

I have found functions that fit all the regions, except for B, as shown in Figure 7. I checked my equations on Desmos as I worked through the regions to ensure that they fit the criteria. If you find a function that would work for region B, please let me know!

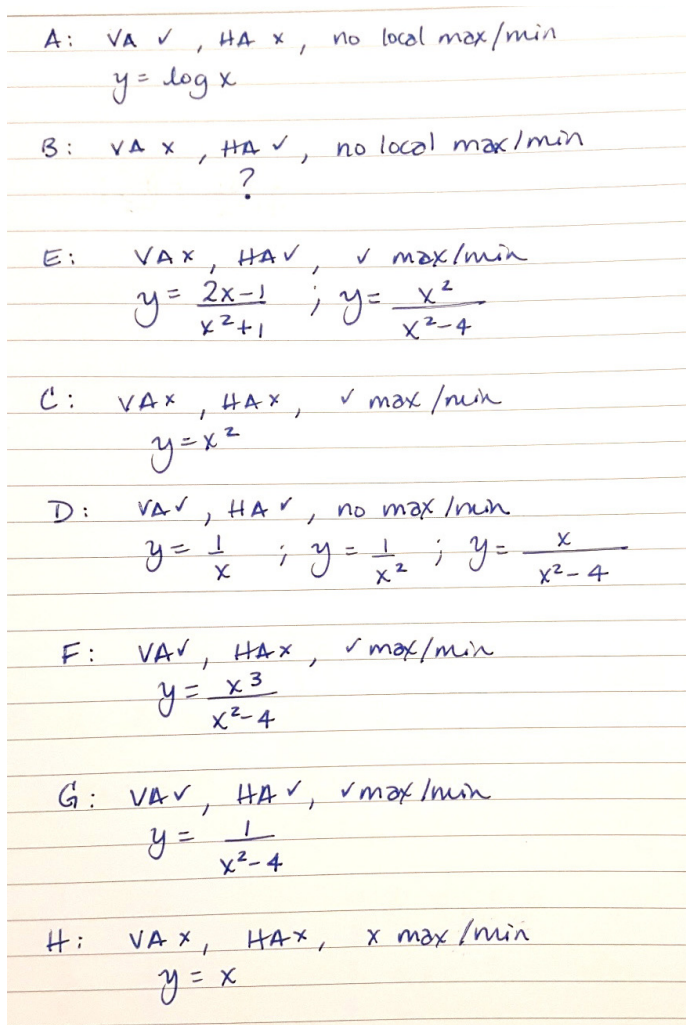


Figure 7

These Venn diagram activities can easily be adapted to almost any topic and, unlike many other tasks, they are quick to make. They can be adjusted quite easily if they are proving to be too much of a challenge or not enough of a challenge. Students can also create their own, using the template or simply by drawing their own Venn diagram. These will become part of my set of easily adaptable tools, like *Open Middle* and *Which One Doesn't Belong*, to draw out the mathematical thinking from my students. I encourage you to check them out too. ▲

Grade 13 Geometry Exam 1949

Eight persons are to travel in two 4-passenger cars. If only four of them can drive, in how many ways can a party of four be chosen for the first car?

▲ HEY, IT'S ELEMENTARY: BUILDING PARENT ENGAGEMENT IN MATH: A PROJECT TO SUPPORT THE IMPLEMENTATION OF THE RENEWED MATH STRATEGY

LYNDA COLGAN

EMAIL: colganl@educ.queensu.ca



Dr. Lynda Colgan is a Professor at the Faculty of Education, Queen's University. In addition to her teaching responsibilities in the BEd and Graduate programs, she is involved in research and knowledge-mobilization projects with the Council of Ontario Directors of Education, TVO/TFO, the Ontario Ministry of Education, and the Mathematics Knowledge Network.

