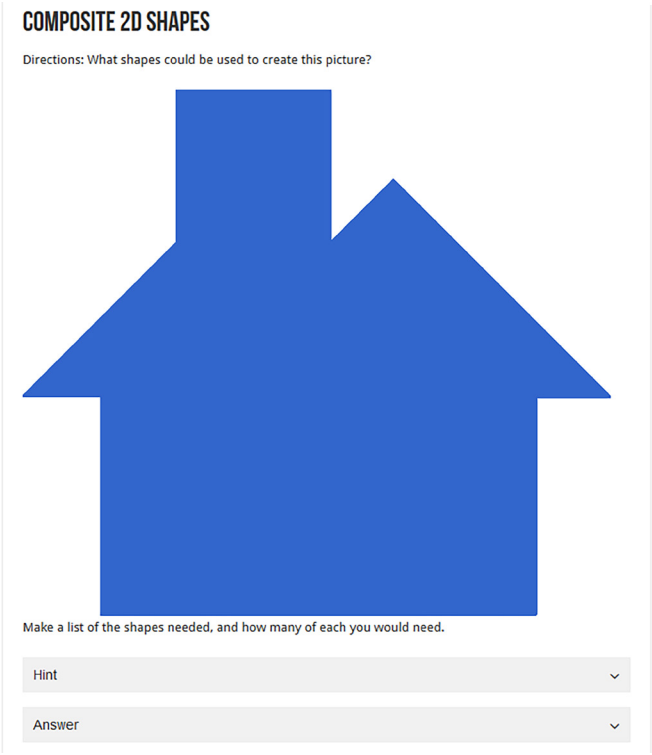
Problems from Open Middle

Lorelei Boschman

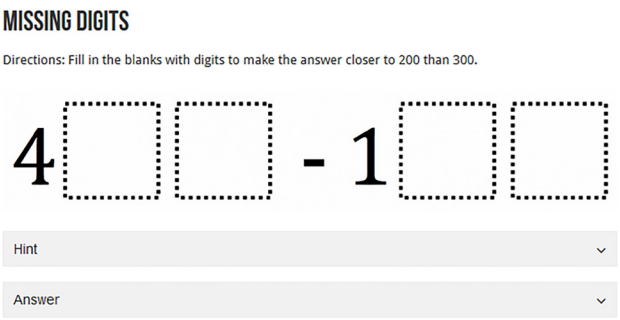
The website Open Middle (www.openmiddle.com) contains some great problem-solving moments for all grades. The website's tagline is "Challenging math problems worth solving," and that is a great description. What an amazing collection of math problems to give to your students today! The problems are categorized by grade level (from kindergarten to high school), as well as by mathematical area of focus. Read on for examples from Grades 1, 3, 6 and 8 and high school.

For Grade 1 (geometry), we have this problem on composite two-dimensional shapes.



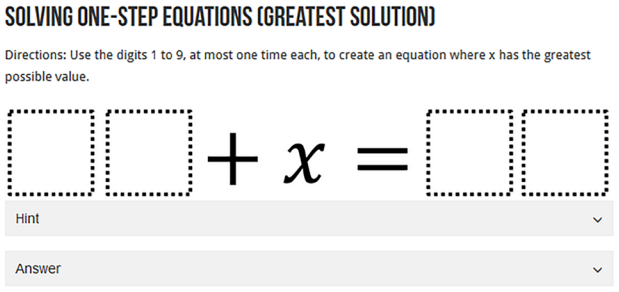
Source: Bryan Anderson, Open Middle, www.openmiddle.com/composite-2d-shapes/. Licensed under CC BY-NC-SA 4.0 (https://creativecommons.org/licenses/by-nc-sa/4.0/).

Here is a problem for Grade 3 (number and operations in base 10).



Source: Marilyn Burns and Graham Fletcher, Open Middle, www.openmiddle.com/missing-digits/. Licensed under CC BY-NC-SA 4.0 (https://creativecommons.org/licenses/by-nc-sa/4.0/).

Here's one from Grade 6 (expressions and equations).

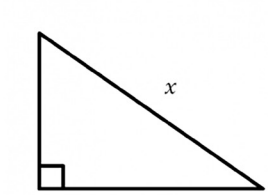


Source: Robert Kaplinsky, Open Middle, www.openmiddle.com/solving-one-step-equations-greatest-solution/. Licensed under CC BY-NC-SA 4.0 (https://creativecommons.org/licenses/by-nc-sa/4.0/).

Here is one from Grade 8 (the number system).

PYTHAGOREAN THEOREM

Directions: What could the lengths of the legs be such that the lengths of the legs are integers and x is an irrational number between 5 and 7?



Hint

Answer

Source: Daniel Luevanos, Open Middle, www.openmiddle.com/pythagorean-theorem-prob/. Licensed under CC BY-NC-SA 4.0 (https://creativecommons.org/licenses/by-nc-sa/4.0/).

The last problem is for high school (functions).

DISCRIMINANT

Directions: Using the digits 0 to 9 at most one time each, fill in the boxes to make one function have no real roots, another function have one real root, and the last function have two real roots.

$$y = \square x^2 + \square x + \square$$
$$y = \square x^2 + \square x + \square$$
$$y = \square x^2 + \square x + \square$$

Hint

Answer

Source: Lynda Chung, Open Middle, www.openmiddle.com/discriminant/. Licensed under CC BY-NC-SA 4.0 (https://creativecommons.org/licenses/by-nc-sa/4.0/).

Open Middle is worth browsing through. Most of the problems can be used immediately and as is with your students. Hints and answers are provided, as is a worksheet that students can use to think through their attempts at solving a problem. Make sure to look at the problems for other grades, as some problems are applicable for many grades.

These problems would make great cooperative learning explorations. How could you incorporate at least one or more of these per week in your classroom?

Lorelei Boschman received her bachelor of education and master of education degrees from the University of Lethbridge. She is the education coordinator at Medicine Hat College, facilitating the four-year bachelor of education program (a collaborative degree program with Mount Royal University) and instructing a variety of postsecondary courses with a mathematics focus. Previously, she taught K–8 at a rural school and spent 21 years teaching high school mathematics. Mathematics education is her passion and life work, and she has been involved in many local and provincial initiatives.