

ASSOCIATION OF MATHEMATICS TEACHERS OF INDIA

Screening Test – Kaprekar Contest
(NMTC-- SUB-JUNIOR LEVEL—VII and VIII Grades)

Saturday, the 15th October 2022

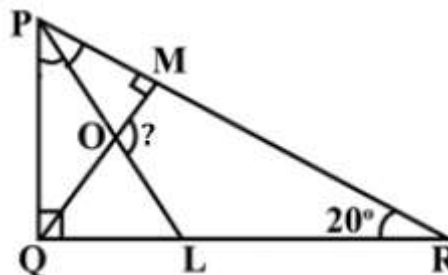
Note:

1. Fill in the Response Sheet with your Name, Class and the Institution through which you appear, in the specified places.
2. Diagrams given are only Visual aids; they are not drawn to scale.
3. You may use separate sheets to do rough work.
4. Use of Electronic gadgets such as Calculator, Mobile Phone or Computer is not permitted.
5. Duration of the Test: 2 pm to 4 pm (2 hours).

- 01.** The value of $\sqrt{46.47.48.49 + 1}$ when simplified is
 a) 2245 **b) 2255** c) 2345 d) 2195
- 02.** Two regular polygons of same number of sides have side lengths 8 *cm* and 15 *cm*. The length of the side of another regular polygon of same number of sides whose area is equal to the sum of the areas of the given polygons is (in *cm*.)
a) 17 b) 23 c) 38 d) 120
- 03.** When $a = 2022$, $b = 2023$, the numerical value of

$$\left(\frac{a}{1 + \frac{a}{b}} - \frac{b}{1 - \frac{b}{a}} - \frac{2}{\frac{1}{a} - \frac{a}{b^2}} \right)$$
 is
 a) 1 b) 2022×2023 c) $(2023)^2$ **d) 0**
- 04.** Two sides of a triangle are of lengths 5 *cm* and 10 *cm*. The length of the altitude to the third side is equal to the average of the other two altitudes. The length of the third side (in *cm*) is
 a) 12 b) 8 **c) $\frac{20}{3}$** d) 9

11. In the adjoining figure, PL is the bisector of $\angle QPR$.
The measure of the angle MOL is ...



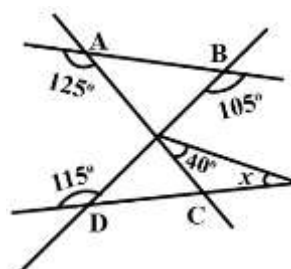
- a) 115° b) 120°
c) 125° d) 135°

12. A four centimetre cube is painted blue on all its faces. It is then cut into identical one centimetre cubes. Among them, the number of cubes with only one face painted is ...

- a) 12 b) 16 c) 18 **d) 24**

13. In the adjoining figure, the value of x (in degrees) is

- a) 20° **b) 25°**
c) 30° d) 35°



14. Given here is a magic square.

The numerical value of

$a^2 + b^2 + c^2 + d^2 + e^2$ is ...

a	14	b	0
c	5	6	11
4	d	10	7
15	2	e	12

- a) 324** b) 144 c) 274 d) 316

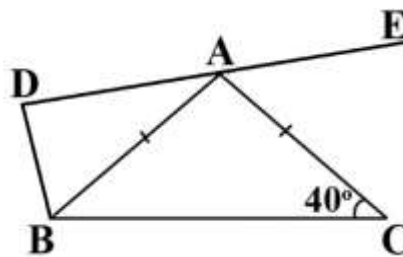
15. $x\%$ of 400 added to $y\%$ of 200 gives 100. If $y\%$ of 800 is 80, what percent of x is y ?

