

**Part A**

1. The expression  $\frac{1}{2 + \frac{3}{4 + \frac{5}{6}}}$  simplifies to

- (A)  $\frac{4}{33}$       (B)  $\frac{29}{76}$       (C)  $\frac{29}{66}$       (D)  $\frac{1}{2}$       (E)  $\frac{29}{40}$
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2. Alain has eaten  $\frac{1}{5}$  of a pizza and Yacine has eaten  $\frac{3}{4}$  of the rest. What portion of the pizza is left for Paul?

- (A) 20%      (B) 25%      (C) 40%      (D) 60%      (E) None of these
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3. How many ways can the value 13 be expressed as the sum of exactly 3 different integers? For example,  $13 = 1 + 4 + 8$  is one such way. Note that  $13 = 4 + 8 + 1$  does not count as a “different” way since the same integers are involved in the sum.

- (A) 5      (B) 6      (C) 7      (D) 8      (E) 14
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4. Nine hens lay 12 eggs in 4 days. How many eggs will 4 hens lay in 9 days?

- (A) 11      (B) 12      (C) 13      (D) 14      (E) 15
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5. The average mark on the first 3 tests Jean took was 76. What average mark does Jean need on the next two tests to have an average of 80 for all of the tests?

- (A) 80      (B) 84      (C) 85      (D) 86      (E) None of these
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6. A basket contains some apples. Alice takes  $\frac{1}{2}$  of the apples and then places 15 of the apples back in the basket. Barry then takes  $\frac{1}{2}$  of the remaining apples and places 10 back in the basket. They find that each of them has the same number of apples. How many apples are left in the basket?

- (A) 10      (B) 20      (C) 30      (D) 50      (E) Not enough information
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**Part B**

11. Suppose that the operation  $*$  is defined by  $a*b = ab - b$  for every pair of integers  $a$  and  $b$ . What is the result of  $(4*1)*3$ ?

- (A) 0                      (B) 1                      (C) 6                      (D) 9                      (E) 12
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12. A bus starts off with some passengers. At the first stop,  $\frac{1}{3}$  of the passengers get off and 8 people get on. At the second stop,  $\frac{1}{2}$  of the passengers remaining get off and 2 get on the bus. There are now half as many passengers as started the trip. How many persons started the trip?

- (A) 18                      (B) 24                      (C) 27                      (D) 30                      (E) 36
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13. Which of the following is the largest?

- (A)  $2^{10}3^5$                       (B)  $2^{17}$                       (C)  $4^8$                       (D)  $6^7$                       (E)  $3^9$
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14. What is the next number in the sequence: 1, 2, 3, 4, 5, 8, 7, 16, 9, ...?

- (A) 8                      (B) 11                      (C) 18                      (D) 23                      (E) 32
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15. The least common multiple of two numbers is 105 and the greatest common divisor is 5. Which of the following could be the sum of the numbers?

- (A) 21                      (B) 25                      (C) 49                      (D) 50                      (E) 105
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16. A tub contains two faucets. Faucet **A** can fill the tub in 15 minutes and faucet **B** can fill the tub in 10 minutes. How long will it take to fill the tub using both faucets?

- (A) 6 min.                      (B) 7.5 min                      (C) 8 min.                      (D) 25 min.                      (E) Not enough information
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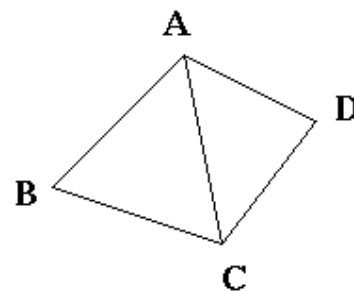
17. The average age of Samir's parents is 49. His father is 8 years older than his mother. If the average age of Samir and his father is 27, how old is Samir?

- (A) 1                      (B) 5                      (C) 9                      (D) 16                      (E) Not enough information
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18. A jar contains some marbles.  $\frac{3}{5}$  of the marbles are red and  $\frac{2}{5}$  are green. 14 red marbles are removed and replaced by the same number of green marbles. The proportion of red marbles is now  $\frac{1}{2}$ . How many red marbles were in the jar originally?

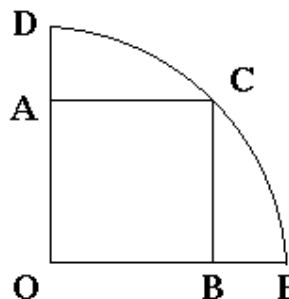
(A) 70                      (B) 84                      (C) 140                      (D) 160                      (E) Not enough information

19. In the figure,  $\mathbf{AD} = \mathbf{DC}$ ,  $\mathbf{AB} = \mathbf{BC}$ ,  $\mathbf{ABC} = 60^\circ$  and  $\mathbf{ADC} = 82^\circ$ . What is the angle  $\mathbf{BAD}$  in degrees?



(A) 107                      (B) 109                      (C) 110                      (D) 111                      (E) None of these

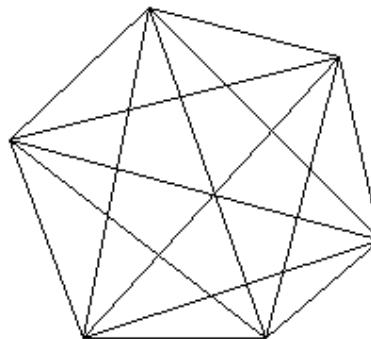
20. Consider the square  $\mathbf{OACB}$  inscribed in a quarter circle. If the area of this square is 16, find the arc length  $\mathbf{ED}$ .



(A)  $4\pi\sqrt{2}$                       (B)  $8\pi\sqrt{2}$                       (C)  $14\pi\sqrt{2}$                       (D)  $32\pi$                       (E) None of these

## Part C

21. How many triangles, which have their corners on the perimeter, are there in the figure?



- (A) 17                      (B) 20                      (C) 24                      (D) 26                      (E) 27
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22. The value of the expression  $1-2-3+4+5-6-7+8+9\dots+76+77-78-79$  is equal to
- (A) -98                      (B) -80                      (C) -60                      (D) 40                      (E) 80
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23. What is the last digit of  $3^{2002}$ ?
- (A) 1                      (B) 3                      (C) 5                      (D) 7                      (E) 9
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24. If  $x+y=5$  and  $x^2+y^2=111$ , the value of  $x^3+y^3$  is :
- (A) 115                      (B) 227                      (C) 300                      (D) 555                      (E) 770
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25. Maurice wants to multiply together two numbers composed of two digits each. Unfortunately, he reverses the digits of one of the numbers and obtains a result which is greater than the exact result by 3015. Which one of the following could be one of the numbers?
- (A) 23                      (B) 38                      (C) 45                      (D) 62                      (E) 81
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26. The mathematician Augustus De Morgan lived in the nineteenth century. He once made the following statement: "I was  $x$  years old in the year  $x^2$ ." In what year was De Morgan born?
- (A) 1801                      (B) 1806                      (C) 1849                      (D) 1860                      (E) None of these
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