Our team at Queen's Faculty of Education, Drs. Lorraine Godden, Michelle Searle, Sandy Youmans, and myself, as well as Research Assistants (and M.Ed. candidates) Tyler Ashford and Barbara Mendes, are in the last busy days of preparing the final "deliverable" to the Ontario Ministry of Education for our two-year project, *Building Parent Engagement in Math*, a website rich in resources for researchers, educators, and school council members. We look forward to its official launch in the near future. The goal of the website is to *mobilize knowledge*, in other words, disseminate what we learned as widely as possible so that others may build upon our learning and embark on their own localized initiatives with demonstrated supports from research *and* practice.

Note that throughout this article, the term "parent" is used as defined on the website, which is "anyone who shares responsibility for the well-being of a child and is actively engaged in his/her education."



Figure 1: Photo during a Ministry-funded initiative, called Building Parent Engagement: A Project to Support Ontario's Renewed Mathematics Strategy

The *Building Parent Engagement in Math* project (BPEiM), which began in Fall 2017, took place in six schools from three school districts across the province—ranging from Windsor in the west to Selby in the east. As the team completes its monographs, infographics, case studies, and

resource packages, we have identified many important factors that contributed to what we believe has been the success of the initiative.

First and foremost, our project demonstrated that positive outcomes are possible through collaborative inquiry (CI) designed to engage parents in their children’s mathematics learning. The program we developed promoted collaboration among educators, students, school/district leaders, university researchers, and, most significantly, parents who play a key role in their children’s mathematics learning, beliefs, and dispositions. Each school community participated in a continuous and effective manner by producing plans, resources, organizing events, and activities that enabled participation of families and students, while ensuring reporting, evaluation, and sharing of supports and challenges to initiatives that endeavour to realize and promote parent engagement in math.

Through extensive collaboration with the purposefully selected partners of this project, the research team collaborated with the schools to create customized plans to be carried out by each school action team in order to implement, self-assess, and evaluate parent engagement. Ultimately, the research team liaised with all participants to conduct multiple case studies that investigated and recorded meaningful moments and outcomes of this study.

It is these case studies and the materials generated by all collaborators that will populate the website so that others might have unrestricted access to the wide array of resources, ranging from surveys and templates to tip sheets and social media-ready interactive mathematics posts.

We also learned much about the conditions and supports that sustain practices geared toward eliminating barriers and creating positive school climates around mathematics teaching and learning, which are two of the strategies that are a focus of the Ontario Ministry of Education’s policy document, *Parents in Partnership* (2010). Specifically, schools are required to:

- foster and sustain a positive, welcoming school climate in which parent perspectives are encouraged, valued, and heard
- identify and remove barriers to parent engagement that may prevent some parents from fully participating in their children’s learning, and to reflect the diversity of our students and communities

As the six schools began this project, the knowledge they held of their parent communities was instrumental in shaping what strategies they might adopt to engage with their parent cohorts.

Many of the initial considerations came from their pre-existing knowledge of their parent community, especially in regard to what strategies might be welcomed or rejected by parents. To be successful in designing and implementing mathematics outreach activities and programs that met the individual needs of staff, students, and families, the school teams asked the parent community for input and suggestions, and reflected critically about their communities in order to design unique plans for parent engagement in mathematics that included implicit goals of inclusion, respect, building parental confidence, mutual support, and trust.

For one rural school, a critical component was to understand the diversity of its students’ family demographics, and how this shaped communication and planning of activities suited to its particular climate. Knowing that many of the parents worked in a nearby city, and many grandparents assumed active, daily childcare roles within family units, one project school invited these extended family members to its math games event, held in the afternoon to accommodate seniors’ schedules and driving preferences. Grandparents and other family members appreciated the event, sharing their gratitude for being made so welcome in the school, and for the opportunity to ascertain how math-based games supported the children’s learning.

