Part A

1. Evaluate the expression $\dfrac{1}{\frac{1}{2}+\frac{1}{3}+\frac{1}{5}}$.

   (A) $\frac{3}{10}$ (B) $\frac{30}{31}$ (C) 1 (D) $\frac{31}{30}$ (E) $\frac{10}{3}$

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2. In a group of people, 29 persons have either blue eyes or brown hair. If 18 persons have brown hair and 21 persons have blue eyes, how many persons have both brown hair and blue eyes?

   (A) 3 (B) 8 (C) 9 (D) 10 (E) 18

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3. The largest possible product of two positive integers whose sum is 9 is

   (A) 8 (B) 9 (C) 14 (D) 20 (E) 24

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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. 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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6. A bottle of juice costs 30 cents. The juice costs 12 cents less than the empty bottle. What is the cost of the empty bottle?

   (A) 9 ¢ (B) 12 ¢ (C) 18 ¢ (D) 21 ¢ (E) None of these

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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. François is playing on a ladder. He starts out on the middle step. He then goes up 5 steps, down 10, up another 7 and up 9 more steps to the top. How many steps are there on the ladder?

(A) 9 (B) 10 (C) 11 (D) 22 (E) 23

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9. How many of the integers between 31 and 131 are divisible by 7 but not divisible by 6?

(A) 11 (B) 12 (C) 13 (D) 14 (E) 15

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

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

Part B

11. Suppose that the operation * is defined by a*b = 3a-2b. What is the result of (4*2)*(7*5)?

(A) 8 (B) 10 (C) 12 (D) 56 (E) None of these

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12. 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 does. 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

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13. 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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14. 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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15. I noticed that when I interchanged the digits of my father's age, I got my own age. When I was born, his age was between twenty and thirty years. What was my father's age when I was born?

(A) 20 (B) 26 (C) 27 (D) 30 (E) None of these

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16. 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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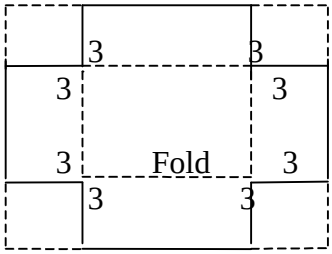
17. A company is designing a package for its product. One part of the package is to be an open box made from a square piece of aluminium by cutting out a 3 cm square from each corner and folding up the sides (see Figure). The box is to contain 75 cm^3. What are the dimensions in cm x cm of the square 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. 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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19. 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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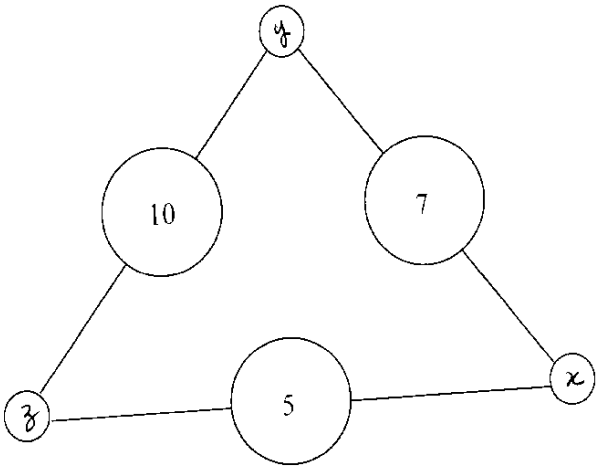
20. The numbers in the larger circles are obtained by adding the two numbers in the smaller circles attached to each larger circle. Determine the sum of the numbers in the small circles.



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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) $\frac{10}{3}$ (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. 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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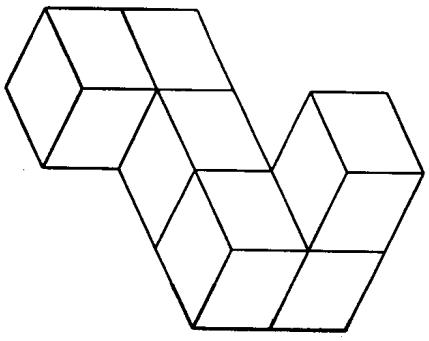
25. How many triangles are contained in this figure?

(A) 16 (B) 17 (C) 25 (D) 26 (E) 27

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