ACE OF PACE OBJECTIVE SECTION

1. **(D)**

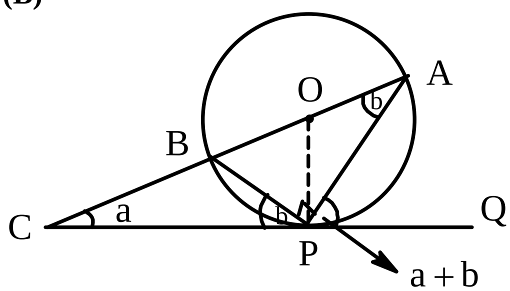
Using power of point A

$AD^2 = AP \times AB$

$\therefore \frac{1}{4}AB^2 = AP \times AB$

$\therefore \frac{1}{4}AB = AP$

2. **(B)**



As $\angle CAP = \angle BPC = b$

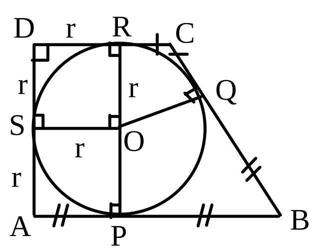
$\therefore \angle APQ = a + b$ [exterior angle of ΔACP]

Also $\angle APB = 90^0$

$\Rightarrow \angle BPC + \angle APQ = 90^0$

$\therefore a + 2b = 90^0$

3. **(A)**



□DROS is a square with side r.

$\therefore CQ = RC = 25 - r$

$\therefore BP = BQ = 38 - (25 - r) = r + 13$

$\therefore r + 13 = 27$

$\therefore r = 14$

4. **(C)**

$$\frac{(3p-4q)^{q-p}}{(4p-3q)^{2q-p}} = \frac{1}{(12-6)^{4-3}} = \frac{1}{6}$$

5. **(C)**

$$\left[\frac{32^{1/5} + 81^{1/4}}{256^{1/2} - 121^{1/2}}\right] = \frac{2+3}{16-11} = 1$$

6. **(A)**

Let $y=\sqrt{\frac{81}{64}\sqrt{\frac{81}{64}\sqrt{\frac{81}{64}........\infty}}}$

$y^2=\frac{81}{64}\sqrt{\frac{81}{64}\sqrt{\frac{81}{64}..........\infty}}$

$\Rightarrow y^2=\frac{81}{64}y$

7. **(A)**

Let the number of marbles with Krishna and Sudheer be K and S respectively.

$K+10=S-10+40\Rightarrow K=S+20$

$K+40=5(S-40)\Rightarrow S+20+40=5(S-40)$

$260=4S$ i.e., $S=65$.

8. **(C)**

Squaring the terms on both the sides, we get

$\left(\sqrt{x+5}+\sqrt{5-x}\right)^2=4^2$

$\Rightarrow x+5+5-x+2\sqrt{(x+5)(5-x)}=16$

$\Rightarrow 10+2\sqrt{25-x^2}=16$

$\Rightarrow \sqrt{25-x^2}=3$

Squaring the terms on both the sides again, we get

$25-x^2=3^2$

$\Rightarrow x^2=25-9$

$\Rightarrow x^2=16\Rightarrow x=\pm4$

$\therefore x=\pm4$ is the required solution of the given equation.

9. **(C)**

The required subsets will be the subsets of $\{1,2,4\}$

$\therefore$ The number of subsets $=2^3$

10. **(D)**

List out values of n, such that $\frac{2}{n}$ is an integer that is $n=\pm1,\pm2$

11. **(A)**

(i) Join OC and find the relation between OB and BC.

(ii) $OB=BC$ and $OC:OB=\sqrt{2}:1$

12. **(D)**

Since B is the midpoint of $\overline{SR}$ and

$PS=BR, PS=BS=PA=AB$.

$\therefore$ PABS is a rhombus and similarly AQRB is a rhombus.

