Practice Fermat Number 3

1. The largest angle in a scalene triangle is 75° . The other 2 angles, when measured in degrees, are integers. Determine the smallest possible value of the smallest angle in the triangle, in degrees

   a) 29 b) 1 c) 15 d) 31 e) 59

2. Four positive integers, a, b, c and d satisfy the relations $5a = 3b$, $2b = 3c$ and $2c = d$. The smallest possible sum $a + b + c + d$ is:

   a) 24 b) 36 c) 52 d) 64 e) 54

3. If $a^2 + b^2 = 89$ and $ab = 40$ a possible value for $a - b$ is:

   a) 2 b) 3 c) 5 d) 8 e) 13

4. The smallest integer N so that the product of 432 and N is a perfect square is

   a) 2 b) 3 c) 6 d) 12 e) 48

5. Triangle ABC has $AB = 24$ and $AC = 36$. Points D and E are chosen on AC and AB respectively so that $AD = 24$ and $AE = 16$. What is the ratio of the area of $\triangle AED$ to the area of $\triangle ABC$?

   a) 2:3 b) 3:7 c) 4:9 d) 5:13 e) 6:17

6. If a, b, c, and d are digits and "ab" $\times$ "cb" = "ddd" determine the sum "ab" + "cb".
   (Note: "ab" is the 2 digit number with digits a and b.)

   a) 49 b) 52 c) 64 d) 72 e) 80

7. There are integer values of a and b such that the quadratic equation $x^2 + ax + b = 0$ has distinct roots a and b. Determine $a + b$

   a) -1 b) 0 c) 1 d) 2 e) 3

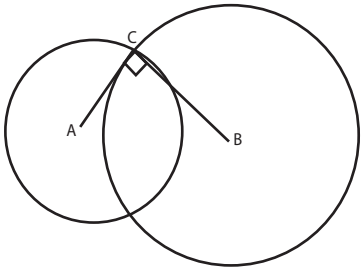
8. Which of the following has the largest area?

   a) A square of side 3.5.
   b) A rectangle of length 4 and width 3.
   c) A triangle with sides 5, 5 and 6.
   d) A trapezoid with sides 3, 2, 3 and 6 where the parallel sides are of length 2 and 6.
   e) A semicircle of radius 3

9. Determine the number divisors of 30^{30} that are perfect squares , including 1 and the number itself.

   a) 4096 b) 3375 c) 29791 d) 1024 e) 900

10. Two circles intersect perpendicularly. In other words, if C is a point of intersection and A and B are the centres of the 2 circles, then the radii AC and BC are perpendicular to each other. If the radii of the circles are 3 and $\sqrt{3}$ what is their area of overlap?



a) $\frac{5}{2}\pi - 3\sqrt{3}$ b) $\frac{7}{2}\pi - 4\sqrt{3}$ c) $\frac{9}{2}\pi - 5\sqrt{3}$ d) $\frac{5}{2}\pi - 2\sqrt{3}$ e) $\frac{7}{2}\pi - 3\sqrt{3}$