



International Vedic Maths Olympiad 2024
Intermediate
Time allowed - 1 Hour

This Olympiad consists of 40 multiple choice questions.

2 marks are awarded for correct answers for questions 1 - 25

3 marks are awarded for correct answers for questions 26 - 35 and -1 mark for each incorrect answer.

4 marks are awarded for correct answers for questions 36 - 40 and -2 marks for each incorrect answer.

Negative marks for incorrect answers for questions 26 - 40 are to discourage guessing.

Answers, A, B, C, D or E, must be written on the answer sheet provided.

Rules

Rough workings can be done on plain paper.

Electronic devices such as computers, calculators, smart watches and mobile phones are not allowed.

Measuring or drawing instruments are not allowed.

Questions 1 - 25: Score 2 marks for each correct answer.

1. $1 - 0.2 + 0.03 - 0.004 + 0.0005$

A 0.9235

B 0.7365

C 0.8265

D 0.8345

E 0.9685

2. $101214 \div 9$

A 11324

B 15247

C 11246

D 11072

E 13142

3. 9876×9993

A 9875868

B 98760868

C 98760768

D 98731828

E 98690868

4. Which of the following is a multiple of 11?

A 5151515

B 6161616

C 7171717

D 8181818

E 9191919

5. What is the value of the digit, A, in the calculation, $83 \times 87 = 7A21$?

A 1

B 2

C 3

D 4

E 5

6. Including repetitions, how many prime factors does 2024 have?

A 3

B 4

C 5

D 6

E 7

7. What is the remainder for $256379 \div 12101$?

A 2258

B 3644

C 2735

D 6434

E 5363

8. Which is the most suitable sutra for the calculation in the previous question?

A All from 9 and the last from 10

B By the last digits

C Vertically and crosswise

D Transpose and Apply

E By Addition and Subtraction

9. 9988^2
- A 99880284 B 98981164 C 99760144 D 99440164 E 99844154

10. One sheet of A4 paper has an area of $\frac{1}{16} \text{ m}^2$. A4 paper has a mass of 80 g per m^2 .
What is the total mass of 320 sheets of A4 paper?

- A 800 g B 1200 g C 1600 g D 2400 g E 3200 g

11. 49^3
- A 116759 B 117649 C 132589 D 172639 E 125459

12. What is the remainder when $2^2 \times 4^4 \times 6^6 \times 8^8$ is divided by 9?

- A 0 B 2 C 4 D 6 E 8

13. What is the mean value of the five answers to 91×89 , 94×86 , 95×85 , 92×88 and 93×87 ?

- A 8086 B 8089 C 8090 D 8091 E 8093

14. After the decimal point, how many digits are in the decimal equivalent of $\frac{1}{6250}$?

- A 4 B 5 C 6 D 7 E 8

15. Three numbers are in the ratio, $\frac{4}{5} : \frac{5}{6} : \frac{9}{10}$.

The difference between the largest and smallest is 12. What is the value of the number that is neither the smallest nor the largest?

- A 92 B 96 C 100 D 104 E 108

16. A sequence begins, 0 3 10 21 36

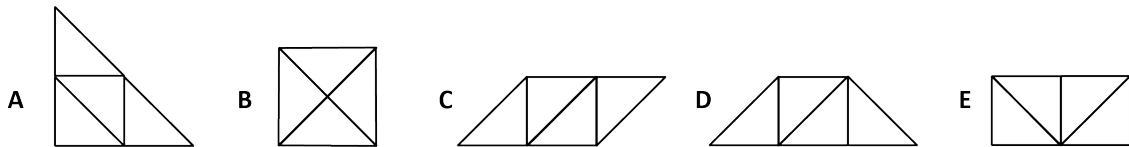
What is the 25th term in the sequence?

- A 406 B 551 C 1073 D 1176 E 1326

17. When using the Vertically and crosswise method to multiply 6734×2963 what is the result of the fourth step before any carry digits have been added?

