ACE OF PACE OBJECTIVE SECTION
(SOLUTION)

1. **(D)**

Consider, Δs , DNR and BMR

$DN = BM$ [Given]

$\angle DNR = \angle BMR$ [Each 90^o]

$\angle DRN = \angle BRM$

[Vertically opposite angles]

$\therefore \Delta DNR \cong \Delta BMR$ [AAS congruency]

$\therefore DR = BR \Rightarrow BD = 2BR$

$\therefore BD = 2 \times 8 = 16cm$

2. **(D)**

In right ΔDBC ,

$DB^2 = DC^2 - BC^2 = 17^2 - 8^2 = 225$

$\Rightarrow DB = 15cm$

And in right ΔDAB

$AB^2 = DB^2 - AD^2 = 15^2 - 12^2 = 81$

$\Rightarrow AB = 9\,cm$

Now, Area of quad. ABCD = $ar(\Delta DAB) + ar(\Delta DBC)$

$= \frac{1}{2} \times AB \times AD + \frac{1}{2} \times BC \times DB$

$= \frac{1}{2} \times 9 \times 12 + \frac{1}{2} \times 8 \times 15 = 54 + 60$

= 114 cm^2

3. **(D)**

$\angle B - \angle C = 44^o$ ....(1)

and $\angle C + \angle B = 90^o$ ....(2)

[BC is diameter of circle ; $\angle A = 90^o$]

From (1) & (2), we get

$\angle B = 67^o$ and $\angle C = 23^o$

$\Rightarrow 10x + 17 = 67$ and $15y - 7 = 23$

$\Rightarrow x = 5$ and $y = 2$

4. **(D)**

Let ΔABC be an isosceles triangle and let $AL \perp BC$

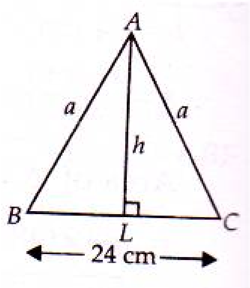
Area = $\frac{1}{2} \times BC \times AL = 192cm^2$

$\Rightarrow \frac{1}{2} \times 24 \times h = 192$

$\Rightarrow h = \left(\frac{192}{12}\right)cm = 16cm$

Now, BL = $\frac{1}{2}(BC) = \left(\frac{1}{2} \times 24\right)cm = 12cm$

And AL = 16 cm



Now, in right angled ΔABL,

$AB = a = \sqrt{BL^2 + AL^2} = \sqrt{(12)^2 + (16)^2}cm$

$= \sqrt{144 + 256}cm$

$\Rightarrow a = \sqrt{400}cm = 20cm$.

Hence perimeter = $(20 + 20 + 24)cm = 64cm$.

5. **(D)**

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

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

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

6. **(D)**

Let us represent the coefficients by A, B, C. we have

$A = a - b,\ B = b - c,\ C = c - a$

$\Rightarrow A + B + C = 0$

$\Rightarrow B = -(A + C)$

Since the roots are equal, the discriminant must be 0. Thus,

$D = b^2 - 4ac = 0$

$\Rightarrow (A + C)^2 - 4AC = 0$

$\Rightarrow (A - C)^2 = 0 \Rightarrow A = C$

$\Rightarrow a - b = c - a \Rightarrow b + c = 2a$

7. **(A)**

We have:

$$\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha + \beta}{\alpha\beta} = \frac{-\frac{8}{3}}{\frac{2}{3}} = -4$$

8. **(B)**

In ΔABD and ΔACD

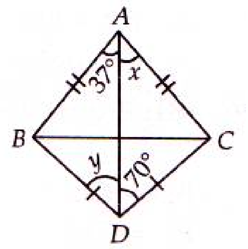
$AB = AC$ [Given]

$BD = CD$ [Given]

$AD = AD$ [Common]

$\Rightarrow \Delta ABD \cong \Delta ACD$

[By SSS Rule]



9. **(C)**

$OA = OB \Rightarrow \angle OAB = \angle OAB = 28^o$

$\angle ABC = 90^o \Rightarrow \angle OBA + \angle OBC = 90^o$

$\Rightarrow 28^o + \angle OBC = 90^o$

$\Rightarrow \angle OBC = 90^o - 28^o = 62^o$

10. **(B)**

Here, a = 5 cm, b= 12cm, c = 13 cm

$\therefore s = \frac{1}{2}(a+b+c)$

$= \frac{1}{2}(5+12+13)$

$= 15cm$

Let A be the area of the given triangle, then

$A = \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{15(15-5)(15-12)(15-13)}$

$= \sqrt{15\times10\times3\times2} = 30cm^2$

Let p be the length of the perpendicular from vertex D on the side BC, then

$A = \frac{1}{2}\times13\times p$

$\Rightarrow 2\times30 = 13p$

$\therefore p = \frac{60}{13}cm$

Hence length of perpendicular from the opposite vertex to the side whose length is 13cm is $\left(\frac{60}{13}\right)$cm

11. **(A)**

Let h be the height of cylinder

Radius of cylinder = Radius of sphere = r

Then, we have $\frac{4}{3}\pi r^3 = \pi r^2 h \Rightarrow h = \frac{4}{3}r$

$\therefore$ Height of cylinder = $\frac{4}{3}$ times its radius

12. **(D)**

$\tan\theta = \cot(90-\theta)$ & $\tan\theta.\cot\theta = 1$

13. (C)

Express the square root function as $(a+b)^2$ and remove the first square root. Again express the obtained function as $(a-b)^2$ and then simplify.

14. (B)

P(either multiple of 4 or 6) = P(multiple of 4) + P(multiple of 6) – P(multiple of both 4 and 6).

15. (A)

There are 4 ace cards in pack of cards.

