ACE OF PACE OBJECTIVE SECTION
(SOLUTION)

1. **(D)**

Let $y=\dfrac{2\left(\sqrt{2}+\sqrt{6}\right)}{3\left(\sqrt{2+\sqrt{3}}\right)}$

Squaring (i) both sides, we get

$$y^2=\left(\frac{2\left(\sqrt{2}+\sqrt{6}\right)}{3\left(\sqrt{2+\sqrt{3}}\right)}\right)^2=\frac{4}{9}\left(\frac{\left(\sqrt{2}+\sqrt{6}\right)^2}{2+\sqrt{3}}\right)$$

$$=\frac{4}{9}\left(\frac{\left(2+6+2\sqrt{12}\right)}{2+\sqrt{3}}\right)=\frac{4}{9}\left(\frac{\left(8+2\sqrt{4\times3}\right)}{2+\sqrt{3}}\right)$$

$$=\frac{16}{9}\left(\frac{2+\sqrt{3}}{2+\sqrt{3}}\right)=\frac{16}{9}$$

Taking square root, we get $y=\dfrac{4}{3}$

2. **(C)**

$$x=2-\sqrt{3}\Rightarrow\frac{1}{x}=\frac{1}{2-\sqrt{3}}\times\frac{2+\sqrt{3}}{2+\sqrt{3}}=2+\sqrt{3}$$

$$\therefore x^2+\frac{1}{x^2}=\left(2-\sqrt{3}\right)^2+\left(2+\sqrt{3}\right)^2=2\left(4+3\right)=14$$

And $x^2-\dfrac{1}{x^2}=\left(2-\sqrt{3}\right)^2-\left(2+\sqrt{3}\right)^2$

$$=-4\sqrt{3}-4\sqrt{3}=-8\sqrt{3}$$

3. **(B)**

We know that

$$a^3+b^3+c^3-3abc=\left(a+b+c\right)\left(a^2+b^2+c^2-ab-bc-ca\right)$$

If $a+b+c=0$, then $a^3+b^3+c^3=3abc$

4. **(A)**

$\left(3,4\right)$ lies on $3y=ax+7$

$$\Rightarrow3\times4=a\times3+7\Rightarrow12-7=a\times3$$

$$\Rightarrow a=\frac{5}{3}$$

5. **(C)**

Since $AB \| CD$

$\angle BAC + \angle ACD = 180^o$

$\Rightarrow x + 2x + x + 5x = 180^o$

$9x = 180^o$

$\therefore x = 20^o$

6. **(A)**

$\angle A : \angle B : \angle C = 2 : 3 : 5$

$\Rightarrow \angle A = 2x, \angle B = 3x, \angle C = 5x$

$\therefore \angle A + \angle B + \angle C = 2x + 3x + 5x = 10x$

$\Rightarrow 10x = 180^o$ [Angle sum property of a triangle]

$\Rightarrow x = 18^o$

$\Rightarrow \angle B = 3 \times 18^o = 54^o$

7. **(A)**

Since, $ABCD$ is a parallelogram.

$\Rightarrow \angle A + \angle B = 180^o$

$\Rightarrow 75^o + \angle DBA + 60^o = 180^o$

$\Rightarrow \angle DBA = 45^o$

In $\Delta ADB, \angle A + \angle ADB + \angle DBA = 180^o$

$\angle ADB = 180^o - 75^o - 45^o = 60^o$

8. **(D)**

In $\Delta ADF, DF^2 = AD^2 - AF^2 = 5^2 - 3^2 = 16$

$\Rightarrow DF = 4$ cm

Similarly $EC = 4$ cm

$DC = 4 + 7 + 4 = 15$ cm

Area of trapezium $ABCD$

$= \frac{1}{2} \times AF \times (AB + DC)$

$= \frac{1}{2} \times 3 \times (7 + 15) = 33 \text{ cm}^2$

9. **(B)**

Draw a line passing through Q and O.

