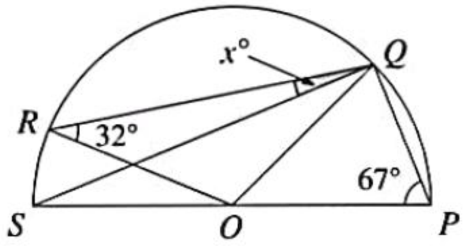
SOLUTIONS

1. (C)
The cat eats 1/3 food in morning and 1/4 food in evening.
Hence, in 1 day, the cat consumes = 1/3 + 1/4 = 7/12 of a can
Therefore, to consume 6 cans of food, the cat will take 6/(7/12) = 72/7 days = 10.3 days (approx.)
So, starting from Monday, on the 11th day or on Thursday the cat will finish eating all the food.
Hence, the correct answer is option C.

2. (A)
Triangle OPQ is isosceles (OP and OQ are both radii), so angle $OPQ = 67^o$.



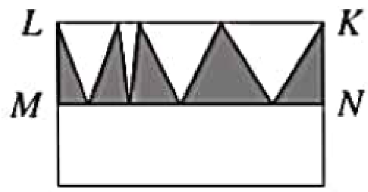
$PQS = 90^o$ (angle in a semicircle).

angle $OQS = 90^o - 67^o = 23^o$.

Triangle OQR is also isosceles (OQ and OR are both radii) so angle $OQR = 32^o$.

$x = 32 - 23 = 9$.

3. (C)
The diagram here shows all of the lower triangles reflected to be above the line MN.

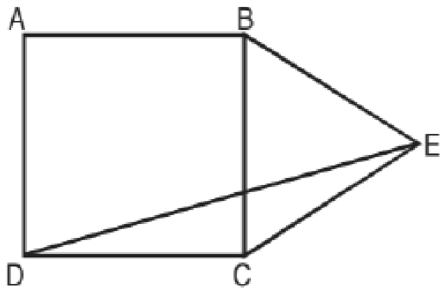


This makes clear that the total area of all of the shaded triangles is

$\frac{1}{2} \times MN \times ML$.

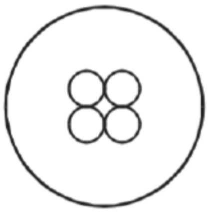
This area is half that of the rectangle $MNKL$, and so equals $\frac{1}{4}$ of the original rectangle.

4. (A)



Since ΔBCE is an equilateral triangle, CE = BC = BE.
And since ABCD is a square, BC = CD. Hence, CD = CE.
So in ΔCDE, we have CD = CE. Hence, $\angle EDC = \angle CED$.
Now $\angle BCE = 60°$ (since equilateral triangle) and $\angle BCD = 90°$ (since square).
Hence, $\angle DCE = \angle DCB + \angle BCE = (60 + 90) = 150°$.
So in $\Delta DCE, \angle EDC + \angle CED = 30°$ (since three angles of a triangle add up to 180^o).
Hence, we have $\angle DEC = \angle EDC = 15°$.

5. (C)



Area of the original paper = $\pi(20)^2 = 400\pi\ cm^2$.

The total cut portion area = $4(\pi)(5)^2 = 100\pi\ cm^2$.

Therefore, area of the uncut (shaded) portion = (400 – 100) = $300\pi\ cm^2$.

Hence, the required radio = $300\pi : 100\pi = 3:1$.

6. (C)

The two equations are : 2o + 3b + 4a = 15 and 3o + 2b + a = 10.
Adding the two equations, we get
5o + 5b + 5a = 25
$\Rightarrow$ o + b + a = 5
$\therefore$ 3o + 3b + 3a = 15.

7. (D)

In five seconds, the cyclist will have travelled 5 × 5m = 25m.
Hence the wheels will have made 25 ÷ 1.125 = 20 complete turns.

8. (C)

We can form a triangle with any 3 points which are not collinear.
3 points out of 5 can be chosen in ${}^5C_3 = 10$ ways. But of these, the three points lying on the two diagonals will be collinear.
So, 10 – 2 = 8 triangles can be formed.

