

multilite m # " Institute # # \* tinstitute ## Institute \$\$ Institute \$7 \$7 'S multille m H 3 There is *no penalty* for an incorrect answer. Scoring: Ro Each unanswered question is worth 2, to a maximum of 10 unanswered questions. Part A: Each correct answer is worth 5. The value of  $\frac{8+4}{8-4}$  is 1. mutilite # # 3 PK (B) 3 (C) 4 The expression  $2^3 + 2^2 + 2^1$  is equal to (A) 6 (D) 5 Y. (E) 22 (A) 6 (B) 10 **(C)** 14 (D) 18 If  $x + \sqrt{81} = 25$ , then x equals 3. N. **(A)** 16 Aritante tan tit 's PR A rectangular field has a length of 20 metres and a width of 5 metres. If its length is 5. Ro increased by 10 m, by how many square metres will its area be increased? **(B)** 20 (C) 50 (A) 10 **(D)** 75 **(E)** 100 6. A large cylinder can hold 50 L of chocolate milk when full. The tick marks show the division of the cylinder Institute # # '\$ 12 into four parts of equal volume. Which of the following Y. is the best estimate for the volume of chocolate milk in (B) 28 L the cylinder as shown? (C) 30 L (A) 24 L (E) 40 L (D) 36 L ANIANA AN AK 'S PR mutute # \*\* Y. 7.5 In the diagram,  $\triangle PQR$  is an equilateral triangle. If PQ = 4x and PR = x + 12, what is the value of x? (C) 4 (A) 48 **(B)** 16 (D) 32 **(E)** 12 Ville Marth 'S PK mutute # # B 面动曲线新林谱像 面前抽曲新林塔梯 x + 12Withte the the the PR The symbol  $\diamond$  is defined so that  $a \diamond b = \frac{a+b}{a \times b}$ . For example,  $2 \diamond 5 = \frac{2+5}{2 \times 5} = \frac{7}{10}$ . What is the value of  $3 \diamond 6$ ? (A) 9 (B)  $\frac{1}{18}$  (C)  $\frac{1}{6}$  (D) 2 (E)  $\frac{1}{2}$ 8. What is the value of  $3 \diamond 6$ ? (A) 9 Willing the the the (D) 2 Ro to the the B. Ph

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multilite m # " multine m # " multille m # " matitute \$\$ \$ mating m # " matinte m # " Astitute the the "& PR 9. In the diagram,  $\triangle PQR$  has a right angle at Q. A square Ro is drawn on each side of the triangle. The area of the istitute # tute \$ square on side QR is 144. The area of the square on side PR is 169. What is the area of the square on side PQ? 169 (A) 16 **(B)** 12 (C) 13 mythille # # 3 PE (E) 25 (D) 36 Silute An # 13 tinkitutt #### matinte # \*\*\* institute \$ 144 10. Barry has three sisters. The average age of the three sisters is 27. The average age of Barry and his three sisters is 28. Will this Participant and the sister of Barry and his three sisters is 28. Will this Participant and the sister of Barry and his three sisters is 28. Will this Participant and the sister of Barry and his three sisters is 28. Will this Participant and the sister of Barry and his three sisters is 28. Will this Participant and the sister of Barry and his three sisters is 28. Will this Participant and the sister of Barry and his three sisters is 28. Will this Participant and the sister of Barry and his three sisters is 28. Will this Participant and the sister of Barry and his three sisters is 28. Will the sister of Barry and his three sisters are sister of Barry and his three sisters is 28. Will this participant and the sister of Barry and his three sisters is 28. Will this participant and the sister of Barry and his three sisters is 28. Will this participant and the sister of Barry and his three sisters is 28. Will this participant and the sister of Barry and his three sisters is 28. Will this participant and the sister of Barry and his three sisters is 28. Will this participant and the sister of Barry and his three sisters is 28. Will the sister of Barry and his three sisters are sisters and the sister of Barry and his three sisters are sister of Barry and his three sisters are sisters ar Y. of Barry and his three sisters is 28. What is Barry's age? (A) 1 **(B)** 30 (C) 4 (D) 29 (E) 31 mutate the the the the Ro mistitute ## # Part B: Each correct answer is worth 6. 11. The lines with equations x = 4 and y = 3x form a triangle with the positive x-axis, as shown. The area of the triangle is multule # # B PS SHE MAK & R (A) 12 **(B)** 24 (C) 36 。st Astitute 称林塔 (**D**) 48 (E) 60 Y. Intitute the the "# PK 12. If a(x+b) = 3x + 12 for all values of x, then a + b equals Y. y = 3xx = 4htitute the the (A) 12 **(B)** 15 (E) 13 (C) 8 (D) 7 13. An integer x is chosen so that 3x + 1 is an even integer. Which of the following must 训训练教学 N. be an odd integer? (A) x + 3 (B) x - 3 (C) 2x(D) 7x + 4(E) 5x + 314. Integers greater than 1000 are created using the digits 2, 0, 1, 3 exactly once in each integer. What is the difference between the largest and the smallest integers that can Astitute ## # 13 PK be created in this way? (A) 2187 **(E)** 4233 **(B)** 2333 Y. (C) 1980 (D) 3209 to the the B to the the the to the the B Ph to the the the the Ro \*\*\*\*\*\* 水雪茶