$\therefore \angle BCA=\angle ADB=90^0$

As PB and QB are bisectors of $\angle P$ and $\angle Q$.

$\angle PBQ = 90^0$.

$\therefore$ CADB is a rectangle.

13. **(C)**

$\angle DAB = 50^0 \Rightarrow \angle DCE = 50^0$ (exterior angle of a cyclic quadrilateral)

$\angle ABC = 80^0 \Rightarrow \angle EDC = 80^0$ (exterior angle of a cyclic quadrilateral)

$\therefore$ In $\Delta DEC, \angle DEC = 180^0 - (50^0 + 80^0) = 50^0$

$\overrightarrow{EG}$ is the bisector of $\angle DEC$

$\Rightarrow \angle DEH = \frac{50^0}{2} = 25^0$

$\therefore \angle DHE = 180^0 - (\angle HDE + \angle DEH)$

$= 180^0 - (80^0 + 25^0) = 75^0$

$\angle FHG = \angle DHE$ (vertically opposite angles) $\Rightarrow \angle FHG = 75^0$

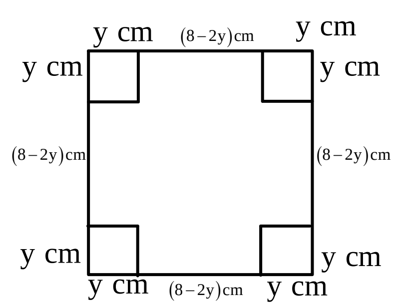
14. **(C)**

The exterior angle of the polygon $= 180^0 - 156^0 = 24^0$

$\therefore$ The number of sides of the polygon $= n = \frac{2 \times 180^0}{24^0} = 15$

$\therefore$ The number of diagonals of the polygon $= \frac{n(n-3)}{2} = 90$

15. **(D)**



Length $=$ Breadth $= (8-2y)$ cm and height $= y$ cm

Its volume $= (8-2y)(8-2y) \times y$

$y = (8-2y)^2\, y$ cubic cm.

$8 - 2y > 0$ i.e. $y < 4$ and y is an integer.

$\therefore y = 1$ or 2 or 3.

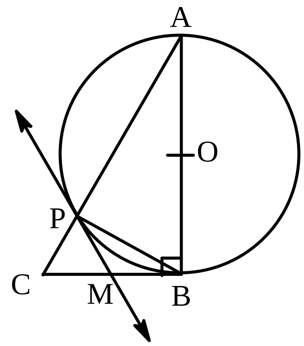
Among these values of y, volume is

Minimum when $y = 3$. When $y = 3$,

Volume $= 12\,cm^3$

$\therefore M = 12$

16. (C)



As AB is diameter, $\angle APB = 90^0$

$\therefore \angle CPB = 90^0$

Also, $PM = MB$

$\therefore \angle PBM = \angle BPM = x$ say

Let $\angle CPM = 90 - x = y$

$\therefore \angle PCM = 180 - (2x + y)$

$= 180 - x - (x + y)$

$= 180 - x - 90$

$90 - x = y$

$\Rightarrow PM = CM$

$\therefore CM = MB$

17. (C)

Powers of 7 ends with 7, 9, 3, 1 in rotation . As 267gives remainder 3 when divided by 4 , the required unit digit is 3.

18. (B)

Let original length and breadth be 100ℓ and 100b respectively.

$\therefore$ The area of original rectangle = $10000lb$

The area of new rectangle = $120l \cdot 130b = 15600lb$

19. (A)

As area of square = area of the rectangle = $8 \cdot 18 = 12^2$, hence side of the square is 12. After rearranging $y = \frac{1}{2}$ side of square.

$\therefore y = 6$

20. (D)

The area to be painted will be 3. $(2((10 \cdot 8) + (12 \cdot 8)) - 60) = 876$ square feet.

21. (C)

$\square$ ABCE forms a square and ΔCDE is an equilateral.

