

TMC - 4



TeenEagle

MATHS

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Qualification Round Questions

1. (Logical Thinking)

3
points

Check the pattern and determine the missing number

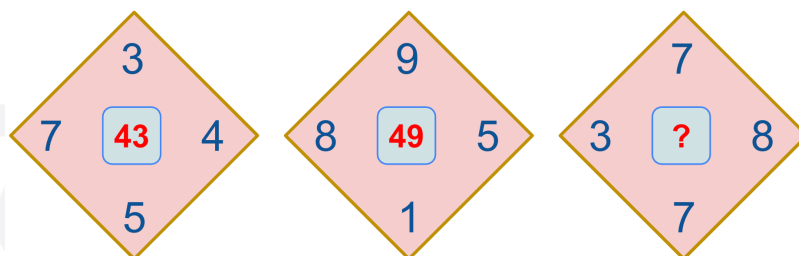


- (A) 6 (B) 5 (C) 4 (D) 3

2. (Logical Thinking)

3
points

Check the pattern and determine the missing number



- (A) 36 (B) 49 (C) 55 (D) 73

3. (Numbers: Power, roots and standard form)

3
points

A student defines two equations in terms of x and y:

$$x = \sqrt{9 + \sqrt{16}}, \quad y = \sqrt[3]{27 - \sqrt{64}}$$

Find the exact value of $x^2 + y^3$.

- (A) 32 (B) 23 (C) 19 (D) 13

4. (Geometry)

3
points

Raju has drawn a rectangle with coordinates $A(2, 5)$, $B(8, 5)$, $C(8, 1)$, and $D(2, 1)$.
What happens to the coordinates of point A if the rectangle is reflected in the line $y = x$?

- (A) $(-2, -5)$ (B) $(2, -5)$ (C) $(-2, 5)$ (D) $(5, 2)$

5. (Geometry)

3
points

A room is 5 metres long, 4 metres wide, and 3 metres high.
What is the length of the longest straight rod that can fit in the room?

- (A) $\sqrt{74}$ m (B) $5\sqrt{2}$ m (C) $6\sqrt{2}$ m (D) 12 m

6. (Geometry)

3
points

Leonardo plots the point $M(4, -2)$ on the coordinate plane and uses it as the centre of a square.
One vertex of the square is located at $P(7, 2)$.

Find the distance from the centre of the square to this vertex, that is, the distance MP .

- (A) $\sqrt{13}$ (B) 5 (C) $\sqrt{41}$ (D) 7

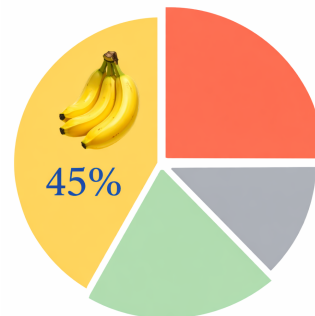
7. (Geometry and Percentages)

3
points

A pie chart shows that 45% of students chose bananas as their favorite fruit.
There are 200 students in total.

What is the angle of the banana sector?

- (A) 162° (B) 125° (C) 90° (D) 45°



8. (Functions)

3
points

The function f is given below.

$$f(x) = x^2 + 2x$$

What is the value of $f(a+1) - f(a)$?

- (A) $2a$ (B) $2a + 1$ (C) $2a + 3$ (D) $2a + 5$

9. (Functions)

3
points

A water tank initially contains 120 litres of water.

It leaks at a constant rate.

The amount of water left after t minutes is given by $W(t) = 120 - kt$.

If the tank is empty after 30 minutes, what is the value of k ?

- (A) $k = 3$ (B) $k = 4$ (C) $k = 5$ (D) $k = 6$

10. (Sequences)

3
points

The sum of three consecutive numbers is 81.

Find the largest number.

- (A) 26 (B) 27 (C) 28 (D) 29

11. (Logical Thinking)

4
points

A machine can pack a batch of flyers in 6 hours.

Faster machine can pack the same batch in 4 hours.

