

Everyone can participate in these puzzles, compare notes, and share solutions. *Enjoy!*

Winter Wonderland

Ice, snow, and frost, oh my! In this month's Family Math Puzzles, you'll glide your way through mathematical paths and patterns with these wintry words. You'll explore the geometry of snowflakes and learn some amazing record-breaking winter statistics. Bundle up for the adventure!

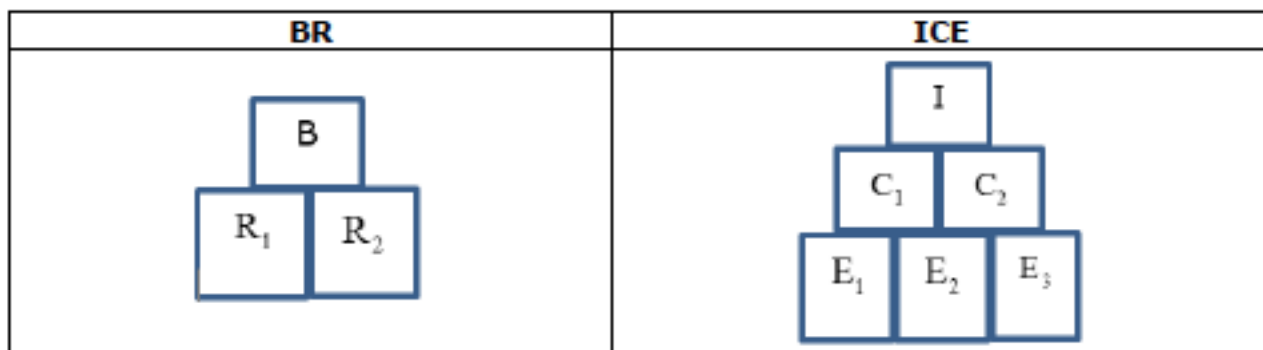
Plenty of Great Ski Trails

The Winter Wonderland Ski Resort has opened its slopes for the season. The ski school uses four hills to help skiers build their skills, each one having its own network of trails to choose.

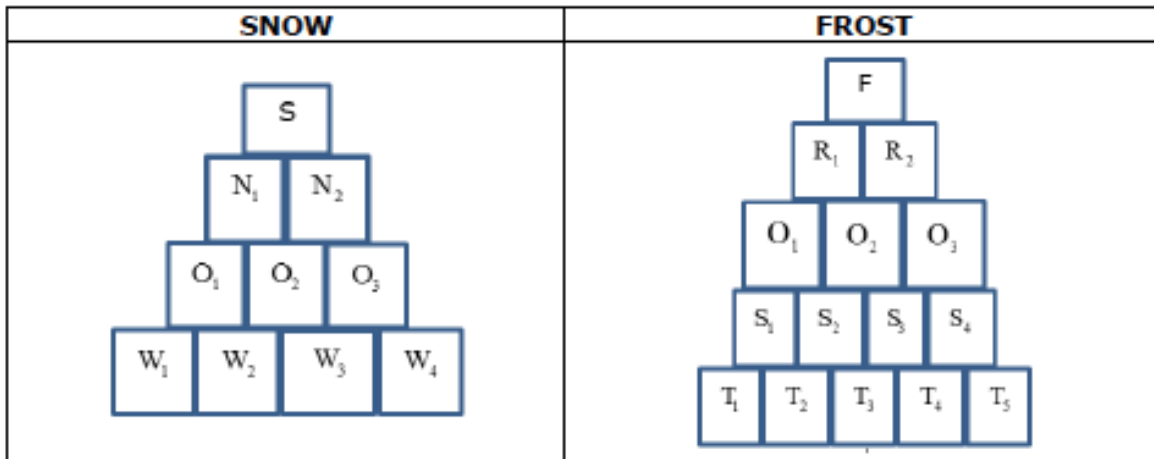
The marketing department for the resort would like to advertise how many different trails they offer. Your mission is to calculate this information.

The slopes are as follows:

- BR, the beginner slope: Skiers start at B at the top of the hill and then choose either path, R₁ or R₂.
- ICE, the intermediate slope: Skiers start at I, choose either path, C₁ or C₂, and then choose one of the E paths that is connected. C₁ is connected to E₁ and E₂, and C₂ is connected to E₂ and E₃.



- SNOW, the schussing slope: Skiers create their desired trail by choosing connected paths that spell the word snow.
- FROST, the freestyle slope: Skiers create their desired trail by choosing connected paths that spell the word frost.



How Many Trails Are Possible?