$\therefore \angle E = \angle AED = 90^0 + 60^0 = 150^0$

22. **(D)**

Let l denote bucket weight and m be water weight. You want l + m and you are given $a = \ell + \frac{2}{3}m$ and $b = \ell + \frac{1}{2}m$. Just by clearing fractions you get 3a = 3l + 2m and 2b = 2l +m which leads to 3a − 2b = l + m.

23. **(D)**

You have two right triangles of x^2+144 = 225 and y^2+144 = 169,
where x + y = BC which yield x^2 = 81 and y^2 = 25 giving you answers ± 9 and ± 5.
This gives you four equations from BC = x + y : 9 + 5,− 9 + 5, 9 − 5,− 9 − 5
Since only 9 + 5 = 14 and 9 − 5 = 4 yield positive answers, you have
14 + 4 = 18

24. **(B)**

This inner rectangle has dimensions b − 2 and a − 2. Twice the area of this rectangle is the area of the larger rectangle with dimensions a and b, so:

$$2(a-2)(b-2) = ab$$
$$ab - 4a - 4b + 16 = 8$$
$$(a-4)(b-4) = 8$$

8 can be broken up as 1.8 and 2.4. Both give one solution for (a, b) since b > a. Thus, the answer is 2

25. **(A)**

The total distance covered $= \frac{1}{2}16 + \frac{3}{2}4 = 14$

The average speed = $\frac{14}{2} = 7$

26. **(A)**

$$\frac{10^{2000}+10^{2002}}{10^{2001}+10^{2001}} = \frac{10^{2000}+10^{2002}}{2.10^{2001}} = \frac{1}{20} + \frac{10}{2} = 5.05$$

27. **(A)**

Since the triangle has side lengths in the ratio of 3 : 4 : 5, we can say that it is a right triangle (since 3,4,5 is a Pythagorean Triplet). We know the radius of the circle is 3, so the hypotenuse is 6. Now, since the triangle is right, we know that the hypotenuse is the diameter of the circle. Say that 5x = 6. Thus, x = 1.2. Therefore, 3x = 3.6 and 4x = 4.8. Now, this means that the length of the other sides are 4.8 and 3.6. Finally, we multiply these sides and divide by 2 to get 8.64.

28. **(C)**

The product, through experimentation, has to be (1) (−1) (3) (−3) (5)
Therefore, we can easily find a, b, c, d, and e.

a = 5; b = 7; c = 3; d = 9; e = 1

A + B + C + D + E = 1 + 3 + 5 + 7 + 9 = 25

29. **(B)**

The sum of the tens place digits should be 20.
∴ The sum of the units place digits is 21.
∴ The sum of the units place digits and the tens place digits are 41.
∴ The sum of all numbers from 1 to 9 is 45, so 45-41 is equal to 4, and 4 is the number not included.

30. **(C)**
I gives a basic semicircle with radius 8 and area 32π. II gives us the same semicircle, but also a quarter circle of radius 4. This is because it takes 4 feet of rope to get to the nearest corner, therefore he has 4 more feet of rope to go directly past the corner or to the left of it.

31. **(B)**
Notice that after adding the first ring, you are adding a total of 17 to the height, then 16 then 15 and so on (this is exactly why the final ring has to 3, because it will add 1 to the total height) so the final answer is:
20 + 17 + 16 + ... + 1 = 173

32. **(C)**
The area that she can see inside the square is 25−9 = 16 square km. The area outside the square consists of 4 rectangle of sides 5x1 and 4 quarter circles with a 1km radius, for a total of $20+\pi$ square km.
Thus the total area is $16 + 20 + \pi \approx 39$ square kilometers.

