

Bergen County Mathematics League

Good Luck To You



Good Luck To All

Contest #6 (Calculators Allowed)

2017-2018

Part I *Time Limit: 12 minutes*

Answers must be exact *or* have 4 (or more) significant digits, correctly rounded.

6-1. What is the value of $-\log_2 \log_2 \sqrt{\sqrt{2}}$?

6-2. Assume that the hands of an accurately set 12-hour analog clock move smoothly and accurately. At exactly how many minutes past 4 o'clock will the minute hand first catch up to the hour hand?

Part II *Time Limit: 12 minutes*

6-3. The perimeter of one square is 36 more than the perimeter of a second square, and the area of the first square is 243 more than the area of the second. What is the length of a side of the larger square?

6-4. The smallest of three consecutive positive even integers, x , is divisible by 5, the next is divisible by 7, and the largest of the three is divisible by 9. If $x < 900$, what is the value of x ?

Part III *Time Limit: 12 minutes*

6-5. For what value of x can a club achieve a membership ratio of 2 adults for each minor either by inducting 24 adults or by expelling x minors?

6-6. What is the degree-measure of the least positive angle x which satisfies

$$\frac{1 + \sin 40^\circ - \cos 40^\circ}{1 + \sin 40^\circ + \cos 40^\circ} = \tan x?$$

Answers

6-1. 3

6-2. $21 \frac{9}{11}$

6-3. 18

6-4. 320

6-5. 12

6-6. 20 or 20°