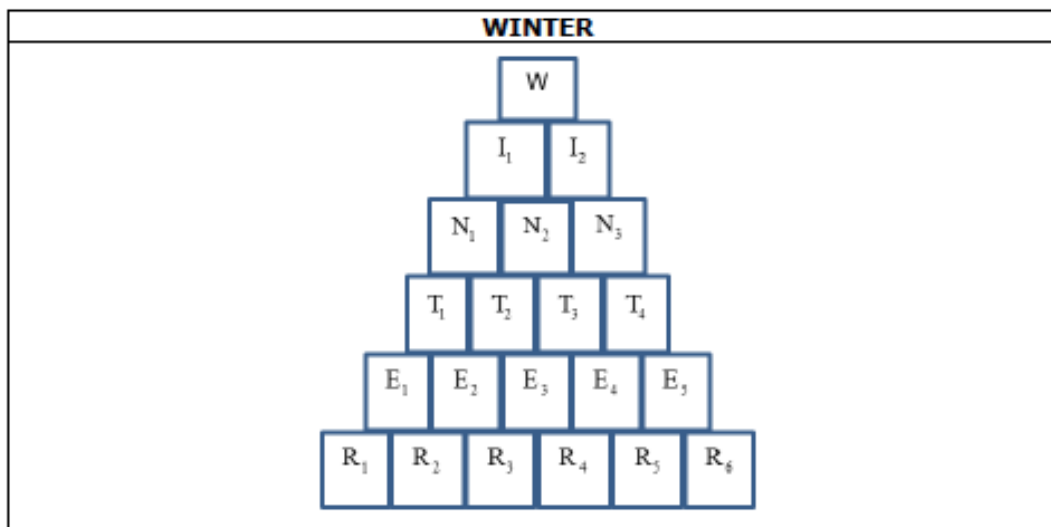
Find the total number of different trails that are possible on each of the ski slopes. Discuss strategies for solving the puzzle.

Ski Slope	BR	ICE	SNOW	FROST
Number of Possible Trails				

Olympic Ski Team

The Olympic training ski team uses the most challenging slope, WINTER.

Can you guess the number of possible trails on WINTER from a pattern you see in your earlier answers? Predict the total and then apply your strategy to find them.



No Two Snowflakes Are Identical

Although no two snowflakes are exactly alike in every detail, they do have something in common about their shape. All snowflakes are basically a hexagon. The shape is determined as water turns to its frozen form, and it is related to the H₂O make-up of water molecules.



Abominable Snow Statistics?

Do some online research to find out more about these U.S. snow-related statistics:

- 1,140 inches (95 feet) is the most snowfall recorded in a single day.
- The largest snowman (actually a snowwoman) on record was 122 feet, 1 inch high.
- The typical width of a snowflake varies from less than 0.5 inch to 2 inches.
- The largest snowflake on record was 15 inches in diameter.

Everyone can participate in these puzzles, compare notes, and share solutions. *Enjoy!*

Winter Wonderland

Ice, snow, and frost, oh my! In this month's Family Math Puzzles, you'll glide your way through mathematical paths and patterns with these wintry words. You'll explore the geometry of snowflakes and learn some amazing record-breaking winter statistics. Bundle up for the adventure!

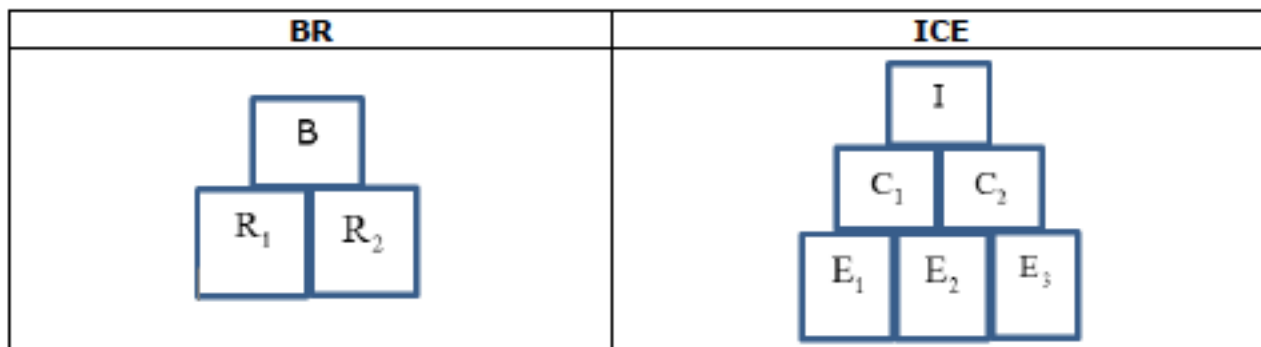
Plenty of Great Ski Trails

The Winter Wonderland Ski Resort has opened its slopes for the season. The ski school uses four hills to help skiers build their skills, each one having its own network of trails to choose.

