SYLLABAX

OLYMPIAD PRACTICE SERIES

# Class 8 — Olympiad Practice Paper

Total Questions: 50 | Mathematics · Science · Logical Reasoning · English · General Knowledge

✓ All answers verified | ✓ Olympiad level | ✓ Free to download

**Instructions:** Each question carries 1 mark. Only one option (A/B/C/D) is correct. No negative marking. Answer key is provided at the end of this paper. | **Time suggested:** 45 minutes.

## MATHEMATICS

**1.** The roots of $2x^2 - 7x + 3 = 0$ are $\alpha$ and $\beta$. Find $\alpha^2 + \beta^2$.

**A)** 37/4 **B)** 9
**C)** 43/4 **D)** 12

**2.** Find the sum of all integers from −50 to 50.

**A)** −50 **B)** 0
**C)** 50 **D)** 2550

**3.** In a GP, the product of first 3 terms is 216 and the sum is 19. What is the middle term?

**A)** 4 **B)** 6
**C)** 8 **D)** 12

**4.** How many zeros are at the end of 100! (100 factorial)?

**A)** 20 **B)** 24
**C)** 25 **D)** 28

**5.** What is the number of solutions to $x^2 \equiv 1 \pmod 8$?

**A)** 1 **B)** 2
**C)** 3 **D)** 4

**6.** The probability of winning game A is 1/3 and game B is 1/4. What is the probability of winning EXACTLY one game?

**A)** 5/12 **B)** 7/12
**C)** 1/2 **D)** 1/4

**7.** A circle passes through (0,0), (4,0) and (0,3). What is its radius?

**A)** 2.5 **B)** 3
**C)** 3.5 **D)** 4

**8.** If $f(x) = x^3 - 3x + 2$, for how many real values of x does $f(x) = 0$?

**A)** 0 **B)** 1
**C)** 2 **D)** 3

**9.** What is the coefficient of $x^3$ in the expansion of $(1 + x)^6$?

**A)** 10 **B)** 15
**C)** 20 **D)** 25

**10.** A point P divides AB (A=(1,2), B=(7,8)) in ratio 2:1. Find the coordinates of P.

**A)** (3,4) **B)** (4,5)
**C)** (5,6) **D)** (6,7)

**11.** If $\sin\theta + \cos\theta = \sqrt{2}$, what is $\sin\theta \times \cos\theta$?

**A)** 0 **B)** 1/2
**C)** 1 **D)** $\sqrt{2}$

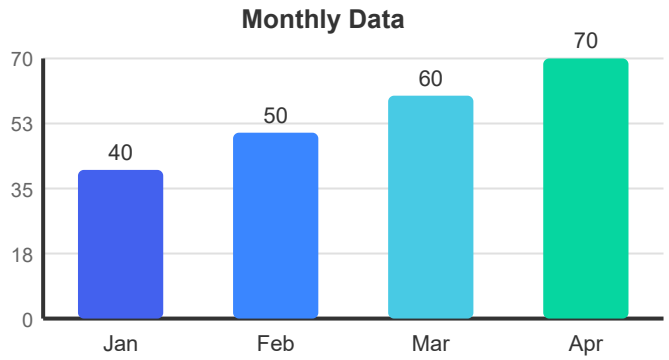
**12.** What is the largest prime factor of 720?