- A 65 B 75 C 85 D 95 E 105

18. Each shape is made of four identical right-angled isosceles triangles. Which shape has the smallest perimeter?



19. Which of the following is the equation of the straight line which passes through the point $(7, -10)$ and has gradient -2 ?

- A $2x + y = 24$ B $2x + y = 4$ C $2x - y = 4$ D $2x + y = -24$ E $2x - y = 24$

20. How many of the following points lie on the line with equation $3x - 2y = 14$?

- $(4, -2)$ $(10, 8)$ $(16, 18)$ $(18, 20)$ $(32, 41)$

- A 1 B 2 C 3 D 4 E 5

21. Tile P has an area of 504 cm^2 . Tile Q has an area of 2352 cm^2 . A floor is to be made with P tiles and another floor with Q tiles. What is the smallest area, in m^2 , that can be made so that both floors have the same area?

- A 0.1512 m^2 B 0.7056 m^2 C 1.0584 m^2 D 3.2928 m^2 E 4.2336 m^2

22. Due to lack of babies being born, the population of South Korea is predicted to fall by 60% by the end of the century. The current population is 52 million. To the nearest million, what is the predicted population for 2100?

- A 21m B 23m C 26m D 28m E 31m

23. What is the common solution to the equations, $x^2 - 10x - 24 = 0$ and $x^2 - 8x - 48 = 0$?

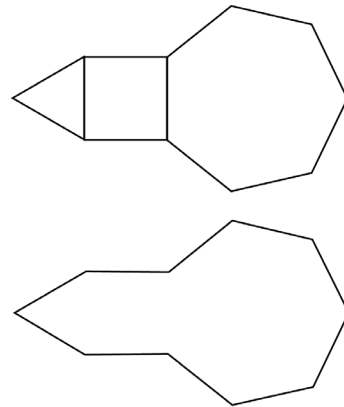
- A -2 B -4 C 6 D 8 E 12

24. Two ice-cream cones, A and B, are mathematically similar. The surface areas are 16 square inches and 25 square inches, respectively. The volume of cone A is 6.4 cubic inches. What is the volume of cone B?

- A 8 cu.in. B 10 cu.in. C 12.5 cu.in. D 25 cu.in. E 125 cu.in.

25. An equilateral triangle, a square and a regular heptagon are placed together as shown. What is the sum of the interior angles of the resulting shape?

- A 1260° B 1440° C 1620°
 D 1800° E 1980°



Questions 26 - 35: Score 3 marks for each correct answer. -1 mark for each incorrect answer.

26. Which of the following is a factor of $6x^3 + 7x^2 + x - 28$?

- A $x^2 - 3x + 7$ B $2x^2 - 11x + 4$ C $6x^2 + x - 4$ D $3x^2 - 8x - 7$ E $2x^2 + 5x + 7$

27. When $0.1\overline{5} + 0.2\overline{27}$ is written as the fraction the answer is $\frac{m}{66}$. What is the value of m ?

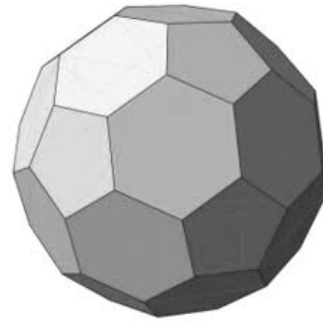
- A 7 B 10 C 25 D 225 E 377

28. Given that a year is 365.24 days long, and a month, from new moon to new moon, is 29.53 days long, how many months will there be in 19 years?

- A 235 B 275 C 281 D 296 E 305

29. A truncated icosahedron has 12 pentagon faces and 20 hexagon faces. Faces are joined along their edges. How many edges are there?

