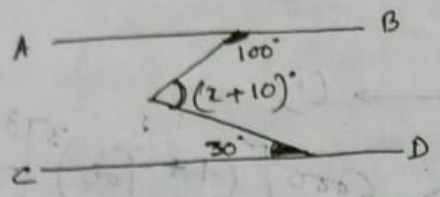
[9] (A) GEOMETRY
(B) TRIGONOMETRY

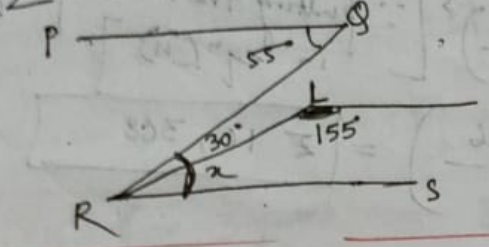
{(A) GEOMETRY} <1>

1. AB || CD; shown in the figure. Find the value of x.



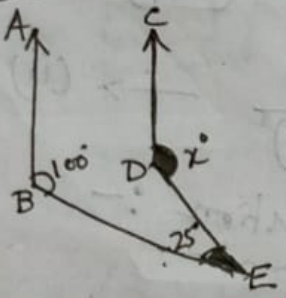
(a) 100° (b) 90°
(c) 110° (d) 140°

2. In the figure PQ || LM || RS. Find the value of ∠LRS.



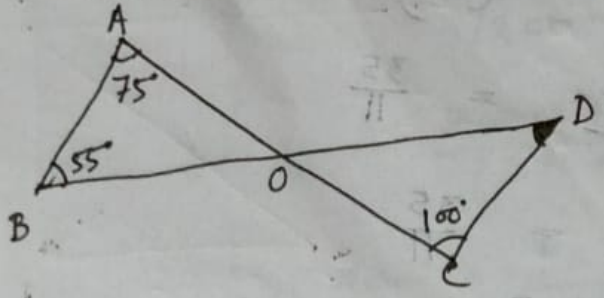
(a) 30° (b) 25°
(c) 35° (d) 40°

3. In the figure AB || CD; ∠ABE = 100. Find the value of ∠CDE:



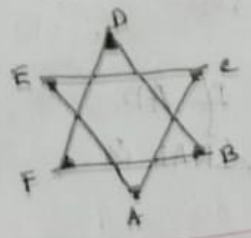
(a) 125° (b) 55
(c) 65° (d) 75°

4. In the given figure, ∠OAB = 75; ∠OBA = 55° and ∠OCD = 100.
Then ∠ODC = ?



(a) 20° (b) 25°
(c) 30° (d) 35°

5. Here in the adjoining figure:
$\angle A + \angle B + \angle C + \angle D + \angle E + \angle F = ?$



(a) 360° (b) 720°
(c) 180° (d) 300°

6. ~~In a right-angled triangle ABC; $\angle B$~~

6. $\triangle ABC$ and $\triangle DEF$ are similar and their areas be respectively 64 cm² and 121 cm². If EF = 15.4 cm; the BC is:
(a) 12.3 cm (b) 11.2 cm (c) 12.1 cm (d) 11.0 cm

7. By decreasing 15° of each angle of a triangle; the ratio of their angles are 2:3:5. The radian measure of greatest angle is:
(a) $\frac{11\pi}{24}$ (b) $\frac{\pi}{12}$ (c) $\frac{\pi}{24}$ (d) $\frac{5\pi}{24}$

8. In a right-angled triangle ABC; AB = 2·5 cm; $\cos B = 0.5$; $\angle ACB = 90°$. The length of side AC, in cm is:
(a) $5\sqrt{3}$ (b) $\frac{5}{2}\sqrt{3}$ (c) $\frac{5}{4}\sqrt{3}$ (d) $\frac{5}{16}\sqrt{3}$

9 The external bisectors of $\angle B$ and $\angle C$ of $\triangle ABC$ meet at point P. If $\angle BAC = 80^\circ$; then $\angle BPC$ is :

