

CRPF PUBLIC SCHOOL, ROHINI

First Intra School Mathematics Olympiad 2010

CLASS XII

Max. Marks: 60

Time: 1 hour 30 minutes

General Instructions:

1. Each question of Section A (Q1-5) carries 2 marks, that of Section B (Q6-15) carries 3 marks and of Section C (Q16-20) carries 4 marks.
2. Each question has five choices (A, B, C, D or E). Select the correct answer to each question and darken the corresponding circle in the Answer Sheet provided to you. For each correct answer in section A, B and C, two, three and four marks will be awarded respectively. **One mark will be deducted for each incorrect answer (of all the sections), while no mark will be deducted for any unattempted question.** Darkening of more than one circle for any answer shall bear zero mark.
3. Darken the correct circle with HB Pencil ONLY.
4. Do not make any stray marks on the answer sheet and do not use it for any kind of Rough Work.

SECTION - A

Q1. The total number of three digit numbers whose digits are even is:

- (A) 64      (B) 75      (C) 100      (D) 125      (E) 150

Q2. For how many integer values of  $x$ , does  $\sqrt{25-x^2}$  equal to an integer?

- (A) 7      (B) 6      (C) 5      (D) 3      (E) 2

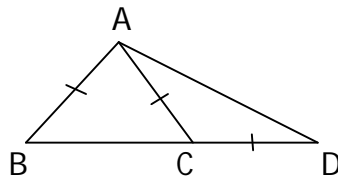
Q3. The next number in the following sequence is:

123, 347, 7815, 151631, \_\_\_\_\_

- (A) 1618      (B) 171835      (C) 182033      (D) 313263      (E) none of these

Q4. In the given figure,  $AB=AC=CD$  and  $\angle BAC=32^\circ$ , then  $\angle BAD$  is:

- (A)  $37^\circ$       (B)  $64^\circ$       (C)  $69^\circ$       (D)  $74^\circ$       (E)  $76^\circ$



Q5. The sum of nine consecutive positive integers is 99. The largest of these integers is:

- (A) 9      (B) 11      (C) 19      (D) 7      (E) 15

**SECTION - B**

Q6. The total number of natural numbers  $n$  for which  $\frac{15n^2+8n+6}{n}$  is a natural number is:

- (A) 8      (B) 2      (C) 3      (D) 4      (E) 5

Q7. The digits 1, 2 and 3 are used to form all the possible three digit numbers. The sum of all those numbers is:

- (A) 550      (B) 666      (C) 1332      (D) 1338      (E) 1342

Q8. If  $\frac{97}{19} = x + \frac{1}{y + \frac{1}{z}}$  where  $x, y, z$  are integers, then the value of  $x + y + z$  is:

- (A) 16      (B) 18      (C) 24      (D) 20      (E) none of these

Q9. The sum of the fourth powers of the roots of the equation  $x^3 - x^2 - 2x + 2 = 0$  is:

- (A) 1      (B) 5      (C) 9      (D) 13      (E) 10

Q10. What is the number of solutions  $(x, y)$  of the equation  $3x + y = 100$ , where  $x$  and  $y$  are positive integers?

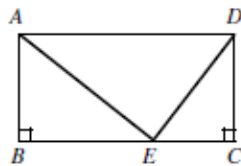
- (A) 28      (B) 33      (C) 30      (D) 35      (E) 20

Q11. A two digit number is increased by 20% when its digits are reversed. Then the sum of the digits of the number is:

- (A) 5      (B) 7      (C) 9      (D) 8      (E) 6B

Q12. In the diagram,  $ABCD$  is a rectangle with  $AD = 13$ ,  $DE = 5$  and  $EA = 12$ . The area of  $ABCD$  is

- (A) 39      (B) 60      (C) 52      (D) 30      (E) 25



Q13. Which is the largest positive integer  $n$  that satisfies  $n^{200} < 3^{500}$ ?

- (A) 13      (B) 14      (C) 15      (D) 16      (E) 17

Q14. In a right-angled triangle, the sum of the squares of the three side lengths is 1800. The length of its hypotenuse is:

- (A)  $\sqrt{1800}$       (B)  $\frac{1}{2}\sqrt{1800}$       (C) 90      (D) 30      (E) 45

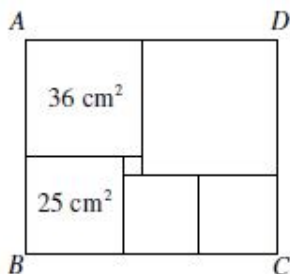
Q15. The value of  $\frac{1}{4 \times 9} + \frac{1}{9 \times 14} + \frac{1}{14 \times 19} + \dots + \frac{1}{2004 \times 2009}$  is:

- (A)  $\frac{1003}{20100}$       (B)  $\frac{2009}{2010}$       (C)  $\frac{1003}{2010}$       (D) 0      (E) none of these

**SECTION - C**

Q16. Rectangle ABCD is made up of six squares as shown. The areas of two of the squares are given. The perimeter of rectangle ABCD, in centimeter, is

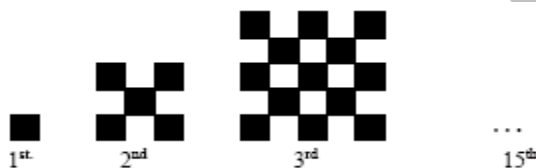
- (A) 50      (B) 44      (C) 46      (D) 52      (E) 48



Q17. If  $x^2 + 2x + 5$  is a factor of  $x^4 + px^2 + q$  then  $(p, q)$  is:

- (A)  $(-2, 5)$     (B)  $(5, 25)$     (C)  $(10, 20)$     (D)  $(6, 25)$     (E)  $(5, -25)$

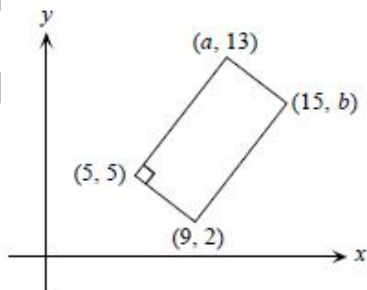
Q18. How many black tiles will be required to build the 15th figure in the given pattern?



- (A) 389      (B) 395      (C) 411      (D) 421      (E) 435

Q19. In the rectangle shown, the value of  $a - b$  is:

- (A) -3      (B) -1      (C) 0      (D) 3      (E) 1



Q20. If  $3 \leq p \leq 10$  and  $12 \leq q \leq 21$ , then the difference between the largest and smallest possible values of  $\frac{p}{q}$  is:

- (A)  $\frac{29}{42}$       (B)  $\frac{29}{5}$       (C)  $\frac{19}{70}$       (D)  $\frac{19}{12}$       (E)  $\frac{19}{84}$

**NOTE:** The **answer key** of this question paper will be available on the School's blog [www.crpfpsrohini.blogspot.com](http://www.crpfpsrohini.blogspot.com) on November 9, 2010 after 6 pm. The **Result** will be declared on 16 November and will also be available on the school's blog.