1 Cubes

Example 1.1: Sample Problem

How many times would a piece of paper need to be folded in half to create 256 layers?

Example 1.2: Sample Problem

Simplify the expressions.

(a) $\dfrac{(-1)^{93} \cdot (-1)^{94} \cdot (-1)^{95}}{(-1)^{96} \cdot (-1)^{97}}$

(b) $\dfrac{5^4 + 5^4 + 5^4 + 5^4}{5^5}$

Example 1.3: Sample Problem

(MATHCOUNTS) Susan's calculator has a key that replaces the number displayed with its cube. If a 2 is displayed, how many times must Susan press the "cubing" key to display a number that is greater than 10^9?

Example 1.4: Sample Problem

Multiply and simplify.

a. $(\sqrt{2} + \sqrt{3}) \cdot (\sqrt{2} + \sqrt{3})$

b. $(5 + \sqrt{5}) \cdot (5 + \sqrt{5})$

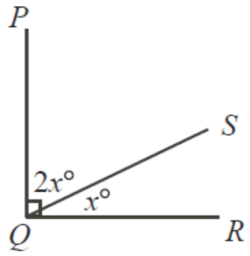
c. $(\sqrt{2} + 1) \cdot (\sqrt{2} - 1)$

Example 1.5: Sample Problem

If n is an integer, and $13 < n\sqrt{11} < 14$, then what is n?

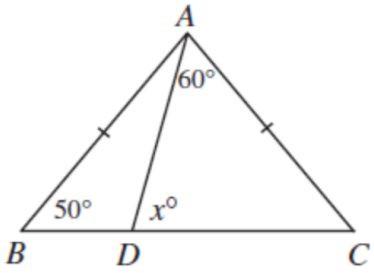
Example 1.6: Sample Problem

In the diagram, $\angle PQR = 90°$. What is the value of x?



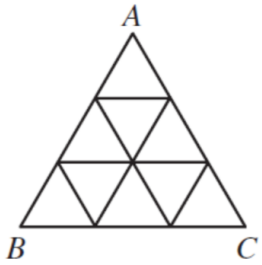
Example 1.7: Sample Problem

In the diagram, triangle ABC is isosceles, with $AB = AC$. If $\angle ABC = 50°$ and $\angle DAC = 60°$, the value of x is



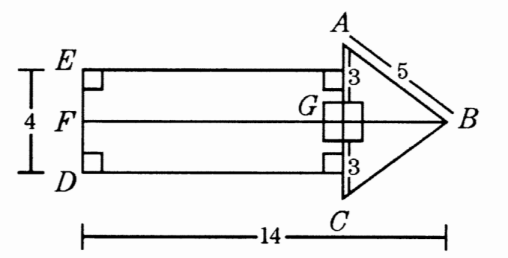
Example 1.8: Sample Problem

ΔABC is constructed from nine small, equilateral triangles, as shown. If the perimeter of each of the nine small triangles is 6 cm, then the perimeter of ΔABC, in cm, is



Example 1.9: Sample Problem

In the diagram, $GC = AG = 3, ED = 4, BF = 14$ and $AB = 5$. What is the number of square units in the area of the region covered by the arrow?



Example 1.10: Sample Problem

Jamie has 2 dimes, 4 nickels and 8 pennies. In how many different ways can she make 26 cents?