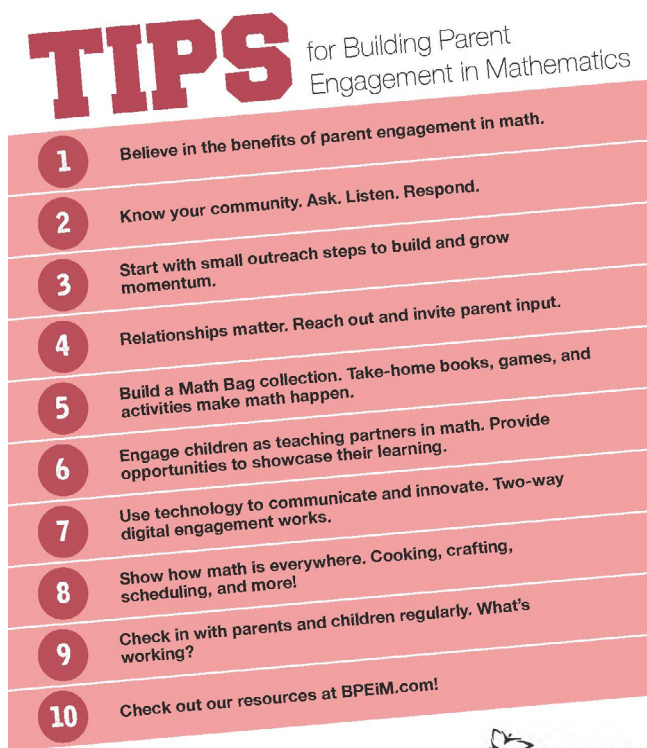


Figure 2: An example tip sheet from the “Getting Started” collection from the BPEiM project



Figure 3: Grandparents and Games was an afternoon event held at Prince Charles School, Verona. Every family took home a set of Uno cards to continue the experience at home.

In the second strand of the Parents in Partnership policy, schools are required to identify and remove barriers that might prevent some parents from fully participating in their children's learning. In addition, schools are called on to reflect the diversity of their student and parent communities. In the *Building Parent Engagement in Math* project, two schools responded to this requirement by adopting a longer-term structured approach that allowed their English as a Second Language (ESL) parents time to develop confidence in the school's parent-engagement initiatives and by producing materials in both English and Arabic. An example of a social media post in both languages is shown in Figures 3a and 3b below.

Math Games

Prepared by the BPEIM Action Team at Immaculate Conception School

Addition Mind Reader

Players:

- 3 players

Materials:

- deck of cards (with face cards removed)
- white board
- dry erase marker

Instructions:

1. Decide which two players will be the mind readers and which player will be the sum leader.
2. Each mind reader takes one card without looking at the card and without looking at the other mind reader's card.
3. Both mind readers will place the card on their foreheads with the number facing the sum leader.
4. The sum leader writes the sum on the white board. Both mind readers have to guess the numbers (cards) they are holding on their foreheads.
5. The mind reader who guesses first becomes the sum leader.

Notes:

- Face cards can be added to the deck and assigned a value (e.g., Jack = 10).
- Subtraction, multiplication and division are also options for this game.

Figure 3a: An example of a social media post developed by a project school for a weekly math challenge for families in its school community

Math Games

Prepared by the BPEIM Action Team at Immaculate Conception School

قارئ الفكر

اللاعبين:

ثلاث لاعبين

المواد:

مجموعة ورق لعب واحد (إزالة الأوراق المحتوية على صورة)

• لوحة بيضاء

• قلم رصاص

التعليمات:

1. اخذ لاعبين يكونون قارئين الأفكار ولاعب آخر قائد الجمع.
2. كل قارئ فكر يسحب كرت بدون النظر عليه وبدون النظر على كرت قارئ الفكر الآخر.
3. كلا قارئين الأفكار يضعون الكرت على جبينهم بحيث يمكن لقائد الجمع قرائته.
4. يكتب قائد الجمع المجموع على لوحة بيضاء. كل قارئ على يجب ان يخمن الرقم الذي على جبينه.
5. أول قارئ فكر يحزر الرقم الصحيح يصبح قائد الجمع.

ملاحظات:

• يمكن استعمال الكروت المحتوية على صورة واضافتها الى مجموعة الأوراق مع تحديد قيمه لكل منها.