**A)** 3 **B)** 5
**C)** 7 **D)** 11

**13.** The number of diagonals of a decagon (10 sides) is:

**A)** 30 **B)** 35
**C)** 40 **D)** 45

**14.** The bar chart shows data for 4 months. What is the median value?




**A)** 50 **B)** 55
**C)** 60 **D)** 65

**15.** If $|2x - 3| \leq 7$, what is the solution set?

**A)** $-2 \leq x \leq 5$ **B)** $-5 \leq x \leq 2$
**C)** $-2 \leq x \leq 5$ **D)** $x \geq 5$ or $x \leq -2$

## SCIENCE

**16.** In the photoelectric effect, the kinetic energy of emitted electrons depends on:

**A)** Intensity of light **B)** Frequency of light
**C)** Area of metal surface **D)** Number of photons

**17.** The Schrödinger wave equation gives the ___ of finding an electron.

**A)** Exact position
**B)** Exact velocity
**C)** Probability density
**D)** Spin state

**18.** Two capacitors of 4 μF and 6 μF in SERIES have equivalent capacitance:

**A)** 2.4 μF
**B)** 3.0 μF
**C)** 5.0 μF
**D)** 10 μF

**19.** In nuclear fission of $^{235}U$, the mass defect is 0.1 u. The energy released = ? (1 u = 931.5 MeV)

**A)** 9.315 MeV
**B)** 93.15 MeV
**C)** 931.5 MeV
**D)** 9315 MeV

**20.** For an ideal amplifier with voltage gain 40 dB, the ratio Vout/Vin = ? (20 log(A) = dB)

**A)** 40
**B)** 100
**C)** 400
**D)** 1000

**21.** The IUPAC name of $CH_3–CH_2–CH_2–COOH$ is:

**A)** Ethanoic acid
**B)** Propanoic acid
**C)** Butanoic acid
**D)** Pentanoic acid

**22.** In electrolysis of $CuSO_4$ using copper electrodes, what happens at the ANODE?

**A)** Copper dissolves
**B)** Copper deposits
**C)** Oxygen is released
**D)** Hydrogen is released

**23.** What is the oxidation number of S in $H_2SO_4$?

**A)** +2
**B)** +4
**C)** +6
**D)** +8

**24.** In Hardy-Weinberg equilibrium, if allele frequency p = 0.6, what is the frequency of heterozygotes (2pq)?

**A)** 0.16
**B)** 0.36
**C)** 0.48
**D)** 0.64

**25.** A myopic person has far point at 2 m. What power lens is needed to correct this?

**A)** +0.5 D
**B)** -0.5 D
**C)** +2.0 D
**D)** -0.5 D

**26.** In a p-n junction diode, the depletion region is formed due to:

**A)** Recombination of electrons and holes
**B)** Applied voltage
**C)** Temperature change
**D)** Doping concentration only

**27.** The uncertainty in momentum is $1\times10^{-24}$ kg·m/s. Minimum uncertainty in position = ? ($h = 6.6\times10^{-34}$ J·s)

**A)** $5.3\times10^{-11}$ m
**B)** $6.6\times10^{-11}$ m
**C)** $1.0\times10^{-10}$ m
**D)** $3.3\times10^{-10}$ m

**28.** For the reaction $N_2 + 3H_2 \rightarrow 2NH_3$, if 14 g of $N_2$ reacts completely, what mass of $NH_3$ is produced? (N=14, H=1)

**A)** 17 g
**B)** 28 g
**C)** 34 g
**D)** 51 g

**29.** The Doppler effect: a source moves TOWARD an observer. The observed frequency compared to emitted frequency is:

**A)** Lower
**B)** The same
**C)** Higher
**D)** Zero

**30.** Which property of a wave is UNCHANGED when it crosses from one medium to another?

**A)** Speed
**B)** Wavelength
**C)** Frequency
**D)** Amplitude

## LOGICAL REASONING

**31.** Find the next number: 1, 2, 6, 24, 120, ___

**A)** 240
**B)** 480
**C)** 720
**D)** 1440

**32.** Find the odd one out: 8, 27, 64, 100, 125, 216

**A)** 27
**B)** 64
**C)** 100
**D)** 125

**33.** What comes next in the pattern shown?

**A)** Triangle
**B)** Circle
**C)** Square
**D)** Star

**34.** A and B can finish a job in 12 days. B and C in 15 days. A and C in 20 days. In how many days can all three finish together?

