

Markhor Junior Contest 2021

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 $\left(-\frac{9}{8}\right) \times \left(\sqrt{\frac{64}{81}}\right)$ is
 - a) 1
 - b) -1
 - c) 0
 - d) 2
2. 8 machines can produce 2400 units in 12 hours. How many hours will 12 machines take to produce 3600 units?
 - a) 8 hours
 - b) 10 hours
 - c) 12 hours
 - d) 16 hours
3. A leaky tap fills $\frac{2}{3}$ of a tank in 12 hours. How many hours will it take to fill the entire tank if an additional tap, filling $\frac{1}{4}$ of the tank in 6 hours, is opened simultaneously?
 - a) 6 hours

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- b) 8 hours
 - c) 10 hours
 - d) 12 hours
4. **A can complete a work in 10 days, B in 5 days, and C in 20 days. They work together for 2 days, then A leaves. How many more days will B and C take to complete the remaining work?**
- a) 2 days 12 hours
 - b) 3 days 4 hours
 - c) 3 days 12 hours
 - d) 4 days 8 hours
5. **If the number of faces and vertices in a solid are 7 and 10 respectively, the number of edges are**
- a) 17
 - b) 15
 - c) 19
 - d) 13
6. **Manya builds a pentagonal prism using straws and balls of clay. How many straws does she need?**
- a) 12
 - b) 15
 - c) 18
 - d) 20

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7. The coordinate of point (4,6) reflected in x-axis is.
- a) (4,6)
 - b) (-4,6)
 - c) (4,-6)
 - d) (-4,-6)
8. A point (3, 4) is rotated 90° counterclockwise about the origin. Find the new coordinates.
- a) (-4, 3)
 - b) (4, -3)
 - c) (-3, 4)
 - d) (3, -4)
9. The angle of rotation of figure having order of rotational symmetry as 10 is
- a) 36°
 - b) 72°
 - c) 24°
 - d) 48°
10. The optimal value of the objective function is attained at the points:
- a) on X-axis
 - b) on Y-axis
 - c) corner points of the feasible region
 - d) none of these

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11. In a class of 200 students, the following information about beverage preferences is available:

- n students prefer both tea and coffee.
- $2n$ students prefer only coffee.
- $3n$ students prefer only tea.
- $4n$ students prefer neither tea nor coffee.
- What is the value of n ?

- a) 20
- b) 25**
- c) 30
- d) 35

12. Let $N=98765432AB$ be a 10-digit number where A and B are digits. If N is divisible by 9, which of the following statements is true?

- a) $A+B$ is divisible by 9.
- b) If A is even, then B is odd.
- c) If A is odd, then B is Odd
- d) $A+B= 9x+1$, and x is a positive integer**

13. Maya buys a mix of candles and incense sticks, spending exactly Rs. 64. Each candle costs Rs. 8, and each incense stick costs Rs. 4. How many candles and incense sticks did she purchase?

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- a) 6 candles and 4 incense sticks
- b) 4 candles and 6 incense sticks
- c) 5 candles and 6 incense sticks
- d) 7 candles and 3 incense sticks

14. In a trivia game, each correct answer gives a player 4 points, while each wrong answer deducts 2 points from their total. If the game has 30 questions and a player ended up with 30 points, how many questions did they get correct?

- a) 12
- b) 14
- c) 15
- d) 16

15. A college hostel mess has food provisions for 25 days for 350 students. After 10 days, some students leave, and it is found that the remaining provisions can now last for 21 more days. How many students left?

- a) 80
- b) 100
- c) 120
- d) 150

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16. A measurement has an error of 5%. If the measurement is 100, what is the range of possible actual values?

- a) 95-105**
- b) 90-110
- c) 95-105
- d) 80-120

17. A software company's quality control reported the following defect rates: 18% for mobile apps, 22% for web applications, and 20% for desktop software. Furthermore, 3% had defects in all three, 8% had defects in both mobile and web apps, 10% had defects in web and desktop software, and 6% had defects in mobile and desktop software. Determine the percentage of software products with defects in web applications only.

- a) 5%
- b) 7%**
- c) 10%
- d) 13%

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18. The minimum value of $Z = 3x + 5y$ subjected to constraints $x + 3y \geq 3$, $x + y \geq 2$, $x, y \geq 0$ is:

- a) 5
- b) 7**
- c) 10
- d) 11

19. If $\sin^{-1} x + \sin^{-1} y = \frac{\pi}{2}$ then value of

$$\cos^{-1} x + \cos^{-1} y$$

- a) $\frac{\pi}{2}$
- b) 0
- c) π
- d) 2π