33. **(B)**
$f(0) = 0$
$f(-1) = -1^0 \times 1^2 = 1\times 1 = 1$
$f(-2) = -2^{-1} \times 0^3 = 0$
$f(-3) = -3^{-2} \times (-1)^0 = \frac{1}{9}$ So, the answer is $1+\frac{1}{9} = \frac{10}{9}$

34. **(D)**

35. **(B)**
The total bill for children = 945 − 495 = 450
$\therefore$ The sum of ages of children =10 years
The only possible combination is 10 = 4 + 4 + 2.

36. **(D)**
Let speeds of Rahul and Priyanka be 1 and m respectively.
Let they meet after covering a distance d run by Rahul.
$\therefore \frac{d}{1} = \frac{d+h}{m}$
$\therefore d = \frac{h}{m-1}$
$\therefore$ The distance covered by Priyanka = d + h = $\frac{mh}{m-1}$

37. **(C)**
Let the number be $10a+b$
$\therefore 9(a-b) = 5(a+b) \Rightarrow 2a = 7b$
$\therefore$ The number is 72.

38. **(A)**

$$y=\frac{a}{b}+\frac{b}{a}-ab=\frac{a^2+b^2-(ab)^2}{ab}$$

Since $ab=a-b$, we get……… $y=\frac{2ab}{ab}=2$.

39. **(A)**

The numbers that are 1 less than a multiple of 5 will end with 4 or 9. So we need to look for primes ending with 9 that are 1 greater than a multiple of 4. The required sum= 29 + 89 = 118.

40. **(B)**

The sum of the angles of a hexagon is 720^0

If there are 4 acute angles, then, their sum < 360^0, then the sum of other two angles > 360^0, that means at least one angle is > 180^0 which is a contradiction.

We can have a convex hexagon with 3 acute angles, 89^0, 89^0, 89^0, 151^0, 151^0, 151^0.

41. **(B)**

$x+28^0=65^0 \Rightarrow x=37^0$

$90^0+x+y=180^0 \Rightarrow y=53^0$

42. **(A)**

$AB>AC$

$\Rightarrow \angle ACB>\angle ABC$

$\therefore \angle PCB>\angle PBC$

$\Rightarrow PB>PC$

43. **(B)**

Let $\angle ABC=2x,\ \angle ACB=2y,\ \angle BAC=2z$

In $\Delta OBC,\ \angle BOC=180-(x+y)$

$$=2(x+y+z)-(x+y)$$

$$=(x+y+z)+z$$

$$=90+\frac{1}{2}\angle BAC$$

44. **(B)**

$\therefore\ y=2x-30^0$

$\therefore x+y=3x-30=180^0$

$x=70^0$

45. **(B)**

Let sides be $3x, 4x, 5x$

$\therefore 12x=24$

$\therefore$ Sides are 6, 8, 10

$\therefore$ Its is a right triangle

Hence the area $=\frac{1}{2}6\times 8=24$ square unit

46. **(C)**

$sp = 100 + 25 = 125\%$ of CP

$\therefore 80 = \frac{125}{100} \times CP$

$\therefore CP = \frac{80 \times 4}{5} = Rs\ 64$

47. **(B)**

The distance covered by the train, with speed 45 km per hour, in 20 seconds is

$\frac{45 \times 1000 \times 20}{60 \times 60} = 250\,m$

$\therefore$ The length of bridge $= 250 - 130 = 120\,m$

48. **(D)**

The sum of 3 numbers $= 51$

The sum of first two numbers = 32

$\therefore$ The third number $= 51 - 32 = 19$

49. **(C)**

$a + b = 80$

$a - b = 20$

$a = 50 \qquad b = 30$

50. **(A)**

The number of days between 300th day of year N and 200th day of year N +1 is either 365−100 = 265 or 266 depending on whether n+1 is a leap year.

As this is divisible by 7 , we conclude that N + 1 is a leap year.

The number of days between 100th day of year N − 1 and 300th day of year N is 365+200 =565 so there is a remainder of 5 when divided by 7 and 5 days before Tuesday is Thrusday