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MATHS OLYMPIAD



PAKTURK
INTERNATIONAL SCHOOLS & COLLEGES

EXAM BOOKLET FOR CLASS 7

13th NATIONAL INTER-SCHOOL MATHS OLYMPIAD

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13th NATIONAL INTER-SCHOOL MATHS OLYMPIAD

INSTRUCTIONS

1. The total time for the Olympiad is 90 minutes. There is no negative marking.
2. There are 50 questions. (Calculator is **not** allowed.)
3. Do not forget to write your name, class and gender on your answer sheet.
4. There is only one correct answer for each question out of given 4 options A, B, C, D. If you mark more than one choice the answer will be considered wrong. Mark your answers on answer sheet; marks on the booklet will not be accepted.
5. Answer sheets will be checked by using the optical reader. Do not fold or use your answer sheet for calculation etc.
6. Before you begin to answer the questions, read them carefully.
7. You may begin your answer from any question; however you must make sure that the number of the question you are answering matches the correct number in the answer sheet.
8. Mark your answer with a lead pencil by filling only the inside of the circles. Do not write or put any other mark on your answer sheet.
9. Speed is important when you answer the questions. If you have difficulty with a question, do not waste your time to solve it, just move on to the next question, You may go back to the 'difficult' question if you still have time after finishing other parts of the Olympiad.
10. The blank areas in the booklet may be used for writing and calculations.
11. Answer key will be uploaded on our website at 7:00 p.m. on 27th November 2017.
12. Results will be announced through our website (www.ismo.pk).

Q1: Which of the following expression has negative value?

- A) $4^2 - 3 \times 5$ B) $2^2 + (-2)^4$
 C) $16 + 4 \times (-5)$ D) $100 \div 25 - 4$

Q2: Sum of three consecutive even numbers is 192. What is the middle one?

- A) 64 B) 62 C) 60 D) 54

Q3: If 864 can be written as $2^m \times 3^n$, then what is $m + n$?

- A) 6 B) 7 C) 8 D) 10

Q4: What is the remainder when the sum of 12345678 and 87654321 is divided by the sum of the digits of 1234?

- A) 9 B) 8 C) 6 D) 1

Q5: $\left(3 - \frac{5}{3}\right)^0 = ?$

- A) 0 B) 1 C) $\frac{4}{3}$ D) $\frac{11}{3}$

Q6: What is the value of $5 + 10 + 15 + 20 + \dots + 185 + 190$ if $1 + 2 + 3 + 4 + \dots + 37 + 38$ is 741?

- A) 3705 B) 3800 C) 3845 D) 4005

Q7: $4 + 4 \div 4 - 4 \times 4 = ?$

- A) -11 B) 8 C) -14 D) 4

Q8: Which of the following is incorrect?

- A) $(+) \times (+) = (+)$ B) $(+) \times (-) = (-)$
 C) $(-) \times (+) = (-)$ D) $(-) \times (-) = (-)$

Q9: What is the simplest form of $1 - \frac{1}{1 + \frac{1}{1 + \frac{1}{2}}}$?

- A) $\frac{1}{5}$ B) $\frac{2}{3}$ C) $\frac{2}{5}$ D) $\frac{5}{2}$

Q10: How many integers are there between -15 and 12?

- A) 26 B) 27 C) 28 D) 29

Q11: Which of the following is the sum of additive and multiplicative inverse of $-\frac{7}{8}$?

- A) $\frac{15}{56}$ B) $\frac{11}{56}$ C) $-\frac{11}{56}$ D) $-\frac{15}{56}$

Q12: The sum of the two-digit numbers ab and ba is 132.

$$\begin{array}{r} ab \\ + ba \\ \hline 132 \end{array}$$

What is the value of $a+b$?

