ACE OF PACE OBJECTIVE SECTION
(SOLUTION)

1. **(D)**

14, 21, …., 98

$\therefore$ 98 = 14 + (n –1) 7

$\Rightarrow$ 84 = (n – 1) 7

$\Rightarrow$ n – 1 = 12

$\Rightarrow$ n = 13

2. **(A)**

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

$$\Rightarrow\frac{a^2-b^2+b^2}{ab}=2\Rightarrow\frac{a}{b}=2$$

$$\therefore\frac{a^2+b^2}{a^2-b^2}+\frac{a^2-b^2}{a^2+b^2}=\frac{4+1}{4-1}+\frac{4-1}{4+1}=\frac{5}{3}+\frac{3}{5}$$

$$=\frac{34}{15}$$

3. **(C)**

$\frac{75}{5}=15$ chocolates

$\frac{15}{5}=3$ chocolates

Then 3 + 2 = 5 wrappers

$\therefore\frac{5}{5}=1$ chocolate

Total = 15 + 3 + 1 = 19 chocolates

4. **(B)**

$$\frac{\sqrt{324}}{\sqrt{49}}\times\frac{\sqrt{676}}{\sqrt{169}}\times\frac{126}{\sqrt{81}}=m$$

$$\Rightarrow\frac{18}{7}\times\frac{26}{13}\times\frac{126}{9}=m$$

$\Rightarrow$ m = 72

5. **(D)**

Number of students who passed = 16 + 29 – 1

= 44

$\therefore$ Total students = 44 + 6 + 5 = 55

6. **(C)**

$$\frac{4}{x+2}-\frac{1}{x-3}=\frac{4}{2x+1}$$

$$\Rightarrow\frac{4x-12-x-2}{(x+2)(x-3)}=\frac{4}{2x+1}\Rightarrow(3x-14)(2x+1)=4x^2-4x-24$$

$$\Rightarrow 6x^2-25x-14=4x^2-4x-24$$

$\Rightarrow 2x^2 - 21x + 10 = 0 \Rightarrow 2x^2 - 20x - x + 10 = 0$

$\Rightarrow 2x(x-10) - 1(x-10) = 0 \Rightarrow x = \frac{1}{2}, 10$

7. (B)

Let number of pen be = 2x Then number of pencil = 3x

Now $\left(1+\frac{12}{100}\right)5\times 2x + \left(1+\frac{10}{100}\right)3x = 725$

$\Rightarrow \left(\frac{112\times 10 + 110\times 3}{100}\right)x = 725 \qquad \Rightarrow x = 50$

$\therefore$ Number of pen = 100

Number of pencils = 150

8. (C)

Let number of persons in the beginning be x then $\frac{x-10}{x} = \frac{100}{110}$

$\Rightarrow 11x - 110 = 10x \qquad \Rightarrow x = 110$

9. (B)

Speed downstream = u + v

Speed upstream = u – v

$.4\times\frac{1}{u-v} = \frac{1}{u+v}$

$\Rightarrow (u-v) = .4(u+v)$

$\Rightarrow$ u – v = 4

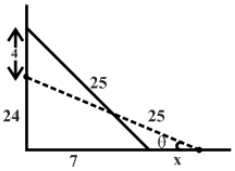
& u + v = 10

$\therefore$ difference = 6

10. (B)

$\text{Loss} = \left(\frac{\text{Loss}}{10}\right)^2 = \left(\frac{5}{10}\right)^2 = \frac{1}{4}\%$

11. (C)