(a) 50° (b) 40° (c) 80° (d) 100°

10 In $\triangle ABC$; $\angle B = 60^\circ$; $\angle C = 40^\circ$. If AD bisects $\angle BAC$ and $AE \perp BC$; then $\angle EAD$ is

(a) 10° (b) 20° (c) 40° (d) 80°

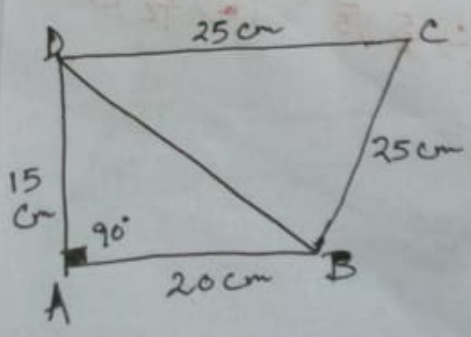
11. If one of the interior angles of a regular polygon is found to be $\frac{9}{8}$ times of one of the interior angles of a regular hexagon; then the number of sides of the polygon is :

(a) 8 (b) 14 (c) 12 (d) 10

12. The difference between the interior and exterior angles of a regular polygon is 60°. The number of sides in the polygon is :

(a) 4 (b) 5 (c) 6 (d) 8

13. In the given figure $AD = 15$ cm; $AB = 20$ cm and $BC = CD = 25$ cm. Find the area of $\square ABCD$:



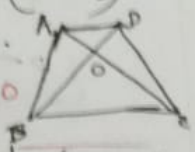
(a) $\frac{25}{4}(24 + 25\sqrt{3})$ cm^2

(b) $24(25 + 24\sqrt{3})$ cm^2

(c) $\frac{25}{2}(24 + 25\sqrt{3})$ cm^2

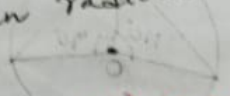
(d) None of these

14. In the adjoining figure; ABCD is a trapezium in which BC ∥ AD, and its diagonals intersect at O. If AO = (3x−1); OC = (5x−3); BO = (6x−5) and OD = (2x+1); then x is equal to.



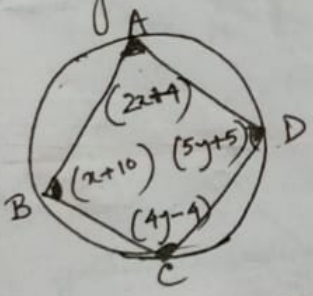
(a) 1 (b) 2 (c) 3 (d) 10

15. ABCD is a quadrilateral such that ∠D = 90°. A circle touches the sides AB, BC, CD and DA at P, Q, R and S respectively. If BC = 38 cm; CD = 25 cm and BP = 27 cm; then radius is equal to.



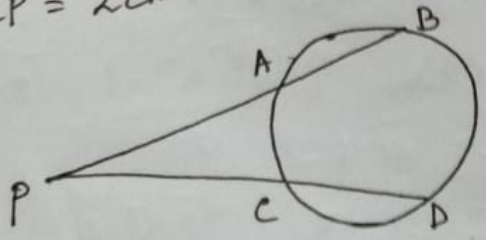
(a) 14 cm (b) 11 cm (c) 12 cm (d) 10 cm

16. The Values of x and y in the figure are measure of angles; then (x+y) is equal to



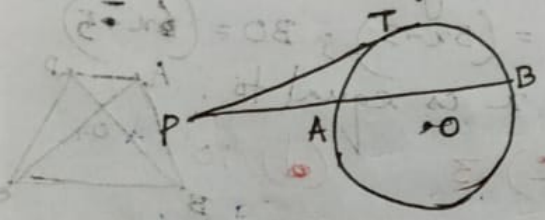
(a) 90° (b) 85°
(c) 75° (d) 65°

17. In the given figure; AP = 3 cm; BA = 5 cm and CP = 2 cm. Find CD:



(a) 12 cm (b) 10 cm
(c) 9 cm (d) 6 cm

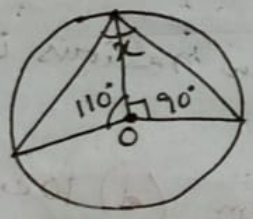
18. In the given figure; tangent PT = 5cm; PA = 4cm; find AB.