- A) 12 B) 11 C) 10 D) 9

Q13: $[x-(2y+z)]-[2z-(x+2y)]=?$

- A) $2x-3z$ B) $x+y+z$
C) $2x+3z$ D) $x-2y$

Q14: What is the maximum value of $3a-b-2c$ for the different values of a , b and c which are the elements of the set $\{1, 2, 3, 4, 5\}$?

- A) 11 B) 10 C) 9 D) 8

Q15: Which of the following is a cube of a natural number and as well as a square of a natural number?

- A) 8 B) 64 C) 256 D) 1000

Q16: $\sqrt{1+\sqrt{1+\frac{9}{16}}}=?$

- A) $\frac{2}{3}$ B) $\frac{3}{2}$ C) $\frac{3}{4}$ D) $\frac{1}{2}$

Q17: The product of $\sqrt{2}$ and which of the following is a natural number?

- A) $\sqrt{48}$ B) $\sqrt{64}$ C) $\sqrt{72}$ D) $\sqrt{54}$

Q18: Evaluate $b^2+c^2-a^2$ if $a=0.5$, $b=0.3$ and $c=0.4$

- A) 0.2 B) -0.2 C) 1 D) 0

Q19: The sum of two fractions is $1\frac{1}{2}$ and their difference is $\frac{5}{12}$. What is the product of the fractions?

- A) $\frac{299}{576}$ B) $\frac{321}{576}$ C) $\frac{197}{576}$ D) $\frac{199}{576}$

Q20: In which of the following rational numbers are in descending order?

- A) $2\frac{1}{4}, -1\frac{5}{6}, 2\frac{1}{3}, -\frac{7}{6}$ B) $2\frac{1}{3}, 2\frac{1}{4}, -\frac{7}{6}, -1\frac{5}{6}$
 C) $2\frac{1}{4}, -\frac{7}{6}, 2\frac{1}{3}, -1\frac{5}{6}$ D) $2\frac{1}{4}, 2\frac{1}{3}, -1\frac{5}{6}, -\frac{7}{6}$

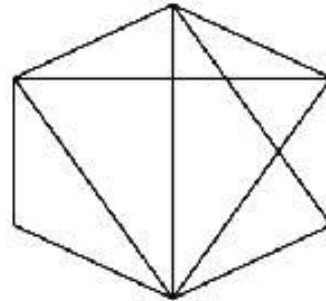
Q21: If $m = 1 + \frac{1}{3} + \frac{1}{6} + \frac{1}{9}$ and $n = 1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8}$ then what is the value of $\frac{m+n}{m-n}$?

- A) $\frac{19}{251}$ B) $-\frac{19}{251}$ C) $\frac{251}{19}$ D) $-\frac{251}{19}$

Q22: If $210 = a \times b \times c \times d \times e$ where a, b, c, d and e are different positive integers, then what is $a + b + c + d + e$?

- A) 12 B) 15 C) 18 D) 21

Q23: How many triangles are there in the given figure below?



- A) 8 B) 17 C) 18 D) 19

Q24: A, B, C and D are four consecutive negative integers ordered from smallest to greatest. Which of the following is the greatest one?

- A) $A - B$ B) $C - A$
 C) $D - B$ D) $D - A$

Q25: Which of the following is neither a square number nor a cube number?

- A) 12^5 B) 3^{12} C) 4^6 D) 5^9

Q26: Maryam is twice as old as her younger sister. The difference between their ages is 13 years. How old is her younger sister?

- A) 10 B) 13 C) 26 D) 22

Q27: $\frac{a}{b} = \frac{c}{d}$ is a proportion where a, b, c, d are natural numbers. Which one of the following is always a natural number?

- A) $\frac{a}{b}$ B) $\frac{c}{d}$ C) $\frac{a+b}{c+d}$ D) $\frac{ad}{bc}$

Q28: Which of the following order is correct?