$\tan\theta = \frac{20}{7+x}$

$\sin\theta = \frac{20}{25} = \frac{4}{5}$

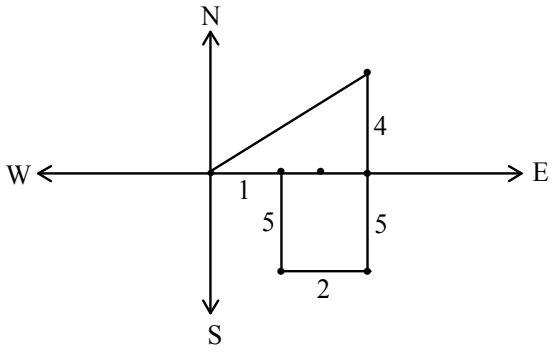
$\therefore \tan\theta = \frac{4}{3}$

$\Rightarrow \frac{4}{3} = \frac{20}{7+x}$

$\Rightarrow 28 + 4x = 60$

$\Rightarrow \qquad 4x = 32 \qquad x = 8$

12. **(C)**



$\therefore \quad \sqrt{3^2+4^2}=5$

13. **(A)**

Let the fraction be $\frac{x}{y}$

$$\frac{x+2}{y-3}=1 \qquad ...(1)$$

& $$\frac{x-2}{y+3}=\frac{3}{8} \qquad ...(2)$$

$\therefore \quad x=8,\ y=13$

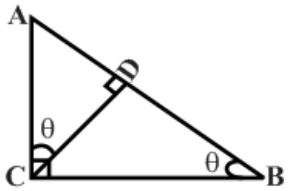
$\therefore \quad$ fraction $=\frac{8}{13}$

14. **(C)**

Atleast one head = HT, TH, HH

$$=\frac{3}{4}$$

15. **(A)**



ΔABC & ΔACD are similar & ΔACD & ΔCBD are similar

$\therefore \frac{AD}{CD}=\frac{CD}{BD}$

$\Rightarrow (CD)^2 = AD.BD$

16. **(B)**

$\text{Area} = 10^2 - \pi \times 5^2$

$= 100 - 3.14 \times 25 = 21.5$

17. **(B)**

$$\frac{x}{6-x}=\frac{10}{14}$$

$\Rightarrow 14x = 60 - 10x$

$\Rightarrow 24x = 60 \quad \Rightarrow x = \frac{60}{24} = 2.5$

$\therefore DC = 6 - 2.5 = 3.5$

18. (B)

5, 10, …, 250

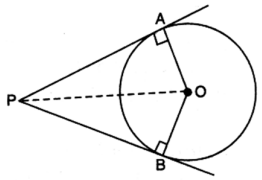
$\therefore$ 250 = 5 + (n – 1) 5

$\Rightarrow n - 1 = \frac{245}{5} = 49$

n = 50

19. (A)

$\Delta POA \cong \Delta POB$ [sss congruence because OA = OB, PA = PB, OP – common]



$\angle POA = \angle POB$

$= 1/2 \angle AOB$ …(i)

Also, $\angle AOB + \angle APB = 180^o$

$\Rightarrow \quad \angle AOB + 80 = 180^o$

$\Rightarrow \quad \angle AOB = 100^o$ …(ii)

From (i) and (ii), we have

$\angle POA = 1/2 \times 100 = 50^o$

Hence, option (a) is correct option.

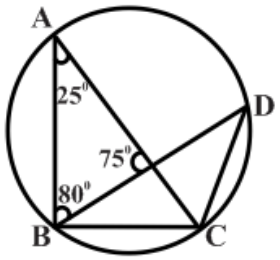
20. (C)

C gets $81 = \left(1 - \frac{3}{16} - \frac{1}{4}\right)x \quad \Rightarrow 81 = \left(\frac{16-3-4}{16}\right)x$

$\Rightarrow x = 16 \times 9 = 144$

$\therefore$ B gets $= \frac{1}{4} \times 144 = 36$

21. (B)



$\angle ACD = \angle ABD$

$= 80^0$

22. **(C)**

$2^x\left(2+\frac{1}{2}\right)=320 \qquad \Rightarrow 2^x\left(\frac{5}{2}\right)=320 \qquad \Rightarrow 2^x=2^7$

$\therefore\ x=7$

23. **(D)**

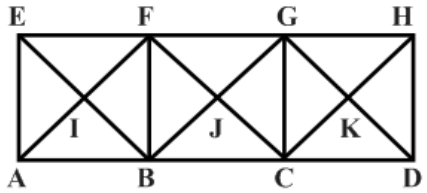
$a = 1.125\ c$

$b = 1.25\ c$

$\Rightarrow b=1.25\times\frac{a}{1.125}$

$\therefore b-a=\left(\frac{1.25}{1.125}-1\right)a=\left(\frac{.125}{1.125}\right)a$

24. **(A)**



Triangles like $\Delta AIB = 12$

Triangles like $\Delta ABF = 12$

Triangles like $\Delta AFC = 4$

Total = 28

25. **(A)**

$a^2+b^2-4a+2b+5=0$

$\Rightarrow (a-2)^2+(b+1)^2=0$

$\Rightarrow\ a=2\ \&\ b=-1$

$\therefore a^2+b^2=4+1=5$

& 3a + b = 6 – 1 = 5

26. **(B)**

Apply componendo and dividendo on each term and multiply all the terms.

