

Student Name: _____

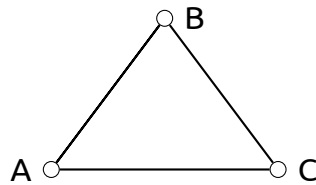
Please write your name on *every* page.

Section D

D1

Isosceles triangle ABC has $AB = BC \neq CA$, and its base CA is its longest side. All sides have lengths that are positive integers. If its perimeter is 16 units, what is its height?

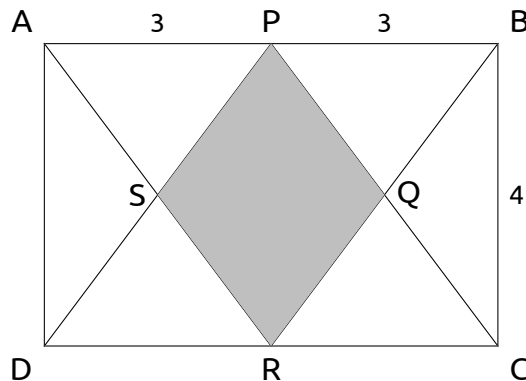
Note: An isosceles triangle is a triangle with at least two sides of equal length.



Answer to D1: _____

D2

In rectangle ABCD, $AB = 6$ and $BC = 4$. P is the midpoint of AB and R is the midpoint of CD. If PC and BR intersect at Q and AR and PD intersect at S, what is the area of PQRS?



Answer to D2: _____

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D3

During a sale, the price of a book is discounted 20%. By how much (as a percentage of the new price) must that be increased to return the book to its usual price?

Answer to D3: _____

D4

There are 48 tourists in a group. All of them can speak at least one of Spanish and French. 26 of them can speak Spanish and 31 can speak French. How many tourists can speak both Spanish and French?

Answer to D4: _____

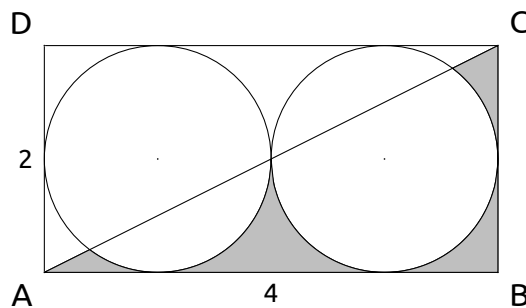
D5

The side length of a blue cube is $\frac{3}{4}$ the side length of a red cube. What is the ratio of the volume of the blue cube to the volume of the red cube?

Answer to D5: _____

D6

Rectangle ABCD has length 4 and width 2. Two circles of radius 1 are drawn inside the rectangle as shown below. Find the area of the shaded region.



Answer to D6: _____

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D7

What is the area of an equilateral triangle with height 3? Write your answer in the form $a\sqrt{b}$ where a and b are positive integers, and b is as small as possible.

Answer to D7: _____

D8

A calendar date is called *productive* if the product of its day and month is equal to the last two digits of its year. For example, 2016-04-04 (April 4, 2016) is productive since $4 \times 4 = 16$. How many dates between January 1, 2000 and December 31, 2999 are productive?

Answer to D8: _____