9. (D)

Required number = LCM (4, 6, 7) + 2 = 86.

10. (B)

Since cyclicity of the power of 2 is 4, so 2^{51} can be written in $2^{4(12)+3}$ or unit digit will be $2^3 = 8$.

11. (C)

$$\begin{array}{r} ab \\ -ba \\ \hline 36 \end{array}$$

10a + b – 10b – a = 0
9 (a – b) = 36
$\therefore$ a – b = 4
$\therefore$ a = 4, 5, 6, 7, 8, 9
$\therefore$ 6 cases

12. (C)

Total area = $\Delta ADB + \Delta ADC$

$\frac{1}{2}\times 5\times 12 = \frac{1}{2}\times 13g + \frac{1}{2}5e + \frac{1}{2}12f$

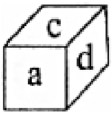
$\therefore$ 5e + 12f + 13g = 60

13. (C)

The number formed by the last 3 digits of the main number is 354. The remainder is 2 if we divide 354 by 8. So the remainder of the main number is also 2 if we divide it by 8.

14. (D)

b is opposite to d.
a is opposite to f.
e is opposite to c.

i.e. 

is correct.

15. (A)

$\frac{a+3d}{a+9d} = \frac{a+d}{a+5d}$

$a^2 + 5ad + 3ad + 15d^2 = a^2 + 9ad + ad + 9d^2$

$6d^2 = 2ad$

$\therefore\ a = 3d$

$\therefore\ \frac{a+d}{a+5d} = \frac{3d+d}{3d+5d} = \frac{1}{2} = k$

16. (C)

Let R be the radius of each circle. Then $\frac{\pi R^2}{2\pi R} = \frac{2\pi R}{\pi R^2}$ which implies that $\frac{R}{2} = \frac{2}{R}$, i.e. $R^2 = 4$, i.e. R = 2.

Then the length of the square is 8. Thus, the area of the square is 64, while the area covered by each coin is $\pi 2^2 = 4\pi$. Since there are four coins, the area covered by coins is $4(4\pi) = 16\pi$.

Hence, the area not covered by the coins is $64 - 16\pi = 16(4-\pi)$.

17. (B)

Given, the interior angle is $165°$, we set up the equation:

$165 = \left[(n-2)\times 180\right]/n$

Multiple both sides by n : 165n = 180 (n – 2)

$\Rightarrow$ 165n = 180n – 360

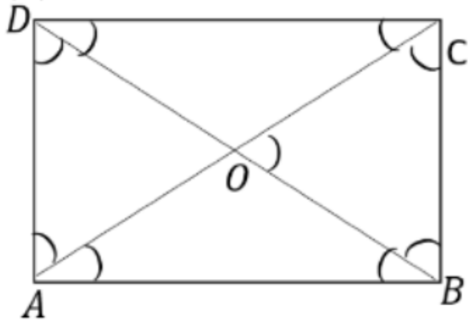
$\Rightarrow$ 180n – 165n = 360

$\Rightarrow$ 15n = 360

$\Rightarrow$ n = 24

$\therefore$ The number of sides of the polygon is 24.

18. (C)



$\angle ADB = 50°$

19. (B)

Note that the difference between the divisors and the remainders is constant.
2 – 1 = 3 – 2 = 4 – 3 = 5 – 4 = 6 – 5 = 1
In such a case, the required number will always be
[a multiple of LCM of (2, 3, 4, 5, 6) – (The constant difference)].
LCM of (2, 3, 4, 5, 6) = 60
Hence, the required number will be 60n – 1.
Thus, we can see that the smallest such number is (60 × 1) – 1 = 59
The second smallest is (60 × 2) – 1 = 119
So between 1 and 100, there is only one such number viz. 59.

20. (B)

$(\sqrt{2}-1)+(\sqrt{3}-\sqrt{2})+(\sqrt{4}-\sqrt{3})+....+(\sqrt{100}-\sqrt{99})$
= 10 – 1 = 9 Ans.