- a) 60 b) 40 **c) 50** d) 20

FILL IN THE BLANKS:

16. In the adjoining figure, $AB = AC$
and $\hat{C} = 40^\circ$.

If $\angle ABD = (3x - 3)^\circ$, $\angle BDA = (2x + 8)^\circ$
and $\angle CAE = (x - 11)^\circ$ then $x = \underline{21}$



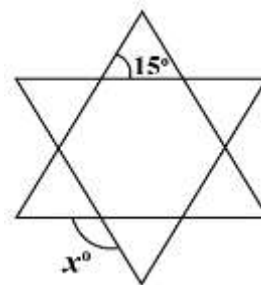
17. If $a = 2022$, $b = -2$, $c = 4044$ then the numerical value of

$$\frac{a(b^2 - c^2)}{bc} + \frac{2b(c^2 - a^2)}{ca} - \frac{c(2b^2 - a^2)}{ab} \text{ is } \underline{1}$$

18. If $a = \sqrt[3]{2} - \frac{1}{\sqrt[3]{2}}$, then the numerical value of $2a^3 + 6a$
is 3.

19. In the adjoining figure, two equilateral triangles cut
each other.

The measure of the angle x° is 165
degrees.



20. A vendor has four regular customers. He sells to the first customer half
his stock of cakes and half a cake. He sells to the second customer half
of the remaining stock and half a cake. He repeats this procedure for the
third and the fourth customer also. Now, finally he is left with 15 cakes.
The number of cakes he had in the beginning is 255.

21. In the sequence 1, 1, 1, 2, 1, 3, 1, 4, 1, 5, ..., the 2022nd term is 1011.

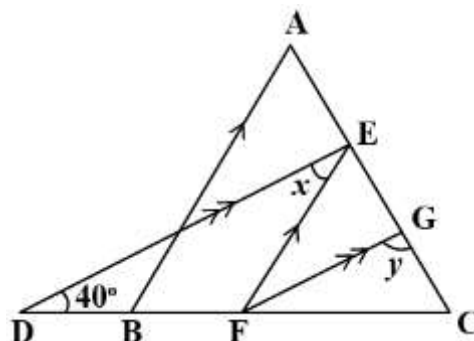
22. In the adjoining figure, ABC is an
equilateral triangle.

AB and EF are parallel.

DE and FG are parallel.

$\angle BDE = 40^\circ$.

Then $x + y$ (in degrees) is 120



23. A gardener has to plant a number of rose plants in straight rows. First he tried 5 in each row; then he successively tried 6, 8, 9 and 12 in each row but always had 1 plant left. Then he tried 13 in a row and to his pleasant surprise, no plant was left out. The smallest number of plants he could have had is 3601.

24. A, B run a race 1 km long straight path. If A gives B 40 m start then, A wins by 19 seconds. If A gives B 30 seconds start, then B wins by 40 m. If B normally would take t_1 seconds to run the total 1 km length and A normally would take t_2 seconds to run the total 1 km length, then $t_1 - t_2$ (in seconds) is 25.

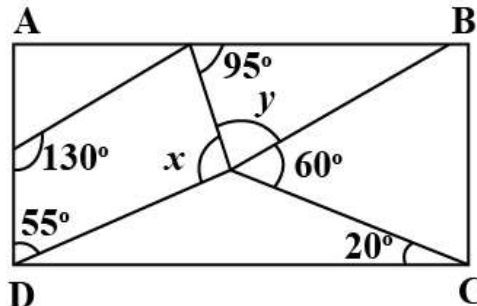
25. David computed the value of 3^{19} as 11a 2261467. He found all the digits correctly except 'a'. The value of 'a' is 06.

26. The sum of eight consecutive natural numbers is 124. The sum of the next 5 natural numbers will be 110.

27. In the adjoining figure, ABCD is a rectangle.

The value of $x + y$ (in degrees)

is 175.



28. If $A = (625)^{-3/4}$ and $B = (78125)^{3/7}$, then the value of $A \times B$ is 01.

29. A room is 5 m 44 cm long and 3 m 74 cm broad. The side of the largest square-slabs which can be paved of this room (in cm.) is 34.

30. A company sells umbrellas in two different sizes, large and small. This year it sold 200 umbrellas, of which one-fourth were large. The sale of large umbrellas produced one-third of the company's income. If $a : b$ is the ratio of the price of a larger umbrella to the price of a smaller umbrella, then ab^2 is 12.