

Markhor Junior Contest 2020

Aspirant Level (Class IX & X, O/A Level's)

Mathematics

Time Allowed 60 Minutes

There are 19 problems, graded as follows:

Questions 1-5 are 1 point each,

Questions 6-10 are 2 points each,

Questions 11-15 are 3 points each,

Questions 16-19 are 5 points each.

1. The value of $\frac{\sqrt{0.0032}}{\sqrt{0.32}}$

- a) 0.0001
- b) 0.001
- c) 0.01
- d) 0.1

2. 15 workers can harvest a field in 20 days.
How many days will 25 workers take to
harvest the same field?

- a) 10 days
- b) 12 days
- c) 15 days
- d) 18 days

Markhor Junior Contest 2020

3. Three pipes, P1, P2, and P3, can fill a reservoir in 12, 16, and 24 hours, respectively. If P1 and P2 are opened simultaneously for 4 hours, and then P3 is opened, how many more hours will it take to fill the reservoir?
- a) 4 hours
 - b) 6 hours
 - c) 8 hours
 - d) 10 hours
4. P, Q, and R can individually complete a task in 12, 9, and 6 hours, respectively. P and Q work together for 3 hours, then R joins. How many more hours will they take to complete the remaining task?
- a) 2 hours 15 minutes
 - b) 2 hours 45 minutes
 - c) 3 hours 15 minutes
 - d) 3 hours 45 minutes
5. In a convex polyhedron, the number of faces is 10 and the number of edges is 24. How many vertices does the polyhedron have?
- a) 16
 - b) 18
 - c) 20
 - d) 22

Markhor Junior Contest 2020

6. A triangular prism has a base with side lengths 5 cm, 6 cm, and 7 cm, and a height of 10 cm. What is its total surface area?
- a) 192 cm^2
 - b) 216 cm^2
 - c) 242 cm^2
 - d) 268 cm^2
7. A circle has center (3, 4) and radius 5. Find the equation.
- a) $(x-3)^2 + (y-4)^2 = 25$
 - b) $(x+3)^2 + (y-4)^2 = 25$
 - c) $(x-3)^2 + (y+4)^2 = 25$
 - d) $(x-3)^2 + (y-4)^2 = 50$
8. A figure has rotational symmetry of order 8. What is the smallest angle of rotation?
- a) 30°
 - b) 45°
 - c) 60°
 - d) 90°
9. What is the primary goal of Linear Programming?
- a) Maximize constraints
 - b) Minimize variables
 - c) Optimize objective function
 - d) Satisfy equations

Markhor Junior Contest 2020

10. In a company of 120 employees:

- **p employees work in both the marketing and IT departments.**
- **Three times the number of employees working in both departments work only in the marketing department.**
- **Twice the number of employees working in both departments work only in the IT department.**
- **20 employees do not work in either of these departments.**

How many employees work in both the marketing and IT departments?

- a) 10
- b) 12
- c) 15
- d) 20

11. Consider a 9-digit number $M=24681357X$

$M=24681357X$, where X represents an unknown digit. If M is divisible by 9, which of the following must be true?

- a) X is an odd number.
- b) The sum of all digits, including X, is divisible by 9.
- c) X is cannot be zero
- d) X cannot be a largest single digit number

Markhor Junior Contest 2020

12. Jack buys notebooks and pens, spending a total of Rs. 450. If each notebook costs Rs. 90 and each pen costs Rs. 30, how many notebooks and pens did he buy?

- a) 2 notebooks and 6 pens
- b) 3 notebooks and 4 pens
- c) 1 notebook and 8 pens
- d) 4 notebooks and 3 pens

13. In a quiz competition, a participant earns 3 points for every correct answer and loses 2 points for every incorrect answer. The quiz contains 40 questions in total, and a participant scored 34 points by the end of the quiz. How many questions did the participant answer correctly?

- a) 20
- b) 22
- c) 24
- d) 26

14. A group of students from a school participated in the Markhor Junior Contest. Out of these, 25% of the boys and 10% of the girls did not win the contest. The number of boys who won was 30 less than the number of girls who won. A total of 70 students did not

Markhor Junior Contest 2020

win the contest. How many students appeared for the contest?

- a) 200
- b) 300
- c) 400
- d) 500

15. The sum of four consecutive multiples of 6 equals 408. What is the second-largest of these numbers?

- a) 96
- b) 114
- c) 108
- d) 102

16. A store increases a price by 20% and then decreases it by 20%. What is the net percentage change?

- a) 0%
- b) 4%
- c) 8%
- d) 12%

17. A medical survey revealed that 27% of patients suffered from hypertension, 32% from diabetes, and 25% from cardiovascular disease. Additionally, 4% had all three conditions, 10% had both hypertension and diabetes, 12% had diabetes and cardiovascular disease, and 8% had

Markhor Junior Contest 2020

hypertension and cardiovascular disease. Find the percentage of patients who suffered from diabetes only.

- a) 14%
- b) 18%
- c) 22%
- d) 26%

18. The maximum value of $Z = 3x + 4y$ subjected to constraints $x + y \leq 4$, $x \geq 0$ and $y \geq 0$ is:

- a) 12
- b) 14
- c) 16
- d) None of the above

19. In a trigonometry test, students were asked to find the number of values of x that satisfy $|\sin x| = |\cos x|$ within the range $[-4\pi, 4\pi]$. How many correct values should they find?

- a) 14
- b) 16
- c) 18
- d) 20