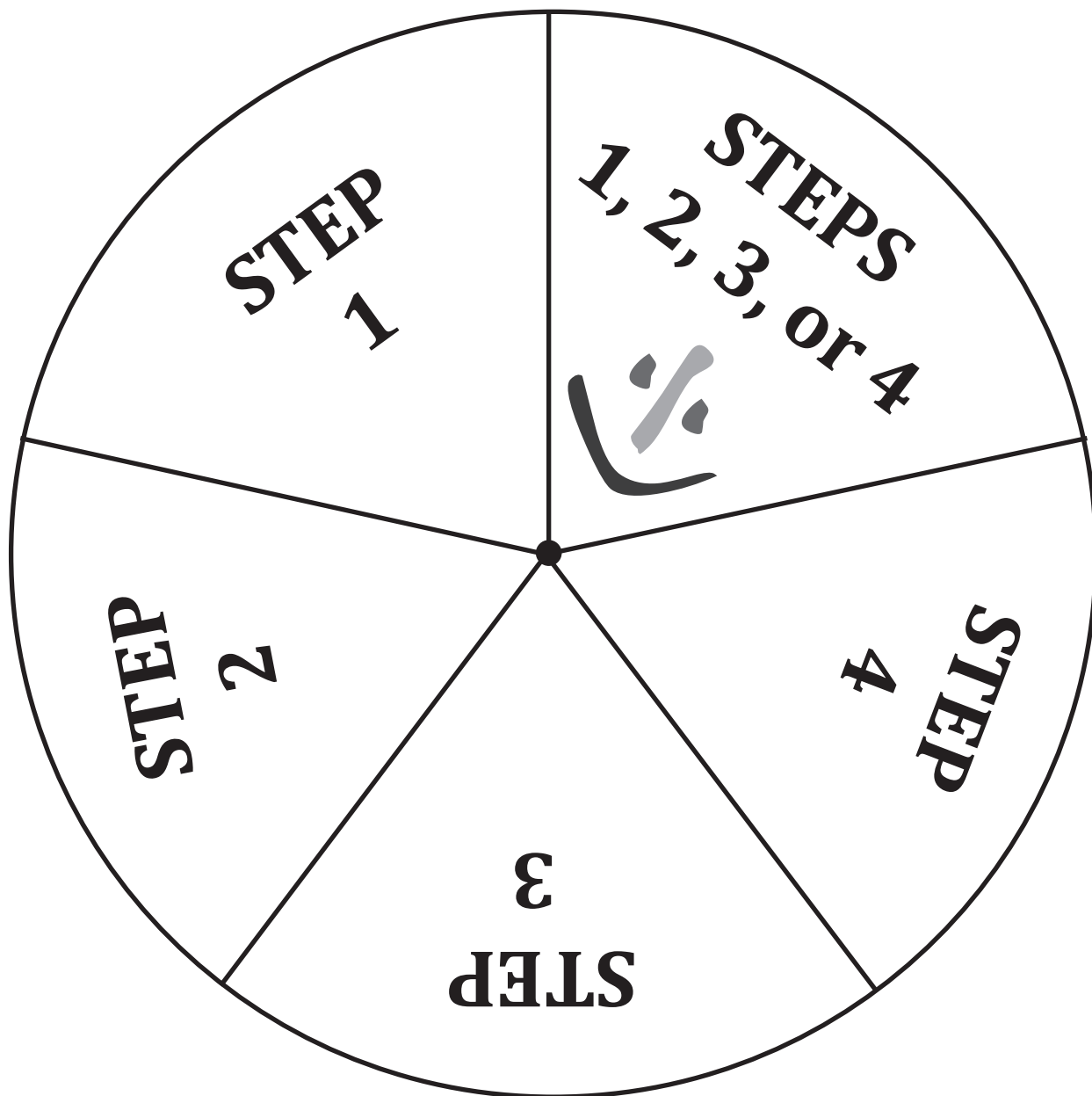


1, 2 2	1, 2 2	1, 2 2	1, 2 2	1, 2 2
1, 2 2	1, 2 2	1, 2 2	1, 2 2	1, 2 2
1, 2 2	1, 2 2	1, 2 2	1, 2 2	1, 2 2
1, 2 2	1, 2 2	1, 2 2	1, 2 3	1, 2 3
1, 2 3	1, 2 3	1, 2 3	1, 2 3	1, 2 3
1, 2 3	1, 2 3	1, 2 3	1, 2 3	1, 2 3
1, 2 5	1, 2 5	1, 2 5	1, 2 5	1, 2 5
1, 2 5	1, 2 5	1, 2 5	1, 2 5	1, 2 5

³ 12	³ 12	³ 12	³ 12	³ 14
³ 14	³ 16	³ 18	³ 18	³ 20
³ 24	³ 24	³ 27	³ 27	³ 30
³ 18	³ 27	³ 40	³ 45	³ 45
⁴ 24	⁴ 28	⁴ 32	⁴ 42	⁴ 48
⁴ 54	⁴ 56	⁴ 63	⁴ 72	⁴ 36

The organizing board is a large vertical rectangle. It is divided into two horizontal sections by a thick black line. The top section is labeled "Steps 1 and 2" on the left side, with a double-headed arrow indicating its height. Inside this section, the numbers 2, 3, and 5 are arranged vertically from bottom to top. The bottom section is labeled "Step 3 Cards" on the left side and "Step 4 Cards" on the right side. A thick horizontal line is drawn across the middle of the bottom section, separating the two labels.

Use a pencil to anchor the looped end of a small paper clip to the center of the circle. Spin the paper clip.



Distributive Property of Multiplication over Addition
 $a \times (b + c) = a \times b + a \times c$

$$\mathbf{X} =$$

Step 1: Decompose .

$$\mathbf{X} \left(\begin{array}{c} \square \\ + \\ \square \end{array} \right) =$$

Step 2: Remove the parentheses.

$$\mathbf{X} \begin{array}{c} \square \\ + \\ \square \end{array} =$$

Step 3: Distribute by multiplication to both addends.

$$\begin{array}{c} \square \\ + \\ \square \end{array} =$$

Step 4: Add the addends.

$$\square$$

Distributive Property of Multiplication over Addition
 $a \times (b + c) = a \times b + a \times c$

$$\mathbf{X} =$$

Step 1: Decompose .

$$\mathbf{X} \left(\begin{array}{c} \square \\ + \\ \square \end{array} \right) =$$

Step 2: Remove the parentheses.

$$\mathbf{X} \begin{array}{c} \square \\ + \\ \square \end{array} =$$

Step 3: Distribute by multiplication to both addends.

$$\begin{array}{c} \square \\ + \\ \square \end{array} =$$

Step 4: Add the addends.

$$\square$$

1, 2	1, 2	1, 2	1, 2	1, 2
1, 2	1, 2	1, 2	1, 2	1, 2
1, 2	1, 2	1, 2	1, 2	1, 2
1, 2	1, 2	1, 2	1, 2	1, 2
1, 2	1, 2	1, 2	1, 2	1, 2
1, 2	1, 2	1, 2	1, 2	1, 2
1, 2	1, 2	1, 2	1, 2	1, 2
1, 2	1, 2	1, 2	1, 2	1, 2
1, 2	1, 2	1, 2	1, 2	1, 2

3	3	3	3	3
3	3	3	3	3
3	3	3	3	3
3	3	3	3	3
4	4	4	4	4
4	4	4	4	4