

Problem solving challenge #6

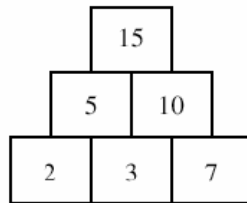
1.

Number Towers

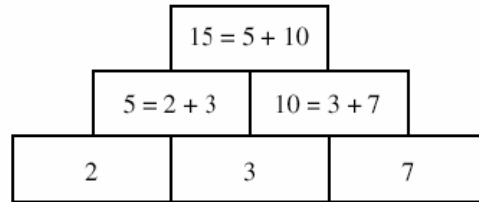
This problem gives you the chance to:

- form and solve equations obtained from a number pattern
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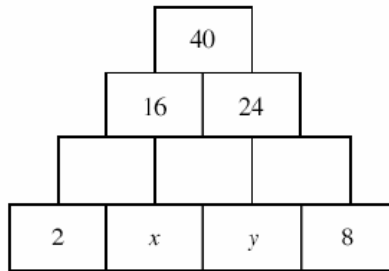
An addition number tower is shown below.



In this tower, each number is the sum of the two numbers just below it.

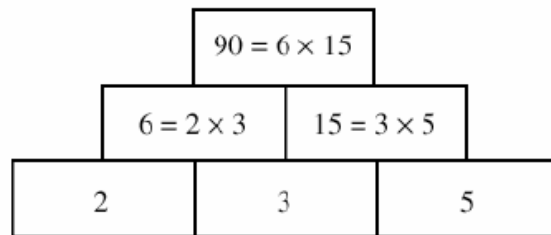
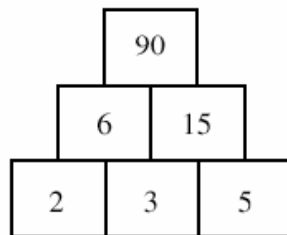


Marcie makes a bigger number tower:

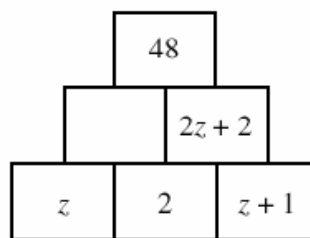


1. Complete the number tower by writing algebraic expressions in the empty boxes.
2. Use the completed number tower to show that $2x + y = 14$ and $x + 2y = 16$.
3. Find values of x and y that satisfy both equations: $2x + y = 14$ and $x + 2y = 16$.

Marcie also designs a **multiplication** number tower.



Look at the multiplication tower below.



4. Complete the multiplication tower by writing an algebraic expression in the empty box.

5. Use the completed multiplication tower to show that $4z^2 + 4z = 48$.

6. Find the possible values of z in $4z^2 + 4z = 48$.