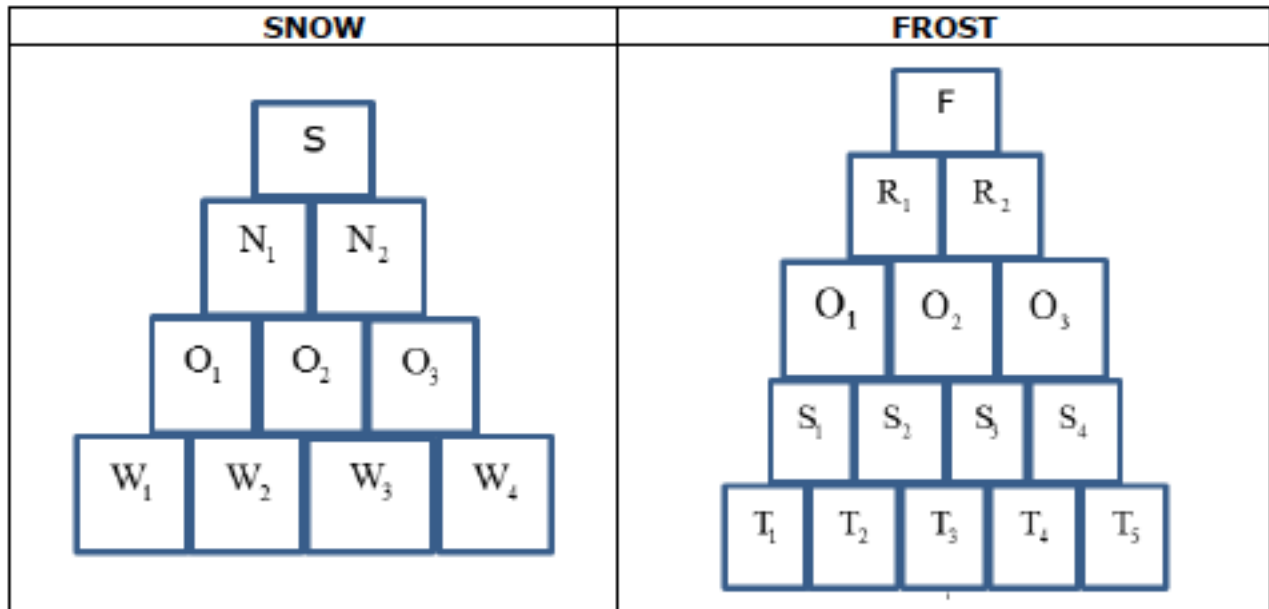
The marketing department for the resort would like to advertise how many different trails they offer. Your mission is to calculate this information.

The slopes are as follows:

- BR, the beginner slope: Skiers start at B at the top of the hill and then choose either path, R₁ or R₂.
- ICE, the intermediate slope: Skiers start at I, choose either path, C₁ or C₂, and then choose one of the E paths that is connected. C₁ is connected to E₁ and E₂, and C₂ is connected to E₂ and E₃.



- SNOW, the schussing slope: Skiers create their desired trail by choosing connected paths that spell the word snow.
- FROST, the freestyle slope: Skiers create their desired trail by choosing connected paths that spell the word frost.



How Many Trails Are Possible?

Find the total number of different trails that are possible on each of the ski slopes. Discuss strategies for solving the puzzle.'

Answers:

Ski Slope	BR	ICE	SNOW	FROST
Number of Possible Trails	2 trails BR ₁ , BR ₂	4 trails IC ₁ E ₁ , IC ₁ E ₂ , IC ₂ E ₁ , IC ₂ E ₂	8 trails SN ₁ O ₁ W ₁ , SN ₁ O ₁ W ₂ , SN ₁ O ₂ W ₂ , SN ₁ O ₂ W ₃ , SN ₂ O ₂ W ₂ , SN ₂ O ₂ W ₃ , SN ₂ O ₃ W ₃ , SN ₂ O ₃ W ₄	16 trails FR ₁ O ₁ S ₁ T ₁ , FR ₁ O ₁ S ₁ T ₂ , FR ₁ O ₁ S ₂ T ₂ , FR ₁ O ₁ S ₂ T ₃ , FR ₁ O ₂ S ₂ T ₂ , FR ₁ O ₂ S ₂ T ₃ , FR ₁ O ₂ S ₃ T ₃ , FR ₁ O ₂ S ₃ T ₄ , FR ₂ O ₂ S ₂ T ₂ , FR ₂ O ₂ S ₂ T ₃ , FR ₂ O ₂ S ₃ T ₃ , FR ₂ O ₂ S ₃ T ₄ , FR ₂ O ₃ S ₃ T ₃ , FR ₂ O ₃ S ₃ T ₄ , FR ₂ O ₃ S ₄ T ₄ , FR ₂ O ₃ S ₄ T ₅

