

1. What is the largest 3-digit integer that is divisible by 8 and is a multiple of 5 ?
 - A. 800
 - B. 850
 - C. 910
 - D. 960
 - E. 990
2. What is the lowest positive common multiple of 14 and 50 ?
 - A. 350
 - B. 150
 - C. 700
 - D. 1050
 - E. 400
3. Two numbers have a greatest common factor of 6 and a least common multiple of 36. Which of the following pairs could they be?
 - A. 18 and 36
 - B. 6 and 12
 - C. 6 and 18
 - D. 12 and 18
 - E. 12 and 36
4. One bell rings every 5 seconds. Another bell rings every 9 seconds. If they ring together and you start counting seconds, how many seconds will pass before the two bells ring together again?
 - A. 15
 - B. 30
 - C. 45
 - D. 60
 - E. 90
5. At the hardware store, screws come in packs of 15 and nuts come in packs of 18. If Alexa uses the same number of screws as nuts and uses all of the screws and nuts she buys, what is the minimum number of nuts she can use?
 - A. 3
 - B. 6
 - C. 30
 - D. 90
 - E. 270
6. Cib sells pens in packs of 6, and Kulmus sells pens in bundles of 8. If both sold the same number of pens last week, what is the smallest number of pens each could have sold?
 - A. 48
 - B. 24
 - C. 14
 - D. 12
 - E. 9
7. For all positive integers x , what is the greatest common factor of the two numbers $90x$ and $300x$?
 - A. 30
 - B. x
 - C. $10x$
 - D. $30x$
 - E. $900x$
8. The least common multiple (LCM) of 2 numbers is 1,300. The lesser of the 2 numbers is 50. What is the minimum value of the other number?
 - A. 2
 - B. 13
 - C. 52
 - D. 26
 - E. 260
9. What is the greatest common factor of 500; 1,000; and 12,500 ?
 - A. 5
 - B. 100
 - C. 125
 - D. 250
 - E. 500
10. The sum of 0.12 and 0.06 can be written as a fraction where the numerator and the denominator are both positive integers. When the numerator and the denominator are both divided by their greatest common factor, what is the sum of the numerator and the denominator of the resulting fraction?
 - A. 18
 - B. 59
 - C. 61
 - D. 118
 - E. 236

11. If the least common multiple of 7, 10, 14, and v is 420, which of the following could be v ?
- A. 14
B. 18
C. 42
D. 5
E. 35
12. What is the least common multiple of 25, 18, and 45?
- A. 90
B. 180
C. 360
D. 450
E. 18,000
13. If a is a factor of 36 and b is a factor of 45, the product of a and b could NOT be which of the following?
- A. 1620
B. 324
C. 90
D. 21
E. 1
14. What is the least common multiple of $8a^2$, 2, $3a$, $6b$, and $4ab$?
- A. $16a^3b$
B. $24a^2b$
C. $24a^3b$
D. $54a^2b$
E. $60a^3b$
15. Which is the greatest term that must be a factor of both a and b ?
- A. 0
B. 1
C. a
D. b
E. ab
16. What is the least common denominator of $\frac{4}{35}$, $\frac{1}{28}$, and $\frac{3}{8}$?
- A. 6
B. 35
C. 140
D. 280
E. 560
17. The least common multiple (LCM) of 2 numbers is 144. The greater of the 2 numbers is 72. What is the maximum value of the other number?
- A. 2
B. 8
C. 24
D. 36
E. 48
18. Which of the following is not a factor of 2002?
- A. 17
B. 14
C. 13
D. 11
E. 2