stitute # # Y. Part C: Each correct answer is worth 8. itute the 21. In the addition shown, the letters X, Y, and Z each X Xrepresent a different non-zero digit. The digit X is Y Y Y(A) 1 **(B)** 2 (C) 7 Z Z ZY YX **(D)** 8 (E) 9 的前期的新林塔 In the diagram, PQRS is a rectangle. Point T is outside 0 the rectangle so that  $\triangle PTQ$  is an isosceles right-angled triangle with hypotenuse PQ. If PQ = 4 and QR = 3, then the area of  $\triangle PTR$  is (C) 7 (A) 5 **(B)** 6 加加斯林省幣 柳林、浅彩 N. **(E)** 9 **(D)** 8 stitute 30 23.One bag contains 2 red marbles and 2 blue marbles. A second bag contains 2 red marbles, 2 blue marbles, and g green marbles, with q > 0. For each bag, Maria calculates the probability of randomly drawing two marbles of the same colour in two draws from that bag, without replacement. (Drawing two marbles without first marble back into the bag.) If these two probabilities are equal, then the value of g is Yu (A) 4 (C) 6 **(B)** 5 (D) 7 **(E)** 8 multille # # '\$ PE A cone is filled with water. Two solid spheres are placed 24.Y. in the cone as shown in the diagram and water spills out. (The spheres are touching each other, each sphere touches the cone all of the way around, and the top of the top sphere is level with the top of the cone.) The larger sphere has radius twice that of the smaller sphere. mutule #### # If the volume of the water remaining in the cone is  $2016\pi$ , Withte the the 's the Y. what is the radius of the smaller sphere? (The volume of a sphere with radius r is  $\frac{4}{3}\pi r^3$ . The volume of a cone with radius r and height h is  $\frac{1}{3}\pi r^2 h$ .) (A)  $2\sqrt{2}$ **(B)** 6 (C) 8 (D)  $6\sqrt{2}$ (E)  $4\sqrt[3]{2}$ non-zero digit immediately to the left of these k zeros. For example, the number  $1\,030\,000$  has 4 trailing zeros. Define Z(m) to be the number 125. A positive integer has k trailing zeros if its last k digits are all zero and it has a positive integer m. Lloyd is bored one day, so makes a list of the value of n - Z(n!)for each integer n from 100 to 10000, inclusive. How many integers appear in his list at least three times? 柳林場際 R. (Note: If n is a positive integer, the symbol n! (read "n factorial") is used to represent the product of the integers from 1 to n. That is,  $n! = n(n-1)(n-2)\cdots(3)(2)(1)$ . For example, 5! = 5(4)(3)(2)(1) or 5! = 120.) **(E)** 6 (A) 2 (C) 4 (B) 3 (D) 5 to the the Be to the the B. Pho

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