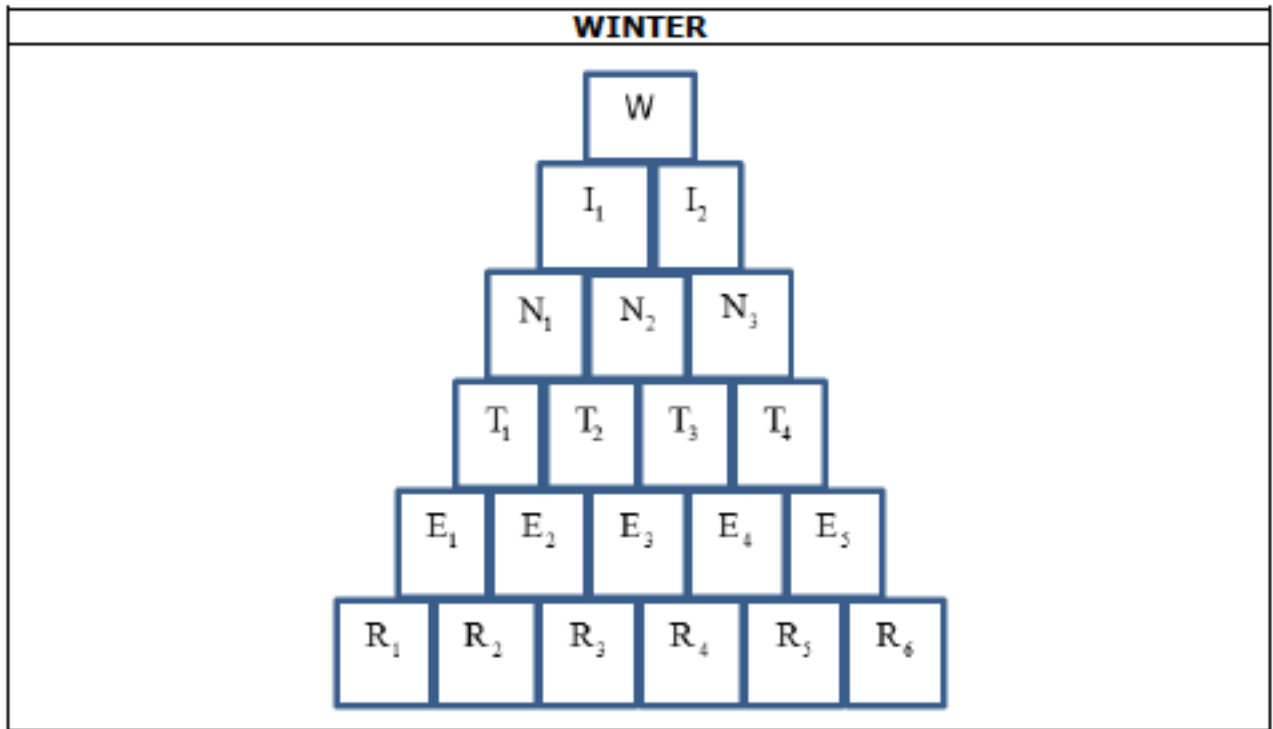
To find the possible strategies, follow these steps:

- Trace each path with a pencil on the pyramid drawing.
- Make a separate copy of the pyramid for each path or use a different color when tracing.
- List the letters as shown in the table.

Olympic Ski Team

The Olympic training ski team uses the most challenging slope, WINTER.

Can you guess the number of possible trails on WINTER from a pattern you see in your earlier answers? Predict the total and then apply your strategy to find them.



Answer: There are 32 possible trails on the WINTER slope.

No Two Snowflakes Are Identical

Although no two snowflakes are exactly alike in every detail, they do have something in common about their shape. All snowflakes are basically a hexagon. The shape is determined as water turns to its frozen form, and it is related to the H₂O make-up of water molecules.



Abominable Snow Statistics?

Do some online research to find out more about these U.S. snow-related statistics:

- 1,140 inches (95 feet) is the most snowfall recorded in a single day.
- The largest snowman (actually a snowwoman) on record was 122 feet, 1 inch high.
- The typical width of a snowflake varies from less than 0.5 inch to 2 inches.
- The largest snowflake on record was 15 inches in diameter.