

Put your name and school on each page – the exam is separated for grading, thank you.

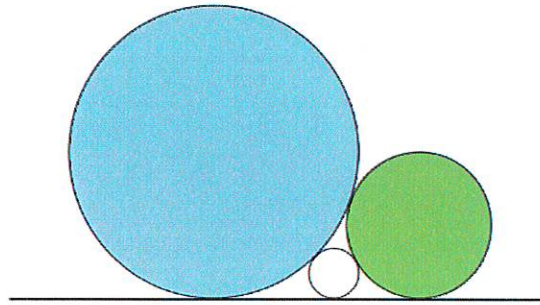
Name: _____

#1

School: _____

Advanced 2019

1. The blue circle's radius is 4 and the green circle's radius is 2. The line is tangent to all three circles, and the three circles touch each other (they are pairwise tangent). What is the radius of the white circle in simplified form?



Name: _____

#2

School: _____

Advanced 2019

2. A rectangle is subdivided into four rectangular regions. The area of each region is shown below. Find the area of the missing region.

6	14
??	35

(not to scale)

Name: _____

#3

School: _____

Advanced 2019

3. Solve the system of linear equations. Write your solution as an ordered triple.

$$\begin{cases} 3x - 5y + 5z = 1 \\ 5x - 2y + 3z = 0 \\ 7x - y + 3z = 0 \end{cases}$$

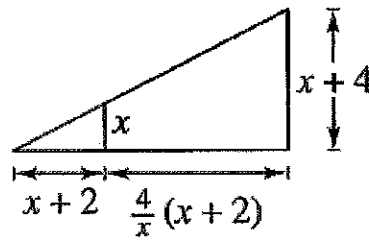
Name: _____

#4

School: _____

Advanced 2019

4. Consider an experiment in which a marble is tossed into a box whose base is shown in the figure below. The probability that the marble will come to rest in the shaded portion of the box is equal to the ratio of the shaded area to the total area of the figure. Find the probability in terms of x in simplified form.



Name: _____

#5

School: _____

Advanced 2019

5. Find ALL the zeros of $x^5 + x^3 + 2x^2 - 12x + 8$.