27. **(C)**

For a conical portion, we have r = 2.5 cm = $\frac{5}{2}$cm, h = 9 cm

For a hemispherical portion, $r=\frac{5}{2}$cm

$\therefore$ volume of ice-cream $=\frac{1}{3}\pi r^2h+\frac{2}{3}\pi r^3=\frac{\pi r^2}{3}[h+2r]$

$=\frac{22}{7}\times\frac{5}{2}\times\frac{5}{2}\times\frac{1}{3}\left[9+2\times\frac{5}{2}\right]cm^3$

$=\frac{22}{7}\times\frac{25}{4}\times\frac{1}{3}\times\frac{14}{1}cm^3=91\frac{2}{3}cm^3$

Hence, the option (C) is the correct option.

28. **(A)**

$$2+\sqrt{2}+\frac{1}{2+\sqrt{2}}\times\frac{2-\sqrt{2}}{2-\sqrt{2}}+\frac{1}{\sqrt{2}-2}\times\frac{\sqrt{2}+2}{\sqrt{2}+2}$$

$$=2+\sqrt{2}+\frac{2-\sqrt{2}}{2}-\frac{\left(\sqrt{2}+2\right)}{2}$$

$$=2$$

29. **(A)**

$$\sin\alpha+\cos\alpha=\frac{1}{5}$$

$$\left(\sin^3\alpha+\cos^3\alpha\right)=\left(\sin\alpha+\cos\alpha\right)\left(\sin^2\alpha+\cos^2\alpha-\sin\alpha\cos\alpha\right)$$

$$=\frac{1}{5}\left(1-\sin\alpha\cos\alpha\right) \quad .....(A)$$

Now, $\left(\sin\alpha+\cos\alpha\right)^2=\frac{1}{25}$

$$\sin^2\alpha+\cos^2\alpha+2\sin\alpha\cos\alpha=\frac{1}{25}$$

$$\sin\alpha\cos\alpha=\frac{1}{2}\left(\frac{1}{25}-1\right)=\frac{-12}{25}$$

From (A)

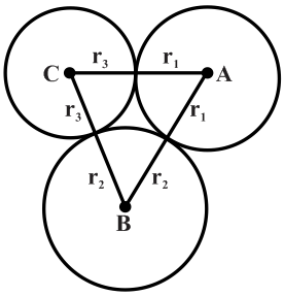
$$\sin^3\alpha+\cos^3\alpha=\frac{1}{5}\left(1-\left(-\frac{12}{25}\right)\right)$$

$$=\frac{1}{5}\times\frac{37}{25}=\frac{37}{125}$$

30. **(D)**

From figure

$$AB=r_1+r_2=17 \quad .....(i)$$



$$BC=r_2+r_3=23 \quad .....(ii)$$

$$CA=r_1+r_3=12 \quad .....(iii)$$

$(1)+(2)+(3)$ gives.

$$2\left(r_1+r_2+r_3\right)=52$$

Or $r_1+r_2+r_3=26 \quad .....(iv)$

From $(i)\&(iv)$, $r_3=9$

$(ii)\&(iv)$, $r_1=3$

$(iii)\,\&\,(iv),\ r_2 = 14$ $\quad \begin{pmatrix} r_1 = 3 \\ r_2 = 14 \\ r_3 = 9 \end{pmatrix}$

31. (A)

$\angle AOB = 80^\circ$

So, $\angle ACB = \dfrac{80^\circ}{2} = 40$

In ΔOAB

$OA = OB = r$

So, $\angle OAB = \angle OBA = \dfrac{180^\circ - 80}{2} = 50^\circ$

In ΔCAB

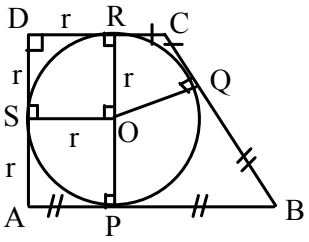
$\Delta CAB = 180^\circ - 40 - 30^\circ = 110^\circ$

$\Rightarrow \angle CAO + \angle OAB + = 110^\circ$

$\Rightarrow \angle CAO + 50^\circ = 110^\circ$

$\Rightarrow \angle CAO = 60^\circ$

32. (A)



$\square DROS$ is a square with side r.

