Part A

1. Evaluate the expression $\dfrac{\frac{1}{3}+\frac{1}{4}}{\frac{1}{3}-\frac{1}{4}}$.

(A) $\frac{7}{12}$ (B) $\frac{12}{7}$ (C) 7 (D) 12 (E) Not defined

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2. If a is 50% larger than c, and b is 25% larger than c, what percent is a larger than b?

(A) 10% (B) 20% (C) 25% (D) 31% (E) None of these

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3. Determine the value of $\dfrac{x+y}{x-y}$ where $x=\frac{3}{4}$ and $y=\frac{2}{3}$.

(A) $\frac{5}{3}$ (B) 5 (C) 6 (D) 17 (E) None of these

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4. How many different 4 digit numbers can be made by ordering the digits 1, 2, 3, 3?

(A) 4 (B) 6 (C) 12 (D) 24 (E) None of these

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5. A few years ago, cement drivers were on strike for 46 days. Before the strike, these drivers earned \$7.50 per hour and worked 260 eight-hour days a year. What percentage increase is needed in yearly income to make up for the lost time within 1 year?

(A) $\frac{23}{1040}\times 100\%$ (B) 7.5% (C) $\frac{23}{130}\times 100\%$ (D) $\frac{69}{52}\times 100\%$ (E) None of these

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6. An automobile travels from point A to point B at a speed of 40 km/h. How fast must it travel in the opposite direction to achieve an average speed of 50 km/h for the round trip?

(A) 50 km/h (B) 58 km/h (C) 60 km/h (D) 66• km/h (E) Not enough Information

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7. For a party, Justin buys a pizza and cuts it into 24 pieces. Marc eats $\frac{1}{6}$ of the pizza and Claudine eats $\frac{1}{4}$ of what remains. After both of them have eaten, Sylvie eats $\frac{1}{3}$ of the rest. Justin gets to eat what is left over. What fraction of the pizza did Justin not eat?

(A) $\frac{1}{2}$ (B) $\frac{5}{12}$ (C) $\frac{7}{12}$ (D) $\frac{2}{3}$ (E) None of these

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8. I have a number such that if I multiply the number by 4 and subtract 12, I get twice as much as when I first subtract 12 and then multiply by 4. The sum of the digits of my number is

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

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9. The number 5^{10} is an n-digit number. What is the value of n?

(A) 6 (B) 7 (C) 8 (D) 9 (E) 10

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10. Alphonse has three times as many marbles as Beatrice. If Alphonse would give 15 of his marbles to Beatrice then he would have twice as many marbles as she would have. How many marbles must Alphonse give to Beatrice so that they each have the same number?

(A) 30 (B) 45 (C) 60 (D) 90 (E) Not enough Information

Part B

11. Suppose that the operation * is defined by a*b = 3a-2b. What is the result of (1*(-2))*(3*4)?

(A) -24 (B) -5 (C) 5 (D) 19 (E) None of these

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12. The cities of Artin and Balin are a distance of 500 km from each other. An airplane regularly makes a round trip between them. The wind always blows at a constant velocity from Artin towards Balin. The speed of the airplane unmodified by the wind is 900 km/h. If the trip from Artin to Balin takes 30 minutes and the return trip takes 37½ minutes, what is the velocity of the wind?

(A) 80 km/h (B) 100 km/h (C) 120 km/h (D) 200 km/h (E) None of these

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13. In a basketball game, a team can score either 1, 2 or 3 points by throwing the ball through a hoop. Our team throws the ball through the hoop 50 times and scores 80 points. What is the largest possible number of 3-point throws our team made?

(A) 5 (B) 10 (C) 15 (D) 20 (E) Not enough information

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14. An inheritance is split among 5 brothers. The first receives half of the inheritance plus $1. The second receives half of the remainder plus $2. The third receives half of the remainder plus $3. The fourth receives half of the remainder plus $4. The last brother receives $500. What is the total amount of the inheritance ?

(A) $7098 (B) $7598 (C) $8098 (D) $8598 (E) $9098

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15. In the sequence 1, 3, 3, 3, 5, 5, 5, 5, 5, 7, 7, … the 100th number is

(A) 10 (B) 19 (C) 20 (D) 21 (E) None of these

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16. X is the smallest positive integer larger than one such that the remainder is 1 when X is divided by any of the numbers 2, 3, 4, 5, or 6. The sum of the digits of X is

(A) 4 (B) 5 (C) 6 (D) 7 (E) 10

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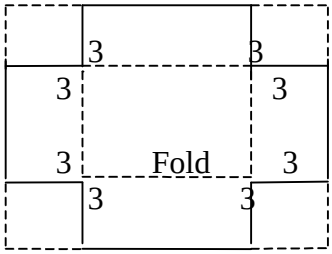
17. A company is designing a package for its product. One part of the package is to be an open box made from a square piece of aluminium by cutting out a 3 cm square from each corner and folding up the sides (see Figure). The box is to contain 75 cm^3. What are the dimensions in cm x cm of the square piece of aluminium that must be used?