- A) $2\sqrt{8} < 4\sqrt{3} < 3\sqrt{5} < \sqrt{44}$
 B) $4\sqrt{3} < 2\sqrt{8} < \sqrt{44} < 3\sqrt{5}$
 C) $2\sqrt{8} < \sqrt{44} < 3\sqrt{5} < 4\sqrt{3}$
 D) $3\sqrt{5} < 2\sqrt{8} < \sqrt{44} < 4\sqrt{3}$

Q29: What is the value of $\frac{a+b}{b}$ if $\frac{a}{b} = 7$?

- A) 7 B) 8 C) 12 D) 14

Q30: $(-2) \times (-137) \times (-5) = ?$

- A) 274 B) -685 C) 1370 D) -1370

Q31: What is the unknown number indicated by question mark in the figure given below?

16	(43)	9
25	(58)	64
81	(?)	49

- A) 67 B) 87 C) 97 D) 19

Q32: A football is made by 20 regular hexagons and 12 regular pentagons. Each areas of the hexagon and the pentagon are 36 cm^2 and 30 cm^2 respectively. What is the surface area of the football?

- A) 1440 cm^2 B) 1080 cm^2
 C) 960 cm^2 D) 840 cm^2

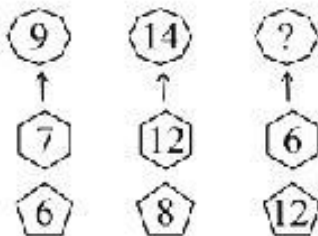
Q33: Every day Mary writes down the date and calculates the sum of the digits written. For example, on April 12 she writes 12.04 and calculates $1 + 2 + 0 + 4 = 7$. What is the largest sum that she calculates during a year?

- A) 20 B) 19 C) 18 D) 17

Q34: The product of which of the following two numbers is not 36?

- A) -12 and -3 B) 6 and -6
 C) 4 and 9 D) -36 and -1

Q35: What is the unknown number indicated by question mark in the figure given below?



- A) 72 B) 18 C) 12 D) 10

Q36: 20 percent of a number is equal to 10 less than 16 percent of the same number. What is the number?

- A) -400 B) -250 C) 250 D) 400

Q37: A book seller sold a book for Rs. 240. What percent should he increase the price in order to sell it for Rs. 300?

- A) 20% B) 24% C) 25% D) 30%

Q38: x and y are directly proportional to 5 and 8 respectively. Which of the following is not correct?

A) $\frac{x}{y} = \frac{5}{8}$

B) $\frac{x}{5} = \frac{y}{8}$

C) $8x = 5y$

D) $\frac{8}{x} = \frac{5}{y}$

Q39: If n is an even integer, which of the following must be an odd integer?

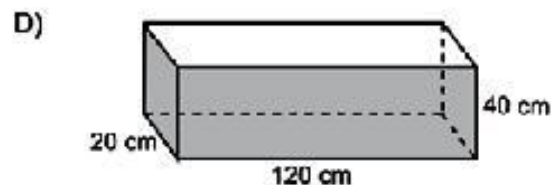
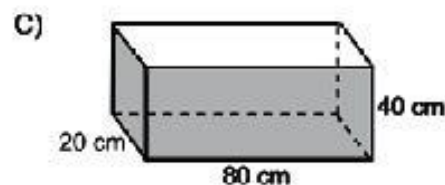
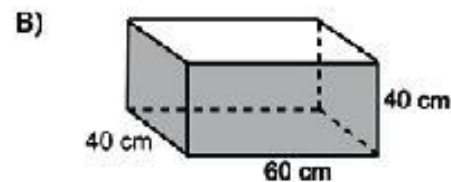
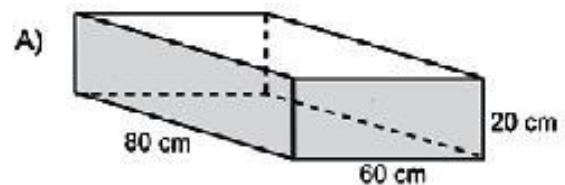
A) $3n-2$