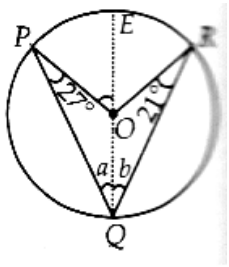
$a = 27^o$ $[OP = OQ]$

$b = 21^o$ $[OR = OQ]$

$\therefore \quad \angle PQR = a + b$

$= 27^o + 21^o = 48^o$

$\angle POR = 2 \times \angle PQR = 2 \times 48^o = 96^o$



10. (A)

$\angle ADC = 180^o - \angle CBA = \angle CBE = 130^o$

$\therefore x = \angle ADC = 130^o$

11. (C)

$\angle BCA = 90^o$ [$\because AB$ is diameter]

$\angle ABC = \frac{1}{2} \times \angle AOC = 20^o$

$\therefore$ In ΔABC, $20^o + x + 90^o = 180^o \Rightarrow x = 70^o$

12. (D)

Length of the longest rod $= \sqrt{l^2 + b^2 + h^2}$

$= \sqrt{(20)^2 + (16)^2 + (12)^2} = \sqrt{800}$

$= 20\sqrt{2} = (20 \times 1.41) = 28.2$ m

13. (C)

Let 'n' be the number of cubes which can be formed from the given cube.

Volume of big cube = Volume of n smaller cubes

$\Rightarrow 20 \times 20 \times 20 = n \times 5 \times 5 \times 5$

$\Rightarrow n = \frac{20 \times 20 \times 20}{5 \times 5 \times 5} = 4 \times 4 \times 4 = 64$

14. (B)

Number of terms = 10 (even)

$\therefore$ Mediam $= \frac{\left(\frac{n}{2}\right)^{th} \text{ term} + \left(\frac{n}{2}+1\right)^{th} \text{ term}}{2}$

$= \frac{5^{th} \text{ term} + 6^{th} \text{ term}}{2}$

$\Rightarrow 24 = \frac{(x+2)+(x+4)}{2}$

$\Rightarrow 48 = 2x + 6 \Rightarrow x = 21$

15. (B)

P (head appears) $= \frac{46}{100}$

$\therefore$ P (head not appears) $= P$ (tail appears)

$\Rightarrow P$ (tail appears) $= 1 - \frac{46}{100}$

$= \frac{54}{100} = \frac{27}{50}$

16. (C)

Total numbers $=11 \therefore n(S)=11$

Let $E=$ odd numbers $=1,3,5,7,9,11 \quad \therefore n(E)=6$

$$\Rightarrow P(E)=\frac{n(E)}{n(S)}=\frac{6}{11}$$

17. (C)

When a pair of dice is rolled, number of elements in sample space is $6\times6=36=n(s)$

Let $E=$ getting a sum of 2 i.e., (1, 1)

$\therefore n(E)=1$

$$\Rightarrow P(E)=\frac{n(E)}{n(S)}=\frac{1}{36}$$

18. (B)

$$\frac{AD}{DB}=\frac{AE}{EC}\Rightarrow\frac{2.4}{x}=\frac{3.2}{4.8}\Rightarrow x=3.6\text{ cm}$$

$\therefore DB=3.6$ cm and hence, $AB=(AD+DB)$

$=(2.4+3.6)\text{ cm}=6\text{ cm}$

19. (A)

Clearly, $\frac{AB}{AC}=\frac{BD}{DC}=\frac{BD}{(BC-BD)}$

$$=\frac{5}{(7.5-5)}=\frac{5}{2.5}=\frac{2}{1}$$

20. (A)

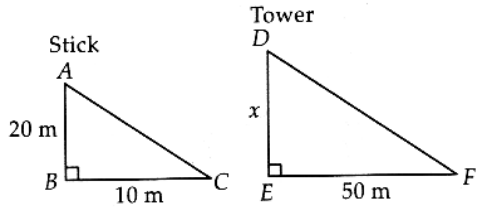
$\angle A=180^{o}-(70^{o}+50^{o})=60^{o}$