(A) 6×6 (B) 9×9 (C) 10×10 (D) 11×11 (E) None of these

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18. What is the 2001st number in the sequence: 2, 5, 8, 11,...?

(A) 5996 (B) 5999 (C) 6000 (D) 6001 (E) 6002

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19. How many digits are needed to write all of the integers from 1 to 1000 inclusive? For example, to write the numbers from 1 to 10 inclusive, one would need 11 digits.

(A) 2889 (B) 2892 (C) 2893 (D) 2899 (E) 2989

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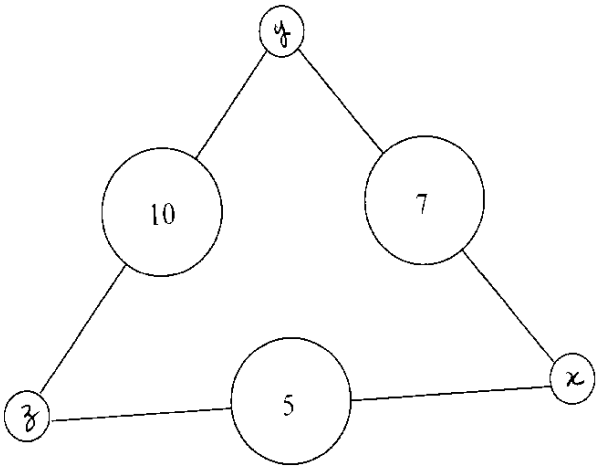
20. The numbers in the larger circles are obtained by adding the two numbers in the smaller circles attached to each larger circle. Determine the sum of the numbers in the small circles.



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(A) 9 (B) 11 (C) 13 (D) 20 (E) None of these

Part C

21. The value of $\dfrac{2^{2001}+2^{1999}}{2^{2000}-2^{1998}}$ is

(A) 2 (B) $\dfrac{10}{3}$ (C) $2^{1000}+1$ (D) $2^{2000}+1$ (E) None of these

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22. How many diagonals does a 12-sided regular polygon have? A regular polygon has sides of equal length and equal angles where two sides meet. A diagonal is a line which connects any two corners of the polygon, but which is not a side of the polygon.

(A) 27 (B) 35 (C) 44 (D) 54 (E) 65

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23. If you define the inverse of a two digit integer to be the number obtained by permuting the two digits (for example, 34 is the inverse of 43), how many two-digit integers will produce a perfect square when added to their inverse?

(A) 1 (B) 4 (C) 8 (D) 9 (E) None of these

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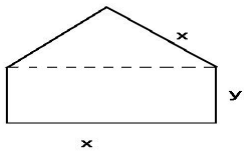
24. A window is formed by a rectangle topped by an equilateral triangle. If the perimeter is given by $6-\sqrt{3}$ and the area of the window is $\dfrac{6-\sqrt{3}}{4}$ find x+y.



(A) $\dfrac{1+\sqrt{3}}{2}$ (B) $\dfrac{6+\sqrt{3}}{4}$ (C) $\dfrac{5-\sqrt{3}}{2}$ (D) $\dfrac{5+\sqrt{3}}{2}$ (E) None of these

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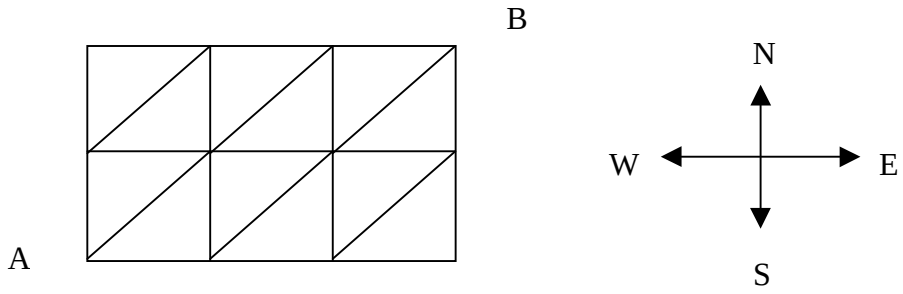
25. How many distinct paths lead from A to B if the only possible directions are to go forward to the north, the east or the north-east?



(A) 15 (B) 20 (C) 25 (D) 30 (E) None of these

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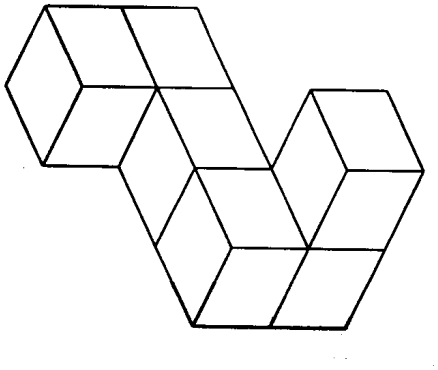
26. What is the surface area in cm^2 of the solid figure shown if the cubes measure 1 cm on each side?



(A) 24 (B) 25 (C) 29 (D) 30 (E) None of these