ANSWER KEY

1. D 2. A 3. D 4. C 5. D 6. B 7. D 8. C 9. E 10. B 11. C 12. D 13. D 14. B
 15. B 16. D 17. E 18. A

ANSWER EXPLANATIONS

- D.** The 3-digit integer is divisible by 8 and is a multiple of 5, so it is divisible by both 8 and 5. This means it can be written in the form $x = 40y$ because 40 is the LCM of 8 and 5. So, we want to find the largest multiple of 40 that is 3 digits or less than 999. We do this by taking $\frac{999}{40} = 24.975$, rounding this number down to 24, and then multiplying $40(24) = 960$.
- A.** We can compute the least common multiple of 14 and 50 by writing out the prime factorization of 14 and 50 and then multiplying each prime factor to the greatest power it appeared throughout the factorizations. We get $14 = 2 \cdot 7$ and $50 = 5^2 \cdot 2$. The greatest power each factor appears in each term turn out to be 5^2 , 7, and 2. So, the product of those factors are $5^2 \cdot 7 \cdot 2 = 25 \cdot 14 = 350$.
- D.** To find the least common factor and multiple for each pair, first reduce each term into its prime factors. For choice A, this produces $18 = 2 \cdot 3 \cdot 3$ and $36 = 2 \cdot 2 \cdot 3 \cdot 3$. Using the regular method for finding the GCF gives $18 = 2 \cdot 2 \cdot 3$, and using the regular method for finding the LCM gives $36 = 2 \cdot 2 \cdot 3 \cdot 3$. Applying this method to all the solutions reveals that D is the correct answer choice.
- C.** The bells will ring together when the time reaches a number of seconds that is a multiple of both 5 and 9. The smallest number that satisfies this is the least common multiple of 5 and 9, which is $5 \cdot 9 = 45$.
- D.** The minimum number of nuts that Alexa can use is the least common multiple of 15 and 18. The prime factorization of 15 is $3 \cdot 5$, and the prime factorization of 18 is $2 \cdot 3 \cdot 3$. 2 appears a maximum of 1 time, 3 appears a maximum of 2 times, and 5 appears a maximum of 1 time. Therefore the least common multiple is $2^1 3^2 5^1 = 2 \cdot 9 \cdot 5 = 90$.
- B.** If the two companies sell the same number of pens in different quantities, the minimum number of pens each sells will be the least common multiple of the different quantities. The least common multiple of 6 and 8 is $2 \cdot 2 \cdot 2 \cdot 3 = 24$.
- D.** The greatest common factor of two numbers is the product of all of the prime numbers common to both numbers' prime factorizations. The prime factorization of $90x$ is $2 \cdot 3 \cdot 3 \cdot 5 \cdot x$. The prime factorization of $300x$ is $2 \cdot 2 \cdot 3 \cdot 5 \cdot 5 \cdot x$. The product of the numbers in common to both is $2 \cdot 3 \cdot 5 \cdot x = 30x$. Note that, while x is included in the prime factorizations, it is not necessarily prime. However, whichever prime numbers make it up would be in common with each other, and thus are included altogether in the final answer as x .
- C.** If one of the numbers is 50, we can find the other simply as the quotient of $\frac{1300}{50} = 26$. However, this is less than 50, so we multiply it by two to get the first multiple greater than 50: 52.
- E.** The greatest common factor of the three numbers is the product of all of the prime numbers common to their prime factorizations. The prime factorization of 500 is $2 \cdot 2 \cdot 5 \cdot 5 \cdot 5$. The prime factorization of 1,000 is $2 \cdot 2 \cdot 2 \cdot 5 \cdot 5 \cdot 5$. The prime factorization of 12,500 is $2 \cdot 2 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5$. The product of the numbers common to all factorizations is $2 \cdot 2 \cdot 5 \cdot 5 \cdot 5 = 500$.
- B.** The sum of 0.12 and 0.06 is 0.18. It can be expressed as $\frac{18}{100}$. The greatest common factor of 18 and 100 is 2. Thus, dividing both by their greatest common factor gives us $\frac{9}{50}$. The sum of the numerator and denominator is 59.

11. **C.** To begin, notice that 420 isn't a multiple of 18, so you can rule out Choice (B). Now find the least common multiple (LCM) of 7, 10, and 14. The LCM of 7 and 10 is 70, so the LCM of 7, 10, and 14 must be a multiple of 70. The number 70 is a multiple of 14 as well, so the LCM of 7, 10, and 14 is 70. However, 70 also is a multiple of 14, 28, and 35. So if any of these numbers were v , the LCM of 7, 10, 14, and v would be 70. As a result, you can rule out Choices (A), (D), and (E), leaving Choice (C) as your only answer.
12. **D.** Use the answer choices and work backwards. Find the smallest number that divides evenly by 18, 25, and 45. This is 450: $450 \div 18 = 25$; $450 \div 25 = 18$; and $450 \div 45 = 10$. If you selected choice (E), be careful—this is a common multiple of all three numbers, but it is not the *least* common multiple.
13. **D.** Factor 36 and 45. 36 has factors 36, 18, 9, 3, and 1. 45 has factors 45, 15, 9, 5, 3, and 1. Answer choice (A) is $36 * 45$, (B) is $36 * 9$, (C) is $18 * 5$, (E) is $1 * 1$, and (D) cannot be made by multiplying 1 number from the set of factors of 36 by 1 number in the set of factors of 45.
14. **B.** First, factor each term. In this problem, the given numbers are all products of 2, 3, a , and b . To find the lowest common multiple of the given values, you need to figure out the maximum number of times each component (2, 3, a , and b) appears in any one of our given values. $8 = 2 * 2 * 2 * a * a$, so the lowest common multiple must have $2 \times 2 \times 2 \times a \times a$ as a factor. No value has more than one factor of 3, so our number is only required to have one factor of 3. Finally, our least common multiple must have two a 's and one b . Multiply the mandatory factors together, to get $24a^2b$.
15. **B.** Factors of a are a and 1, factors of b are b and 1. Therefore, the greatest factor they must share is 1.
16. **D.** First, write the prime factorization of the numbers. $35 = 7 * 5$, $28 = 2 * 2 * 7$, $8 = 2^3$. Multiply each number raised to the highest power then multiply. $7 * 5 * 2^3 = 280$.
17. **E.** 72 is evenly divisible by 2, 8, 24, and 36, so these cannot be the answers as then the LCM would be 72; the only possible answer is 48.
18. **A.** 2002 is evenly divisible by every answer except 17.