1. The value of $\dfrac{1001^2 \quad 999^2}{101^2 - 99^2}$ is

   (A) 1 (B) 10 (C) 20 (D) 40 (E) 100

2. Let S be the set of three-digit numbers where all the digits are equal to 1 or 2. Find the sum of all numbers in S.

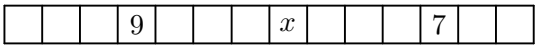
   (A) 1332 (B) 333 (C) 999 (D) 666 (E) 1665

3. How many of the following numbers are greater than 10?

   $$3\sqrt{11}, \quad 4\sqrt{7}, \quad 5\sqrt{5}, \quad 6\sqrt{3}, \quad 7\sqrt{2}.$$

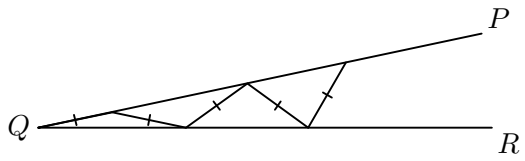
   (A) 1 (B) 3 (C) 5 (D) 4 (E) 2

4. The 14 digits of a credit card are to be written in the boxes below. If the sum of any three consecutive digits is 20, then the value of x is

   (A) 3 (B) 4 (C) 5 (D) 7 (E) 9

5. In the diagram below, $\angle PQR = 12°$, and a sequence of isosceles triangles is drawn as shown.

   What is the largest number of isosceles triangles that can be drawn?

   (A) 8 (B) 4 (C) 5 (D) 7 (E) 6

6. The numbers a, b, c, d, and e are equal to the numbers 1, 2, 3, 4, and 5 in some order. The largest possible value of $ab + bc + cd + de$ is

   (A) 40 (B) 43 (C) 45 (D) 46 (E) 49

7. If $x^2 = 3x + 1$, then x^3 is equal to

   (A) $10x + 3$ (B) $4x + 1$ (C) $4x + 3$ (D) $13x + 3$ (E) $10x + 1$

8. Two numbers x and y satisfy three of the following equations but not the remaining equation. What is the value of x?

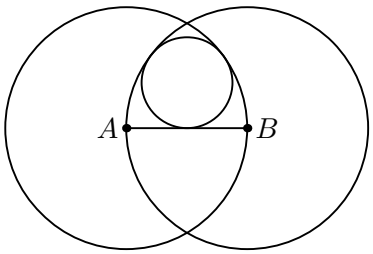
   $$x + y = 63, \quad x \quad y = 47, \quad xy = 392, \quad x/y = 8.$$

   (A) 7 (B) 8 (C) $\frac{196}{3}$ (D) 55 (E) 56

9. If a and b are real numbers such that $0 < a < b$ and $a^2 + b^2 = 6ab$, then $\dfrac{a+b}{a-b}$ is equal to

   (A) $\sqrt{2}$ (B) $2\sqrt{2}$ (C) $2\sqrt{2}$ (D) $-\sqrt{2}$ (E) $\sqrt{6}$

10. The distance between the points A and B is 2. The circle with center A and radius 2 is drawn, as well as the circle with center B and radius 2. A third circle is drawn that is tangent to both circles, and segment $\overline{AB}$, as shown below. Find the area of this third circle.

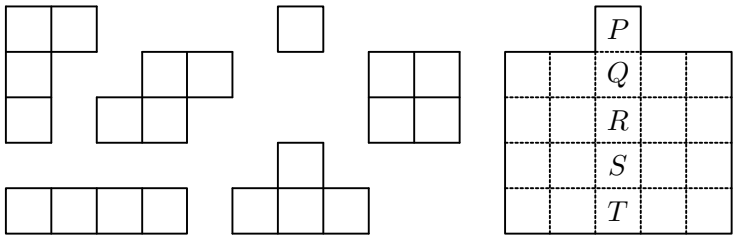


   (A) $\frac{9\pi}{16}$ (B) $\frac{3}{4}$ (C) $\frac{5\pi}{8}$ (D) $\frac{3}{8}$ (E) $\frac{7\pi}{8}$

11. If $x = \sec \quad + \tan\theta$ and $y = \sec\theta - \tan \quad$, then which of the following is true for all values of θ for which x and y are defined?

   (A) $x + y = 2$ (B) $xy = 1$ (C) $x^2 + y^2 = 2$
   (D) $x^2 + y^2 = 1$ (E) $x - y = 2$

12. The six tiles on the left can be re-arranged to completely cover the shape on the right, without overlap. The tiles may be rotated and/or reflected. Which square must the tile consisting of one unit square cover?



   (A) P (B) Q (C) R (D) S (E) T

13. When the expression

$$(x_1 + x_2 + x_3 + x_4 + \cdots + x_9 + x_{10})(x_1 - x_2 + x_3 - x_4 + \cdots + x_9 - x_{10})$$

   is expanded and simplified, how many different terms appear?

   (A) 20 (B) 25 (C) 30 (D) 35 (E) 50

14. The least common multiple of $10! \cdot 18!$ and $12! \cdot 17!$ is

   (A) $\dfrac{18! \quad 12!}{6!}$ (B) $18! \cdot 17!$ (C) $\dfrac{12! \cdot 18!}{3!}$ (D) $12! \quad 18!$ (E) $\dfrac{18! \cdot 17!}{6!}$

15. When the product $1 \quad 3 \times 5 \times 7 \qquad 99$ is written as a number, its tens digit is

   (A) 2 (B) 7 (C) 5 (D) 0 (E) 3