A 20 B 32 C 60
D 90 E 120

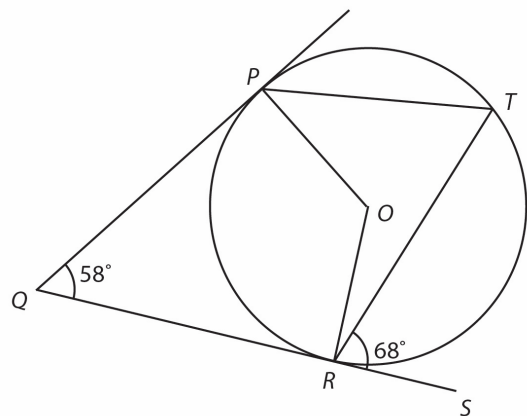


30. In the figure, QP and QRS are tangents to the circle with centre O.

$$\hat{PQR} = 58^\circ \text{ and } \hat{TRS} = 68^\circ .$$

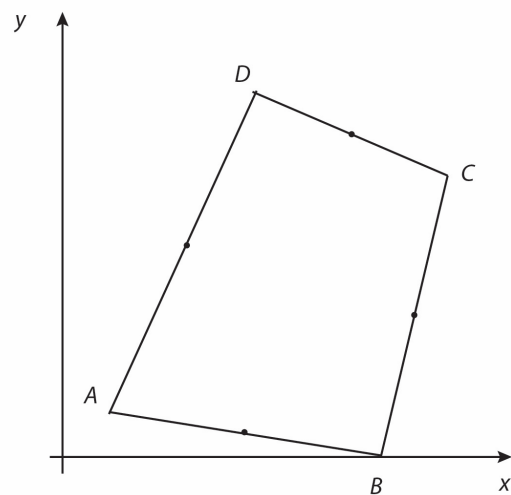
What is the size of \hat{OPT} ?

A 39° B 48° C 58°
D 61° E 63°



31. An irregular quadrilateral, has vertices $A(2, 2)$, $B(10, 0)$, $C(12, 8)$ and $D(6, 10)$. Midpoints of each side are joined to make quadrilateral PQRS. What shape is PQRS?

A Square B Rectangle C Parallelogram
D Rhombus E Kite



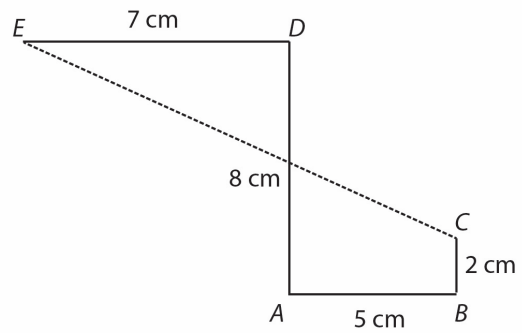
32. $2^a = \frac{2^n}{\sqrt[3]{2}}$ $2^b = (\sqrt{2})^5$ $a + b = 8$

What is the value of n ?

A $2\frac{2}{3}$ B $3\frac{3}{4}$ C $4\frac{4}{5}$ D $5\frac{5}{6}$ E $6\frac{6}{7}$

33. In the figure, $AB = 5$ cm, $BC = 2$ cm, $AD = 8$ cm and $ED = 7$ cm.
What is the length of EC ?

- A $6\sqrt{5}$ B $7\sqrt{6}$ C $8\sqrt{7}$
D $9\sqrt{8}$ E $10\sqrt{9}$



34. What is the 11th digit, after the decimal point in the recurring decimal equivalent for $4/39$?

- A 4 B 5 C 6 D 7 E 8

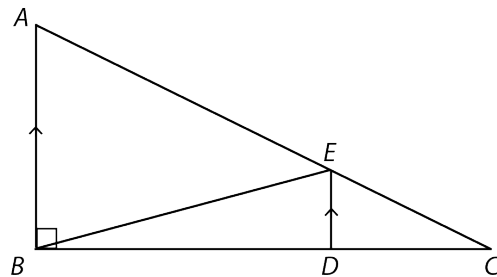
35. A regular p -sided polygon has exterior angle q° and a regular q -sided polygon has exterior angle p° .
For how many possible pairs of numbers (p, q) is this possible?