**A)** 8
**B)** 10
**C)** 12
**D)** 15

**35.** In a 3×3 magic square, the sum of each row, column, and diagonal is 15. The centre cell must be:

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

**36.** 6 people sit in a circle. In how many ways can they be arranged?

**A)** 60
**B)** 120
**C)** 360
**D)** 720

**37.** If ALL cats are animals and SOME animals are wild, which conclusion is definitely true?

**A)** All cats are wild
**B)** Some cats are wild
**C)** All animals are cats
**D)** None of the above necessarily follows

**38.** A clock gains 5 minutes every hour. It was set to correct time at 8 AM. What does it show at actual 4 PM?

**A)** 4:40 PM
**B)** 5:00 PM
**C)** 5:20 PM
**D)** 5:40 PM

**39.** How many ways can the letters of 'MISSISSIPPI' be arranged?

**A)** 34650
**B)** 36000
**C)** 39600
**D)** 43200

**40.** A frog can jump 1 m or 2 m at a time. In how many ways can it reach the 8th metre from the start?

**A)** 21
**B)** 24
**C)** 28
**D)** 34

## ENGLISH

**41.** Identify the CHIASMUS:

**A)** Ask not what your country can do for you — ask what you can do for your country.
**B)** I came, I saw, I conquered.
**C)** She sells seashells by the seashore.
**D)** It was the best of times, it was the worst of times.

**42.** Choose the word that best completes: 'The professor's ___ lecture was difficult to follow without prior knowledge.'

**A)** verbose
**B)** abstruse
**C)** eloquent
**D)** terse

**43.** Which sentence correctly uses the word 'AFFECT' vs 'EFFECT'?

**A)** The medication will effect her mood.
**B)** The medication will affect her mood.
**C)** The affect of the medication was felt quickly.
**D)** She couldn't effect to the change.

**44.** What literary device is: 'The curious incident of the dog in the night-time' (the dog did nothing)?

**A)** Irony
**B)** Paradox
**C)** Understatement
**D)** Ellipsis

**45.** In rhetoric, which device repeats a word at the END of successive clauses? 'Government of the people, by the people, for the people.'

**A)** Anaphora
**B)** Epistrophe
**C)** Chiasmus
**D)** Asyndeton

## GENERAL KNOWLEDGE

**46.** P vs NP is an unsolved problem in which field?

**A)** Physics
**B)** Biology
**C)** Computer Science
**D)** Economics

**47.** Gödel's Incompleteness Theorem (1931) states that any sufficiently complex axiomatic system is:

**A)** Always complete and consistent
**B)** Either incomplete or inconsistent
**C)** Always consistent but never complete
**D)** Provably consistent

**48.** The CRISPR-Cas9 technology is primarily used for:

**A)** Brain scanning
**B)** Gene editing
**C)** Drug synthesis
**D)** Protein folding prediction

**49.** Which mathematician proved Fermat's Last Theorem in 1995?

**A)** John Nash
**B)** Andrew Wiles
**C)** Terence Tao
**D)** Grigori Perelman

**50.** The Standard Model of particle physics does NOT account for:

**A)** Electromagnetic force
**B)** Strong nuclear force
**C)** Gravity
**D)** Weak nuclear force

# Answer Key — Class 8 Olympiad Practice Paper

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **1.** C | **2.** B | **3.** B | **4.** B | **5.** D | **6.** A | **7.** A | **8.** D | **9.** C | **10.** C |
| **11.** B | **12.** B | **13.** B | **14.** B | **15.** A | **16.** B | **17.** C | **18.** A | **19.** B | **20.** B |
| **21.** C | **22.** A | **23.** C | **24.** C | **25.** B | **26.** A | **27.** A | **28.** C | **29.** C | **30.** C |
| **31.** C | **32.** C | **33.** A | **34.** B | **35.** B | **36.** B | **37.** D | **38.** A | **39.** A | **40.** D |
| **41.** A | **42.** B | **43.** B | **44.** A | **45.** B | **46.** C | **47.** B | **48.** B | **49.** B | **50.** C |

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