Whole-class Discussions: Four Corners Variation – Opposite Sides

MATHEMATICS Grades 10 - 12

In this strategy, students individually choose an "agree" or "disagree" response to a question or prompt and move to an area in the room where they join others who share their ideas and response. This strategy is flexible and can be used for many topics, questions, and problems in mathematics.

Purpose

- Allow students to make their own response to a question, prompt, or problem; encourage critical thinking.
- Encourage an exchange of student-generated ideas and solutions to problems in small groups.
- Facilitate a class discussion and analysis of student-generated ideas and responses.

Payoff

Students will:

- make up their own minds on the validity of an idea and/or solution to a mathematics problem.
- speak freely in a relaxed environment.
- think creatively and critically.

Tips and Resources

- Encourage students to make up their own mind concerning the validity of a response to a question, prompt, or a solution to a mathematics problem.
- Provide a simple protocol for students to discuss the key ideas that prompted them to be on one side or the other (e.g., What are your responses? How are your responses similar? Explain how are your responses are different than the other side).
- See Teacher Resource: *Opposite Sides - Examples.*
- See Teacher Resource: *Four Corners – Examples.*

Further Support

- Post the protocol for sharing ideas, so that students generate details that support their choice.
- The teacher may need to encourage some students to develop a response and make a decision.

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What teachers do	What students do
Before • Create a true/false statement or question for students to ponder. Choose a statement that requires critical thinking. • Assign one side of the room as the "Agree" side, and the opposite side of the room as the "Disagree" side. • Give students a minute or two of quiet time to individually think about the question and take a stance. • A minute or two should be ample time; ensure that this time is spent quietly so that students make their own choices.	▪ Carefully ponder the statement, making a personal decision as to the position they will take. • Respect other students' quiet thinking time.
During • Ask students to move to the side of the room that represents their stance on the question. • Have some students justify their choice of sides to the whole class. • Allow students to change sides after another student's explanation. However, when a student chooses to change sides, ask the student to give reasons for the change. • Be prepared to contribute to the "debate" by asking "what if ..." questions.	• Move to the side of the room that describes their stance on the statement. • Actively listen to other students' justifications. • Be prepared to justify their own choice. • If sufficiently swayed by a justification from the other side, be prepared to justify a move to the other side of the room.
After • Debrief the activity by leading a discussion to summarize the justifications and clarify concepts in order to dispel misconceptions.	• Participate in summarizing the justifications.

Notes

Whole-class Discussions: Opposite Sides – Examples

"Agree" Side

Mathematical Statement,

A Solution to a Problem

"Disagree" Side

Sample Statements
Grade 10 Applied
1. Similar triangles have equivalent corresponding angles and sides.
2. sinA = opp/adjacent; cosA= adjacent/hypotenuse; tanA= hypoteneuse/adj.
3. Surface area (pyramid) = area of square base + area of 4 similar triangles.
4. x/3+5 = 4x-2.
5. $2x^2$-128 = (2x-8) (x+8).
6. A parabola is represented as $y = -ax^2 + bx + c$ is an upwards parabola.
Grade 11 Workplace
1. An employee can be paid a salary and a commission.
2. The least amount of coins for $28.45 is 1 quarter and 2 dimes.
3. $1 414.78 is the value of $1 000 compounded semi-annually, 10 yrs at 3.5%.
4. For a simple interest loan, you only pay interest on the original principal.
5. Variable costs for operating a vehicle includes repairs, price of vehicle, license.
6. It is always cheaper to travel by train than bus.
Grade 12 University
1. The behaviour of a polynomial function, $f(x) = a_nx^n + a_{n-1}x^{n-1} + \cdots a_1x + a_0$ is essentially the same as that of the monomial, a_nx^n .
2. The logarithmic function is defined as the inverse of the exponential function. These are examples of a logarithmic function: f(x) =lnx; $g(x) = \log_4 x$; $h(x) = \log_{0.5} x$.
3. The current rate of change in the Canadian population can be determined by calculating the average rate of change (i.e., slope of the tangent to a curve at a point).
4. A discontinuous function can be determined if there are undefined points or zeros in the denominator, for those functions composed entirely of products and quotients of polynomials. A simple example of this is f(x)=1+1/(x-1). There is a zero in a denominator at x=1. This is where the function is discontinuous.