• على سبيل المثال الكارت المحتوي على صورة الولد يمكن تمثيله ب رقم عشرة

• الطرح والضرب والقسمة هيه من الخيارات الاخرى لهذه اللعبة

Figure 3b: An example of a social media post developed by a project school for a weekly math challenge for families in its school community, which has been translated into Arabic in order to extend the "reach" of the communication

In the case of this school, the impact of the mathematics outreach program was profound:

We have a big ESL demographic here. In our Grades 1 to 3, 90 percent are newcomers between the last one to five years of being here, 90 percent of those who came and participated in our math events. It made them comfortable to come into the school and talk about it. They are seeing the teachers more often. We had two sessions a month and they seemed to really value this. It has built great relationships among the students, parents, and teachers. This project has been so valuable for our school, especially with getting parents involved here. Some of them still feel intimidated coming into school, especially because there is that language barrier; they feel they can't communicate to us what they want to know, or what they want to ask. But now, since they have come to those sessions, many of them we see them weekly, sometimes three times per week, and they are comfortable seeing us now. The knock-on effect in our relationships is really noticeable (school principal).

While it is impossible to capture all of the findings of this two-year project, the website will be a virtual repository, introducing our team and our schools; sharing our findings from the project through technical reports, infographics, monographs, scholarly papers, and slides from conference presentations; offering research-based suggestions for getting started by describing best practices from the six project schools; presenting detailed case studies of each school's particular successes in different areas of parental engagement in math; and sharing field-tested resources for

school teams, parent councils, educators, and parents.

The Building Parent Engagement in Mathematics project hopes that by sharing its materials with concrete practices that foster productive parent engagement and parent-school partnerships in mathematics, the claim can be challenged.

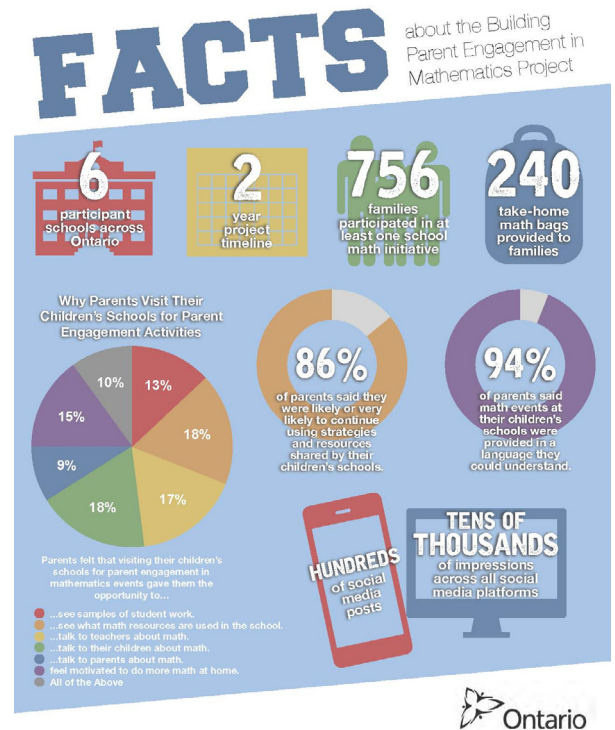


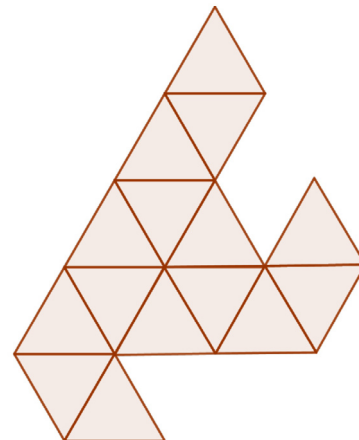
Figure 4. An infographic summarizing the impact of the Building Parent Engagement in Math project

Reference

Ontario Ministry of Education. (2010). *Parents in partnership: A parent engagement policy for Ontario schools*. Toronto, ON: Queen's Printer for Ontario.

Icebreaker 2 Puzzle

Your task is to break this iceberg (i.e., collection of triangles) into four identical shapes!



Reproduced with permission of copyright owner. Further reproduction prohibited without permission.