## Practice Fermat Number 4

1. What is one-half of $1.0 \times 10^{24}$?

   a) $5.0 \times 10^{11}$ b) $1.0 \times 10^{12}$ c) $5.0 \times 10^{23}$ d) $5.0 \times 10^{24}$ e) $1.0 \times 10^{11}$.

2. For how many different values of $a$ does $\sqrt{a+16} = \sqrt{a} + 4$

   a) 0 b) 1 c) 2 d) 3 e) infinitely many

3. If $x^3y^2 = 32$ and $x^2y^3 = 243$ determine $xy$

   a) $\sqrt[5]{1024}$ b) $\sqrt[5]{3125}$ c) 6 d) 5.5 e) $\sqrt[5]{16800}$

4. If $x$ and $y$ are positive integers such that $x^2 - 2xy - 3y^2 = 21$ then the largest possible value for $x$ is in the range

   a) $x < 10$ b) $10 \leq x < 20$ c) $20 \leq x < 30$ d) $30 \leq x < 40$ e) $40 \leq x$

5. In the sequence of terms $a_1, a_2, a_3, a_4, a_5, \ldots$ we have $a_k = 2a_{k-1} - a_{k-2}$ for $k > 2$. If $a_1 = 5$ and $a_2 = 11$ determine $a_{100}$

   a) 401 b) 499 c) 594 d) 599 e) 605

6. The point $P(a, b)$ on the line $2x + 5y - 35 = 0$ is the same distance from each of the points $(7, -4)$ and $(-4, 7)$. The value of $a + b$ is

   a) 3 b) 7 c) 10 d) 13 e) 17.5

7. How many 6 digit numbers are there whose digits sum to 51?

   a) 3 b) 6 c) 20 d) 36 e) 56

8. In a cube of edge length 4 the centers of the 6 faces form an octahedron. What is the sum of the lengths of the edges of the octahedron?

   a) 24 b) $48\sqrt{2}$ c) $24\sqrt{3}$ d) $24\sqrt{2}$ e) 48

9. A circle of radius 2 cm rolls along the inside of an equilateral triangle of perimeter 36 cm . Determine, to the nearest cm, the perimeter of the triangle traced out by the center of the circle.

   a) 12cm b) 13cm c) 14cm d) 15cm e) 16cm

10. A rectangular table $PQRS$, has length $PQ$ 7 units and width $QR$ 4 units. A ball is rolled from point $P$ at 45 degrees to $PQ$ and bounces off $SR$. The ball continues to bounce off sides at 45 degrees until it reaches one of the corners $P$, $Q$, $R$, or $S$. How far will the ball travel?

    a) $11\sqrt{2}$ b) $10\sqrt{2}$ c) $56\sqrt{2}$ d) $27\sqrt{2}$ e) $28\sqrt{2}$