$\frac{BD}{DC}=\frac{AB}{AC}$ means AD is a bisector of $\angle A$.

$$\therefore \angle\text{BAD}=\frac{\angle\text{A}}{2}=\frac{60^{0}}{2}=30^{0}$$

21. (A)

Let height of the tower be x. The two triangles are similar



$$\therefore\frac{AB}{DE}=\frac{BC}{EF}\Rightarrow\frac{20}{x}=\frac{10}{50}\Rightarrow x=100\,\text{m}$$

22. (C)

The relationship is : $3x : 3$

23. (B)

Clearly, the correct sequence is :

$2^3 - 1, 3^3 - 1, 4^3 - 1, 5^3 - 1, 6^3 - 1, 7^3 - 1, 8^3 - 1.$

$\therefore$ 28 is wrong and should be replaced by $3^3 - 1$.

i.e. 26 Hence, the answer is (B).

24. (C)

The number are written according to the rule $n^3 + 1; n$ being 1, 2, 3, etc.

$\therefore$ the missing number is $3^3 + 1$ i.e. 28, Hence, the answer is (C).

25. (B)

The rule is: In the figure $5 \times 4 = 20; 5 + 4 = 9$

In the second figure : $3 \times 8 = 24$ and $3 + 8 = 11$

$\therefore$ In the third figure: $9 \times 4 = 36$.

Hence, the answer is (B).

26. (A)

Usually we start from the end and keep on simplifying: Daughter of uncle's father means uncle's sister. Uncle's sister means mother and son of mother means her brother. So the boy is sarita's brother. The answer is (A).

27. (C)

Sohan's son's uncle means Sohan's brother. So, the old man's son is Sohan's brother, i.e. the old man is the father of Sohan. The answer is (C)

28. (A)

29. (D)

Clearly a dot is added in the centre of the circle in figure A to form the figure B. Similar relationship will be figure (D) from figure C.

Hence, figure (D) is the answer.

30. (A)

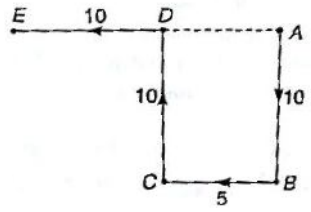
The two figures approach each other and get overlapped. Similar relationship will be figure (A) from figure C. Hence, the answer is (A).

31. (C)

Clearly, according to Sunita, the distance was more than 12 km but less than 14 km which is 13 km

32. (B)

A is the starting point, goes to B. then moves to C, then to D and finally he is E. So he has to go back a distance EA which is equal to ED + DA = (10 + 5) i.e. 15 km



33. (A)

From the statement, it mean that age of the father is double the age of the son. Since father is 36 years old, the son is 18 years old.

So, son's age 5 years ago is 13years

34. (D)

Let the number of adults and children be 2x and 3x

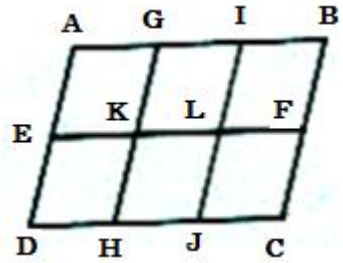
$\therefore$ Literate population = 60% of 2x + 85% of 3x

$= \frac{15}{4}x$

$\therefore$ Required % = $\frac{15}{4}x \times \frac{1}{5x} \times 100\% = 75\%$

35. (C)

The figure in question has been labeled at different point as shown in the following figure.



From the above diagram parallelogram are follows

(i) Parallelogram from the outer figure: ABCD, AIJD, GBCH -3

(ii) Parallelogram from the upper half of the figure:
AGKE, GILK, IBFL, AILE, GBFK, ABFE-6

(iii) Parallelogram from the lower half of the figure:
EKHD, KLJH, LFCJ, KFCH, ELJD, EFCD-6

(iv) Parallelograms vertically inclined:
AGHD, GIJK, & IBCJ