

- Christine deposited $\frac{3}{5}$ of her savings into account A yielding 4% interest and she invested the rest into account B, yielding 3% interest. The interest earned in account A was 240 dollar higher than the interest earned in account B. How much money did she invest?
(A) \$10,000 (B) \$20,000 (C) \$40,000 (D) \$120,000 (E) cannot be determined
- The pages of a book are numbered 1 through 2017. How many times does the digit 7 occur?
(A) 602 (B) 202 (C) 402 (D) 405 (E) 302
- Suppose that a and b are distinct real numbers such that each of them is one less than its reciprocal. What is their sum $a + b$?
(A) -1 (B) 1 (C) 0 (D) $\frac{1}{2}$ (E) $-\frac{1}{2}$
- Let $a \neq 1$ be a positive number. Calculate $I = \log_{\sqrt{a}} a$.
(A) $I = \frac{1}{2}$ (B) $I = 0$. (C) $I = -2$. (D) $I = 2$. (E) $I = -\frac{1}{2}$
- What is the biggest whole number smaller than $\sqrt{2^{100} + 10^{10}}$?
(A) 2^{50} (B) $2^{50} + 1$ (C) $2^{50} + 10^5 - 1$ (D) $2^{50} + 10^5$ (E) $2^{50} + 10^5 + 1$
- Which of these numbers is the largest?
(A) 10^{30000} (B) 3^{60000} (C) 2^{100000} (D) 1000^{1000} (E) $1000!$
- Cities A and B are 160 miles apart. One car is traveling from city A toward city B, while a motorbike is simultaneously traveling the opposite direction, from city B toward city A. Two hours after the departure of both vehicles they meet somewhere in between, at point C. If motorbike's speed is $\frac{3}{5}$ of the car's speed, find the distance of point C from city A.
(A) 30 miles (B) 50 miles (C) 60 miles (D) 100 miles (E) 120 miles

8. The fifth term of an arithmetic sequence is 49 and the difference between successive terms of the sequence is 8. What is the sum of the first 20 terms of the sequence?
- (A) 177 (B) 500 (C) 1689 (D) 1860 (E) 2050
9. Jack and Lee walk around a circular track. It takes Jack and Lee respectively 6 and 10 minutes to finish each lap. They start at the same time, at the same point on the track, and walk in the same direction around the track. After how many minutes will they be at the same spot again (not necessarily at the starting point) for the first time after they start walking?
- (A) 15 (B) 16 (C) 30 (D) 8 (E) 60
10. The polynomial $p(x) = x^4 + 2x^3 + ax^2 + 5x + b$ is divisible by $x^2 + x - 6$ for certain values of a and b . What is the sum of a and b ?
- (A) -60 (B) 72 (C) -54 (D) 58 (E) -72
11. A man traveled from A to B at 40 miles an hour and then from B to A at 60 miles an hour. What was his average speed (in miles per hour) during the entire journey?
- (A) 46 (B) 48 (C) 50 (D) 52 (E) 54
12. How many real number solutions to $\sqrt{1 + \sqrt{x}} = x - 1$?
- (A) 0 (B) 1 (C) 2 (D) 3 (E) 4
13. There are three digits A, B and C such that
- $$AB + CB = BBA.$$
- What is their sum?
- (A) 8 (B) 9 (C) 10 (D) 11 (E) 12

14. Let n be a positive integer. Which of the numbers $\{1, 2, 3, 5, 6\}$ need not divide evenly into $n^3 + 5n$?
- (A) 1 (B) 2 (C) 3 (D) 5 (E) 6
15. Find digit values for the letters T, W, O, E, I, G, and H so that $2(TW0)^2 = EIGH T$. What is the value of O?
- (A) 4 (B) 5 (C) 6 (D) 8 (E) 9
16. Every integer has a nonary (Base 9) representation using only the digits $0, 1, \dots, 8$. Let $f(x) = (2x + 3)^2(x^4)$. What is the sum of the digits of the nonary representation of $f(9)$?
- (A) 8 (B) 9 (C) 10 (D) 11 (E) more than 11
17. Three integers a, b and c satisfy both $0 \leq a \leq b \leq c$ and
- $$abc + ab + ac + bc + a + b + c = 848.$$
- What is the smallest possible value of $a + b + c$?
- (A) 176 (B) 282 (C) 424 (D) 848 (E) There are no such triplets.
18. Find the minimum of $x_1^2 + x_2^2 + x_3^2 - x_1x_2 - x_1x_3 - x_2x_3$ as x_1, x_2 , and x_3 range over all real numbers, independently.
- (A) 0 (B) 2 (C) 1 (D) -1 (E) -2
19. The roots of the equation $x^3 - ax^2 + 5x - 1 = 0$ have the property that for each root r its multiplicative inverse $1/r$ is also a root. What is the value of a ?
- (A) 0 (B) -2 (C) 5 (D) 1 (E) 2
20. What is the last digit of the number 7^{7^7} ?
- (A) 1 (B) 7 (C) 9 (D) 3 (E) 8