

FREE PRACTICE PACK · EDITION 1

Class 10 Mathematics Olympiad practice

16 original questions + explained answers

For students preparing for SOF IMO.

Inside this pack

Eight topic-practice questions and an eight-question, 25-minute mini-mock.

Topics selected for practice

- Real numbers and polynomials
- Equations and progressions
- Geometry and trigonometry
- Statistics and probability

How to use it

Try the practice first. Complete the mini-mock in one sitting. Check the explanations, mark mistakes, and retry them the next day.

This pack covers selected topics. It is original BodhiScore material, independent of SOF, and is not an official paper or a full-length exam. Check the official syllabus for the complete scope.

Topic practice

Work through these eight questions without a timer. Explain your choice before checking the solutions.

1. Real numbers and polynomials

If α and β are roots of $x^2 - 5x + 6 = 0$, what is $\alpha + \beta$?

- | | |
|-------------|-------------|
| A. 6 | B. 2 |
| C. 3 | D. 5 |
-

2. Equations and progressions

An arithmetic sequence starts 7, 12, 17. What is its 20th term?

- | | |
|---------------|---------------|
| A. 102 | B. 107 |
| C. 112 | D. 97 |
-

3. Geometry and trigonometry

In a right triangle, $\sin(\theta) = \frac{3}{5}$. What is $\cos(\theta)$ if θ is acute?

- | | |
|-------------------------|-------------------------|
| A. $\frac{2}{5}$ | B. $\frac{3}{5}$ |
| C. $\frac{4}{5}$ | D. $\frac{5}{4}$ |
-

4. Statistics and probability

A fair coin is tossed 3 times. What is the probability of exactly 2 heads?

- | | |
|-------------------------|-------------------------|
| A. $\frac{1}{8}$ | B. $\frac{3}{8}$ |
| C. $\frac{1}{2}$ | D. $\frac{3}{4}$ |
-

Topic practice (continued)

5. Real numbers and polynomials

Find the HCF of 84 and 126.

- | | |
|--------------|--------------|
| A. 21 | B. 42 |
| C. 63 | D. 14 |
-

6. Equations and progressions

Solve $x^2 - 9 = 0$.

- | | |
|-------------------------|-------------------------|
| A. $x=3$ or -3 | B. $x=9$ or -9 |
| C. $x=3$ only | D. $x=-3$ only |
-

7. Geometry and trigonometry

A 10 m ladder leans against a wall with its foot 6 m from the wall. How high does it reach?

- | | |
|---------------|----------------|
| A. 8 m | B. 16 m |
| C. 4 m | D. 6 m |
-

8. Statistics and probability

The median of 3, 5, 8, 11, 13 is what?

- | | |
|-------------|--------------|
| A. 5 | B. 8 |
| C. 9 | D. 11 |
-

Timed mini-mock

Set a 25-minute timer for these eight questions. Score 1 point per correct answer; there is no penalty for an incorrect answer. This is BodhiScore's practice scoring.

9. Real numbers and polynomials

If $p(x) = x^2 - 4x + 1$, what is $p(3)$?

- | | |
|--------------|--------------|
| A. -2 | B. -1 |
| C. 2 | D. 4 |
-

10. Equations and progressions

The 5th term of an AP is 18 and the common difference is 3. What is its first term?

- | | |
|--------------|-------------|
| A. 12 | B. 3 |
| C. 6 | D. 9 |
-

11. Geometry and trigonometry

A circle has radius 7 cm. Using $\pi = \frac{22}{7}$, find its circumference.

- | | |
|------------------|------------------|
| A. 22 cm | B. 44 cm |
| C. 154 cm | D. 308 cm |
-

Timed mini-mock (continued)

12. Statistics and probability

A bag has 5 red and 3 green balls. One is selected at random. What is the probability it is not green?

- | | |
|-------------------------|-------------------------|
| A. $\frac{5}{3}$ | B. $\frac{3}{8}$ |
| C. $\frac{5}{8}$ | D. $\frac{1}{2}$ |
-

13. Real numbers and polynomials

A polynomial has zeros 2 and -5. Which is a monic quadratic with these zeros?

- | | |
|-----------------------|-----------------------|
| A. $x^2-3x-10$ | B. $x^2+7x+10$ |
| C. $x^2-7x+10$ | D. $x^2+3x-10$ |
-

14. Equations and progressions

The sum of the first 10 positive integers is what?

- | | |
|---------------|--------------|
| A. 100 | B. 45 |
| C. 50 | D. 55 |
-

Timed mini-mock (continued)

15. Geometry and trigonometry

A tower casts a 12 m shadow when the angle of elevation of the Sun is 45 degrees. How tall is the tower?

- | | |
|----------------|--------------------------|
| A. 24 m | B. 6 m |
| C. 12 m | D. $12\sqrt{2}$ m |
-

16. Statistics and probability

Two dice are rolled. What is the probability their sum is 7?

- | | |
|--------------------------|--------------------------|
| A. $\frac{1}{4}$ | B. $\frac{7}{36}$ |
| C. $\frac{1}{12}$ | D. $\frac{1}{6}$ |
-

Answers and explanations

Check why the answer works, then retry any question you missed.

1. D - 5

For ax^2+bx+c , the sum of roots is $-b/a$, here 5.

2. A - 102

The common difference is 5; term 20 is $7 + 19 \times 5 = 102$.

3. C - 4/5

The 3-4-5 triangle has adjacent-to-hypotenuse ratio 4/5.

4. B - 3/8

There are 3 ways to choose the two head positions among 8 equally likely outcomes.

5. B - 42

$84 = 2 \times 42$ and $126 = 3 \times 42$, so their greatest common factor is 42.

6. A - $x=3$ or -3

$(x - 3)(x + 3) = 0$, so x equals 3 or -3.

7. A - 8 m

Pythagoras gives height = $\sqrt{10^2 - 6^2} = 8$ m.

8. B - 8

The middle of the five ordered values is 8.

Answers and explanations (continued)

9. A - -2

$$p(3)=9-12+1=-2.$$

10. C - 6

$$a + 4d = 18, \text{ so } a = 18 - 12 = 6.$$

11. B - 44 cm

$$\text{Circumference} = 2\pi r = 2 \times 22/7 \times 7 = 44 \text{ cm}.$$

12. C - 5/8

Five of the eight balls are not green, giving probability $5/8$.

13. D - $x^2+3x-10$

$$(x-2)(x+5)=x^2+3x-10.$$

14. D - 55

$$\text{The sum is } n(n+1)/2 = 10 \times 11/2 = 55.$$

15. C - 12 m

$$\tan 45 \text{ degrees} = \text{height}/12 = 1, \text{ so height is } 12 \text{ m}.$$

16. D - 1/6

There are six pairs summing to 7 out of 36 equally likely outcomes.

Topic scope checked against SOF syllabus: [SOF IMO Class 10 syllabus](#)