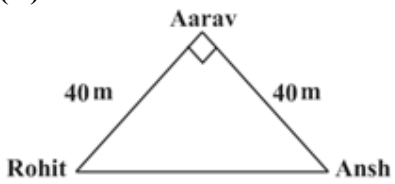
$\therefore CQ = RC = 25 - r$

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

$\therefore r + 13 = 27$

$\therefore r = 14$

33. (A)



Ansh is east of Rohit.

34. (B)

Akbar	Amar	Anthony
$x + 5000$	x	$x + 7000$

Total principle $= 3x + 12000$

$S \cdot I \cdot = \dfrac{(3x + 12000) \times 12 \times 1}{100} = 3240$

$\Rightarrow \quad x = 5000$

35. (B)

Sum of all angles of 4 triangles = $4 \times 180 = 720^o$

Sum of angles of quadrilateral = 360^o

$\because$ vertically opposite angles are equal,

$a + b + c + d + e + f + g + h = 720 - 360 = 360^o$

36. (A)

The letters of the given word are written in reverse order to obtain the code.

Reversing the order of letters in POLITICAL, we get LACITILOP, which is the required code.

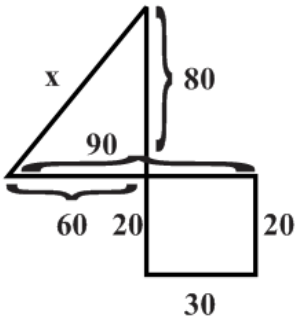
Hence the answer is (A)

37. (D)

$$\text{Wood required } = 30 \times \frac{1}{2} \times (70 + 110) \times 30$$

$$= 81000 \text{ cm}^2$$

38. (B)



$$x = \sqrt{60^2 + 80^2}$$

$$= 100$$

39. (D)

Mary's mothers fourth child was Mary herself.

40. (A)

Let no. be x, y

$x.y = LCM \times HCF$

$\Rightarrow 12 \times x = 6 \times 36$

$\Rightarrow x = 18$

41. (A)

Only 'A' is the possible mirror image

42. (A)

In concyclic quadrilateral ABCD.

$y = 58^o$

Also, $\angle ADE = y = 58^o$

Now, in ΔADE

$x + y + \angle DAE = 180^o$

$\Rightarrow x = 32^o \quad \left[\because \angle DAE = 90^o \left(\text{from } \Delta ABF\right)\right]$

$\therefore \; y - x = 58^o - 32^o = 26^o$

43. (D)

The code word is TIE.

If you were told any one character of MOD, then you would not be able to determine whether the number of vowels are one or two. e.g. if you were told M, there are two words with M - AIM with 2 vowels and MOD with 1 vowel. So you would not be able to say the number of vowels. Same arguments can be given for characters O and D. Hence, the word with any one of M, O or D is not a code word i.e. AIM, DUE, OAT and MOD are not the code word. Thus, TIE is the code word.

T : two words - TIE and OAT, both with 2 vowels

I : two words - TIE and AIM, both with 2 vowels

E : two words - TIE and DUE, both with 2 vowels.

44. (C)

There are 27 triangles in the adjacent figure.

Triangles with 1 unit length – 10 (upward facing) + 6 (downward facing)

Triangles with 2 unit length – 6 (upward facing) + 1 (downward facing)

Triangles with 3 unit length – 3 (upward facing)

Triangles with 4 unit length – 1 (upward facing)

45. (B)

Fig. (IV) is identical to Fig. (I) so, correct option is (b)

46. (A)

There is no loss no profit transaction with 2^{nd} shopkeeper.

$\therefore$ Total Loss = 200 + 800 = 1000

47. (A) 48. (C) 49. (B) 50. (A)

47 – 50 Solution.

E – Cricket – Poor in studies

D – Volleyball, Tennis & two more games – Poor

A – Volleyball, Football – Good

B – Volleyball, Tennis – Average

C – Hockey & Volleyball – Good