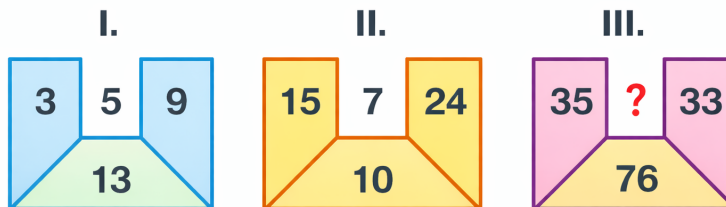
If they work together, how long will they take?

- (A) 2 hours 15 minutes
(B) 2 hours 24 minutes
(C) 3 hours 10 minutes
(D) 4 hours

12. (Logical Thinking)

4
points

Check the pattern and determine the missing number.



- (A) 12 (B) 11 (C) 10 (D) 9

13. (Algebra)

4
points

Misha is simplifying a rational expression for a science model:

$$\frac{3x + 5}{x^2 - 1}$$

She rewrites it in the form:

$$\frac{3x + 5}{x^2 - 1} = \frac{A}{x - 1} + \frac{B}{x + 1}$$

Find the values of A and B .

- (A) $A = 4$ and $B = -1$
- (B) $A = 2$ and $B = 3$
- (C) $A = 5$ and $B = -2$
- (D) $A = 1$ and $B = 4$

14. (Geometry)

4
points

Two brothers each draw a triangle.

The triangles are similar, and the ratio of their corresponding sides is $2 : 5$.

If the perimeter of the smaller triangle is 18 cm, find the perimeter of the larger triangle?

- (A) 36 cm (B) 45 cm (C) 48 cm (D) 54 cm

15. (Sequences)

4
points

A school in Astana selects three consecutive class numbers for the TeenEagle competition. The total of the three numbers is 120.

What is the largest class number?

- (A) 39 (B) 40 (C) 41 (D) 42

16. (Algebra and Sequences: Linear equations quadratic equations)

4
points

A mathematician defines a number x such that

$$x = 3 + \frac{4}{3 + \frac{4}{3 + \dots}}$$

It is known that $x > 0$ and x is rational.

What is the value of x ?

- (A) 5 (B) 4 (C) 3 (D) 2

17. (Numbers: Power; roots and standard form)

4
points

Alex evaluates two expressions:

$$x = \sqrt{m + \sqrt{n}}, \quad y = \sqrt[3]{p - \sqrt{q}}$$

Given that:

$$m + p = 40, \sqrt{n} + \sqrt{q} = 7, \text{ and } q = 16$$

Find the exact value of $x^2 + y^3$.

- (A) 39 (B) 41 (C) 35 (D) 37

18. (Ratio and Proportions)

4
points

A library at TeenEagle School has x books in total.

The ratio of fiction to non-fiction books is 4 : 9.

Some non-fiction books are donated, while the number of fiction books stays the same.

After the donation, fiction books make up $\frac{2}{5}$ of the total number of books.

How many books were donated, in terms of x ?

- (A) $\frac{2}{5}x$ (B) $\frac{9}{13}x$ (C) $\frac{3}{13}x$ (D) $\frac{10}{13}x$

19. (Percentages)

4
points

At the TeenEagle investment firm, Noah invests \$12,500.
After 5 years, his investment earns \$3,750 in interest.

At what annual rate of simple interest did he invest his money?

- (A) 4.5% (B) 5.6% (C) 6.0% (D) 7.5%

20. (Coordinate Geometry and Graphs: Coordinate geometry)

4
points

The graphs of $y = (x - 2)^2$ and $y = x + 1$ intersect at A and B .
Find the length of AB .

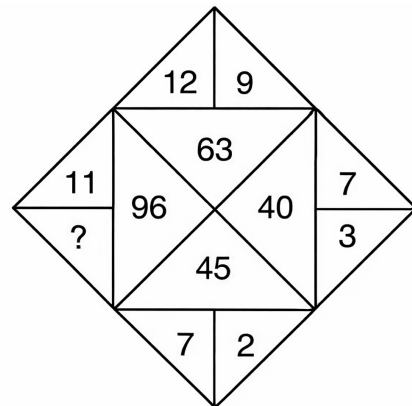
- (A) $\sqrt{26}$ (B) $\sqrt{13}$ (C) $2\sqrt{13}$ (D) 13

21. (Logical Thinking)

5
points

Check the pattern and determine the missing number.