- A 12 B 16 C 18 D 20 E 24

Questions 36 - 40: Score 4 marks for each correct answer. -2 marks for each incorrect answer.

36. ABC is a right-angled triangle. AB is parallel to ED . The area of triangle EDC is 24 cm² and the area of triangle BED is 72 cm².
What is the area of triangle ABE ?

- A 96 cm² B 120 cm² C 180 cm²
D 216 cm² E 288 cm²

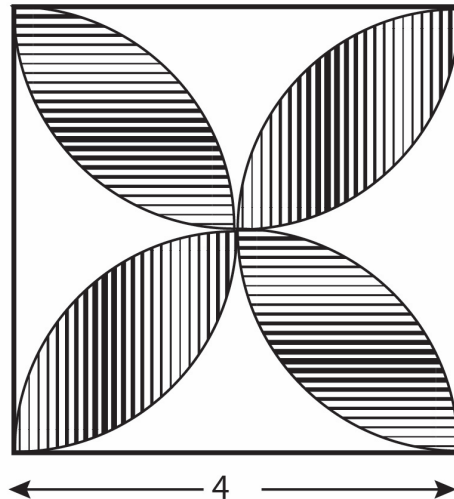


37. What is the minimum value of $x^2 + y^2 + 2xy + 8x + 8y + 12$?

- A -8 B -6 C -4 D -2 E 0

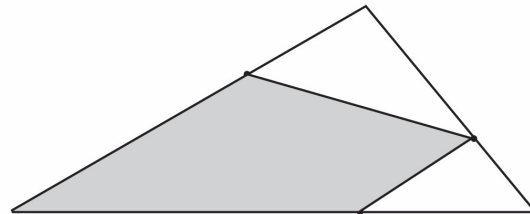
38. A square has side length 4. Four arcs have their centres at the midpoints of the sides of the square. What is the shaded area?

- A $4\pi - 2$ B $4\pi - 6$ C $6\pi - 8$
 D $8\pi - 12$ E $8\pi - 16$



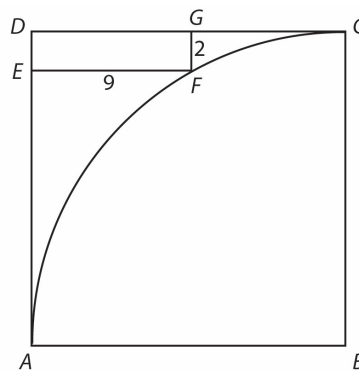
39. Points are placed one third of the way along each edge of a triangle as shown. What fraction of the whole triangle is shaded?

- A $\frac{1}{2}$ B $\frac{5}{9}$ C $\frac{2}{3}$
 D $\frac{7}{12}$ E $\frac{3}{4}$



40. $ABCD$ is a square with a quarter-circle centred at B and passing through A and C . The rectangle $EFGD$ measures 9 units by 2 units. What is the edge length of the square?

- A 15 B 17 C 21
 D 25 E 27



NOT DRAWN TO SCALE

Answer Key Intermediate IVMO 2024

Questions 1 - 25: Score 2 marks for each correct answer, 0 marks for each incorrect answer.

Questions 26 - 35: Score 3 marks for each correct answer, -1 mark for each incorrect answer.

Questions 36 - 40: Score 4 marks for each correct answer, -2 marks for each incorrect answer.

1. C	11. B	21. B	31. C
2. C	12. A	22. A	32. D
3. E	13. B	23. E	33. A
4. E	14. B	24. C	34. C
5. B	15. C	25. B	35. D
6. C	16. D	26. E	36. E
7. A	17. D	27. C	37. C
8. D	18. B	28. A	38. E
9. C	19. B	29. D	39. C
10. C	20. C	30. A	40. B