B) $3(n+1)$

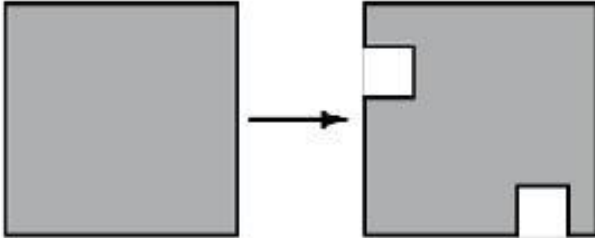
C) $n-2$

D) $\frac{n}{3}$

Q40: Which of the following cube has different volume?



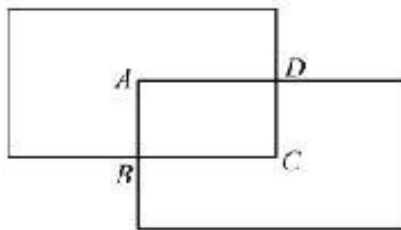
Q41: Two congruent squares are removed from a square as it is shown below.



What is the perimeter of the second figure if the area of first figure is 484 m^2 and the area of each square that is removed is 36 m^2 ?

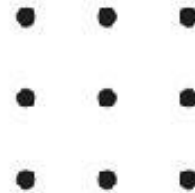
- A) 112 m B) 108 m C) 96 m D) 88 m

Q42: In the figure below, the overlapped rectangles are congruent. The points B and D are the midpoints. What is the perimeter of the whole figure if the perimeter of ABCD is 72 cm?



- A) 196 cm B) 200 cm
C) 216 cm D) 224 cm

Q43: Any two adjacent points are equidistant vertically and horizontally. How many squares can be obtained by joining any four points?



- A) 4 B) 5 C) 6 D) 7

Q44: Ammar added the lengths of three sides of a rectangle and got 86 cm. Sohail added the lengths of three sides of the same rectangle and got 94 cm. What is the perimeter of the rectangle?

- A) 100 cm B) 120 cm
C) 130 cm D) 140 cm

Q45: Raees is three times as old as Ahsan, who is two years older than half of Faham's age. If Faham is 12, how old is Raees?

- A) 8 B) 18 C) 20 D) 24

Q46: Fundraising is organized for internally displaced people (IDPs). The money collected every hour is doubled. If Rs.1 million is collected in the first hour, then the total amount collected at the end of six hours will be:

- A) Rs. 16 millions B) Rs. 32 millions
C) Rs. 64 millions D) Rs. 72 millions

Q47: If $1.2 - \frac{x}{1.2} + 4.5x - \frac{x}{4.5} = 5.6 + x$, then what is the value of $x + \frac{1}{x}$?

- A) $\frac{53}{9}$ B) $\frac{103}{48}$ C) $\frac{104}{15}$ D) $\frac{106}{45}$

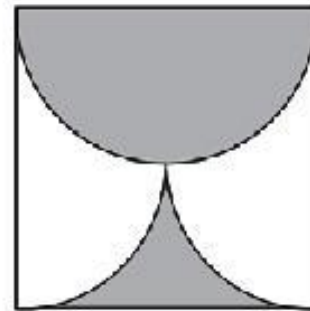
Q48: Junaid accepted a reduction of 20% in his salary when his company was not doing well. Now his company's financial position has improved and his boss wants to restore his original salary. By what percentage must his reduced salary be increased?

- A) 10% B) 8% C) 12% D) 25%

Q49: If p is 30% of q and q is 20% of r and r is 40% of s then what is the ratio of p to s ?

- A) 125:3 B) 30:125
C) 125:30 D) 3:125

Q50: The shaded part of the square with side a is bounded by a semicircle and two quarter arcs. What is the area shaded regions in terms of a ?



- A) $\pi \frac{a^2}{2}$ B) $\frac{a^2}{2}$ C) $\pi \frac{a^2}{4}$ D) $\frac{a^2}{4}$

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