- (A) 5 (B) 8 (C) 10 (D) 12



22. (Logical Thinking)

5
points

Check the pattern and determine the missing number.

	6	5	9	4	
20	22	8	19	25	
	7	6	3	?	

- (A) 8 (B) 9 (C) 10 (D) 11

23. (Logical Thinking)

5
points

In a school, there are 4 clubs: Art, Chess, Drama and Science.
There are 4 students: Alya, Bora, Can and Derya.
Each student joins exactly one club, and each club has exactly one student.

Clues:

1. Alya is not in Drama or Science.
2. Bora is not in Art.
3. Can is not in Chess.
4. Derya is either in Drama or Chess.
5. Science is not chosen by Bora or Derya.

Which club does Can join?

- (A) Art (B) Chess (C) Drama (D) Science

24. (Sequences)

5
points

A shop labels three boxes with consecutive integers.
The sum of the three numbers is 60, and the middle number is a multiple of 7.

What is the largest box number?

- (A) 20 (B) 21 (C) 22 (D) No solution

25. (Algebra and Sequences: Linear equations quadratic equations)

5
points

A student at TeenEagle School studies an infinite continued fraction defined by:

$$x = 4 + \frac{1}{4 + \frac{1}{4 + \frac{1}{\dots}}}$$

Which of the following is the exact value of x if it is greater than 4?

- (A) $2 + \sqrt{5}$
(B) 4
(C) $2 + \sqrt{17}$
(D) $2 + \sqrt{13}$

26. (Algebra)

In Barcelona city six workers dig a 6-metre trench in 8 days.

If 3 workers leave after 2 days, how many total days will it take to finish a 9-metre trench?

- (A) 20 days (B) 22 days (C) 24 days (D) 26 days



5
points

27. (Percentages)

Emma invests some money at a simple interest rate of % per year. After 6 years, the interest earned is 45% of the principal.

What is the value of r ?

- (A) 4.5 (B) 6.0 (C) 7.5 (D) 9.0

5
points

28. (Coordinate Geometry and Graphs: Coordinate geometry)

The graphs of $y = (x - 1)^2$ and $y = mx + 1$ intersect at A and B .

If the length of $AB = 4\sqrt{5}$ and $m > 0$, then find m .

- (A) 2 (B) 1 (C) $\sqrt{3}$ (D) 4

5
points

29. (Basic trigonometric equations)

Solve the trigonometric equation below:

$$6 \cos x + 3 = 3 \sin^2 x$$

for $0^\circ \leq x \leq 360^\circ$

- (A) $60^\circ, 360^\circ$ (B) $90^\circ, 270^\circ$ (C) $120^\circ, 240^\circ$ (D) $0^\circ, 180^\circ, 360^\circ$

5
points

30. (Coordinate geometry)

The line $y = 2x - 3$ intersects the curve $y = x^2 - 4x + 5$ at points P and Q .

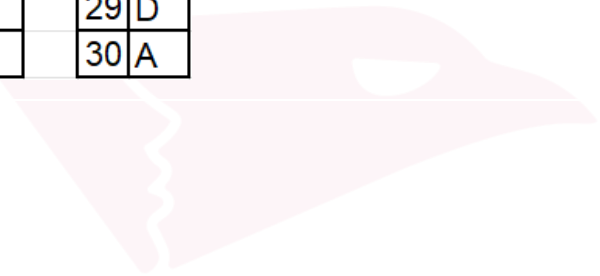
If the x -coordinate of P is $x = 2$, find the coordinates of Q .

- (A) (4, 5) (B) (4, 1) (C) (2, 5) (D) (-4, 5)

5
points

Answer Key

1	A	11	B	21	A
2	D	12	A	22	D
3	A	13	A	23	C
4	D	14	B	24	D
5	B	15	C	25	A
6	B	16	B	26	B
7	A	17	A	27	C
8	C	18	C	28	A
9	B	19	C	29	D
10	C	20	A	30	A



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