16. (A)

First, we will simplify each term one by one. We have:

$$\frac{1}{3-\sqrt{8}}=\frac{1}{3-\sqrt{8}}\times\frac{3+\sqrt{8}}{3+\sqrt{8}}$$

$$=\frac{3+\sqrt{8}}{9-8}=3+\sqrt{8}$$

$$\frac{1}{\sqrt{8}-\sqrt{7}}=\frac{1}{\sqrt{8}-\sqrt{7}}\times\frac{\sqrt{8}+\sqrt{7}}{\sqrt{8}+\sqrt{7}}$$

$$=\frac{\sqrt{8}+\sqrt{7}}{8-7}=\sqrt{8}+\sqrt{7}$$

$$\frac{1}{\sqrt{7}-\sqrt{6}}=\frac{1}{\sqrt{7}-\sqrt{6}}\times\frac{\sqrt{7}+\sqrt{6}}{\sqrt{7}+\sqrt{6}}$$

$$=\frac{\sqrt{7}+\sqrt{6}}{7-6}=\sqrt{7}+\sqrt{6}$$

$$\frac{1}{\sqrt{6}-\sqrt{5}}=\frac{1}{\sqrt{6}-\sqrt{5}}\times\frac{\sqrt{6}+\sqrt{5}}{\sqrt{6}+\sqrt{5}}$$

$$=\frac{\sqrt{6}+\sqrt{5}}{6-5}=\sqrt{6}+\sqrt{5}$$

$$\frac{1}{\sqrt{5}-2}=\frac{1}{\sqrt{5}-2}\times\frac{\sqrt{5}+2}{\sqrt{5}+2}$$

$$=\frac{\sqrt{5}+2}{5-4}=\sqrt{5}+2$$

Thus, the given expression is equivalent to:

$$\left(3+\sqrt{8}\right)-\left(\sqrt{8}+\sqrt{7}\right)+\left(\sqrt{7}+\sqrt{6}\right)-\left(\sqrt{6}+\sqrt{5}\right)+\left(\sqrt{5}+2\right)$$

$$=3+\sqrt{8}-\sqrt{8}-\sqrt{7}+\sqrt{7}+\sqrt{6}-\sqrt{6}-\sqrt{5}+\sqrt{5}+2$$

$$= 3 + 2 = 5$$

17. (A)

Use the centroid formula

18. (C)

The measure of inclination of a line with the positive X-axis is called the slope.

19. **(B)**

(i) Prove the given vertices form a right angled triangle

(ii) In a right angled triangle, the vertex containing right angle is the orthocenter

20. **(D)**

Diameter of the sphere = length of the edge of a cube

21. **(C)**

Use $2\pi r h = 1100\ m^2$

22. **(C)**

Find $'r'$ by using volume formula

23. **(D)**

We use the distance formula:

$$= \sqrt{(4-0)^2 + (-6-3)^2}$$

$$= \sqrt{16+81} = \sqrt{97}$$

24. **(B)**

$$P(\text{March or September}) = \frac{2}{\text{Total number of months in a year}}$$

25. **(A)**

Since a die has six faces, the total number of outcomes is six, out of which one is favorable. Therefore, $P(4) = \frac{1}{6}$

26. **(A)**

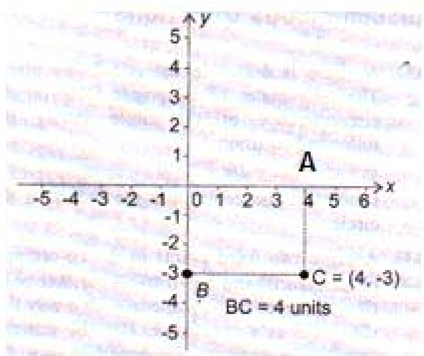
Using the external section formula, the required point is

$$(h,k) = \left(\frac{3\times3-1\times0}{3-1}, \frac{(3\times-1)-1\times1}{3-1}\right)$$

$$= \left(\frac{9}{2}, -2\right)$$

27. **(A)**

The point (4, – 3) is plotted below:



Clearly, the distance of the given point from the x –axis is 3 units.

28. **(B)**

29. **(B)**
The abscissa of a point is positive in the I and IV quadrants

30. **(D)**
Any point on the y – axis is of the form (0, b) where b could be any real number.

31. **(A)**
We note that $\angle ACB = 180^o - \left(70^o + 90^o\right)$
$= 20^o$
Now, in $\angle BCD$, we have (using the angle sum property):
$x^o = 180^0 - \left(90^o + 20^o\right)$
$= 70^o$

32. **(B)**
The correct answer is 50. The two marked angles are corresponding angles for a pair of parallel lines, and hence must be equal. Thus
2x – 30 = x + 20
$\Rightarrow x = 50$

33. **(D)**
We have:
$E(-2) = (-2)^2 + 6(-2) + 19$
$= 4 - 12 + 19$
$= 11$
Hence, the correct option is (D)

34. **(B)**
To check whether each number lies within the specified interval or not, you can mentally calculate the approximate decimal representation of that number, or you can compare the relative magnitude of the numerator with the denominator. For example, if you consider $\frac{11}{8}$, you can see that 11 is larger than 8, but not as large as twice of 8. Therefore, $\frac{11}{8}$ must be greater than 1 but less than 2.

35. **(B)**
We Have:

$$\frac{1}{1+a^{m-n}} + \frac{1}{1+a^{n-m}} = \frac{1}{1+\frac{a^m}{a^n}} + \frac{1}{1+\frac{a^n}{a^m}}$$

$$= \frac{a^n}{a^n + a^m} + \frac{a^m}{a^m + a^n} = \frac{a^m + a^n}{a^m + a^n} = 1$$