M. Prakash Institute **23 April 2023**
Entrance Test **10am-12noon**
3 Year foundation program **Paper type: AB**

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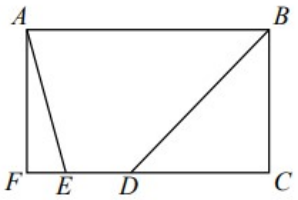
1. Find the value of $20 \times \left(\frac{1}{2} + \frac{1}{5} + \frac{1}{10}\right)^{-1}$?

2. Sum of five consecutive natural numbers is 35. Find the sum of next five consecutive natural numbers.

3. Find the smallest natural number to be added to 2023 so that we get a perfect square.

4. Points A, B, C, and D are on a line in that order. The distance from A to D is 24 . The distance from B to D is 3 times the distance from A to B. Point C is halfway between B and D. What is the distance from A to C ?

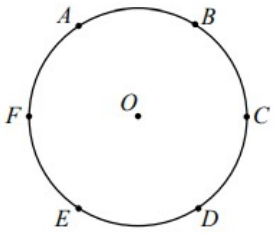
5. In the diagram, $ABCF$ is a rectangle with $AB = 30$ and $AF = 14$. Points E and D are on FC so that $FE = 5$ and the area of quadrilateral $ABDE$ is 266. The length of DC is



6. The average of a, b and c is 16 . The average of c, d and e is 26 . The average of a, b, c, d, and e is 20 . The value of c is

7. A positive number is increased by 25%. By what percentage should the result be decreased to return to the original value?

8. Points A, B, C, D, E, and F are evenly spaced around the circle with centre O, as shown. The measure of $\angle ACO$ is

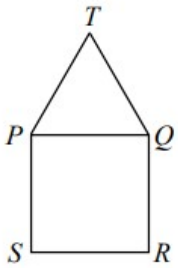


9. A rectangle has positive integer side lengths and an area of 24 . The perimeter of the rectangle cannot be
(If your answer is 20, mark 20 as your answer. If your answer is 28, mark 28 as your answer, etc.)
(A) 20 (B) 22 (C) 28 (D) 50 (E) 36

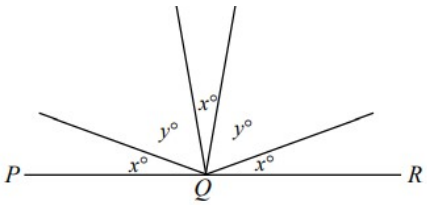
10. The operation $a \nabla b$ is defined by $a \nabla b = \frac{a+b}{a-b}$ for all integers a and b with $a \neq b$. For example, $2 \nabla 3 = \frac{2+3}{2-3} = -5$. If $3 \nabla b = -4$, what is the value of b ?

11. If x is 20% of y and x is 50% of z, then what percentage is z of y ?

12. In the diagram, pentagon TPSRQ is constructed from equilateral $\triangle PTQ$ and square $PQRS$. The measure of $\angle STR$ is equal to



13. In the diagram, PQR is a straight line segment. If $x + y = 76$, what is the value of x?



14. If $3^x = 5$, the value of 3^{x+2} is

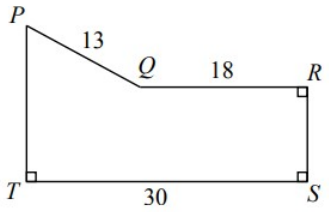
15. A group of friends are sharing a bag of candy. On the first day, they eat $\frac{1}{2}$ of the candies in the bag. On the second day, they eat $\frac{2}{3}$ of the remaining candies. On the third day, they eat $\frac{3}{4}$ of the remaining candies. At the end of the third day, there is 1 candy remaining in the bag. How many candies were in the bag before the first day?

16. The variables a, b, c, d, e, and f represent the numbers $4, 12, 15, 27, 31$, and 39 in some order. Suppose that

$$a + b = c$$
$$b + c = d$$
$$c + e = f$$

The value of $a + c + f$ is

17. In the diagram, pentagon $PQRST$ has $PQ = 13$, $QR = 18, ST = 30$, and area of the pentagon $PQRST$ is 270.. Also, $\angle QRS = \angle RST = \angle STP = 90°$. Find the perimeter of $PQRST$.



18. Simplify and find $\dfrac{\dfrac{3168}{13}}{3 - \dfrac{7}{13}} =$

19. Find the sum of all natural numbers between $\sqrt{37}$ and $\sqrt{120}$.

20. $\dfrac{\sqrt{507} + \sqrt{845} + \sqrt{1183}}{\sqrt{3} + \sqrt{5} + \sqrt{7}} =$.

Key:

1	2	3	4	5	6	7	8	9	10
25	60	2	15	17	26	20	30	36	5
11	12	13	14	15	16	17	18	19	20
40	30	28	45	24	73	82	99	34	13