



## MONTGOMERY COUNTY MATHEMATICS LEAGUE

Individual for Contest # 6

(No Calculators)

2014-2015

Time: 10 minutes

1. Of three positive integers, the second is twice the first and the third is twice the second. One of these integers is 17 more than another. Find the sum of the three integers.
  2. Express  $x^8 - 14x^4 + 25$  as a product of two fourth degree polynomials with integer coefficients.
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Time: 10 minutes

3. In isosceles triangle  $ABC$  with  $AB = AC$ ,  $E$  is the trisection point of base  $\overline{BC}$  nearer  $B$ . The parallel to  $\overline{AB}$  through  $E$  intersects  $\overline{AC}$  at  $F$ . If  $AB = 12$ , find  $FC$ .
  4. Three different numbers are randomly selected from among the first ten positive integers. Find the probability that the sum of these three numbers is 15.
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Time: 10 minutes

5. In attempting to cross a stream at a right angle to the current, a man finds that at his fastest speed, he lands 3 miles downstream from the point directly opposite his starting point. If the width of the stream is 4 miles and the rate of the current is 5 miles an hour, how fast (in miles per hour) can the man row in still water?
6. Secants  $\overline{EDC}$  and  $\overline{EBA}$  intersect circle  $O$ , making  $\overline{AB}$  a diameter and  $\overline{CD}$  a chord. If  $AB = 2DE$ , and  $m\angle E = 18$ , find  $m\angle COA$ .