(a) $\frac{7}{4}$ cm (b) $\frac{11}{4}$ cm

(c) $\frac{9}{4}$ cm (d) $\frac{15}{4}$ cm

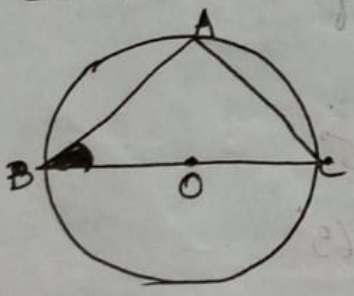
19. If O is the centre of the circle; the value of 'x' in the adjoining figure is:



(a) 80° (b) 70°

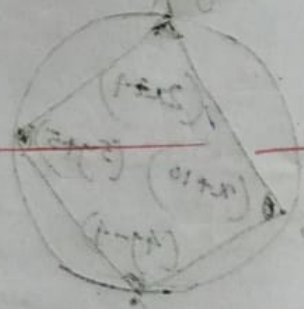
(c) 60° (d) 50°

20. In the given figure, BOC is a diameter of a circle and AB = AC. Then; ∠ABC = ?



(a) 30° (b) 45°

(c) 60° (d) 90°



[9] TRIGONOMETRY (E)

1. If $\cot A + \operatorname{cosec} A = 3$ and A is an angle; then the value of $\cos A$ is

(a) $\frac{4}{5}$ (b) 1 (c) $\frac{1}{2}$ (d) $\frac{3}{4}$

2. If $\tan(x+y)\tan(x-y) = 1$; then the value of $\tan x$ is:

(a) $\sqrt{3}$ (b) 1 (c) $\frac{1}{2}$ (d) $\frac{1}{\sqrt{3}}$

3. The value of $\cot\frac{\pi}{20} \cdot \cot\frac{3\pi}{20} \cdot \cot\frac{5\pi}{20} \cdot \cot\frac{7\pi}{20} \cdot \cot\frac{9\pi}{20}$

(a) -1 (b) $\frac{1}{2}$ (c) 0 (d) 1

4. If $4x = \sec\theta$ and $\frac{4}{x} = \tan\theta$ then $8\left(x^2 - \frac{1}{x^2}\right)$ is

(a) $\frac{1}{16}$ (b) $\frac{1}{8}$ (c) $\frac{1}{2}$ (d) $\frac{1}{4}$

5. If in $\triangle ABC$; $\angle A = 90°$; $BC = a$; $Ac = b$ and $AB = c$; then the value of $\tan B + \tan C$ is;

(a) $\frac{c^2}{ab}$ (b) $\frac{a^2+c^2}{b}$ (c) $\frac{b^2}{ac}$ (d) $\frac{a^2}{bc}$

6. If $\tan(\theta_1 + \theta_2) = \sqrt{3}$ and $\sec(\theta_1 - \theta_2) = \frac{2}{\sqrt{3}}$; then the value of $\sin 2\theta_1 + \tan 3\theta_2$ is equal to (Assume that $0° < \theta_1 - \theta_2 < \theta_1 + \theta_2 < 90°$)

(a) 0 (b) 3 (c) 1 (d) 2

7. If $\sin\alpha + \cos\beta = 2$ $\left(0° \le \beta < \alpha \le 90°\right)$; then $\sin\left(\frac{2\alpha+\beta}{3}\right) = ?$

(a) $\sin\frac{\alpha}{2}$ (b) $\cos\frac{\alpha}{3}$ (c) $\sin\frac{\alpha}{3}$ (d) $\cos\frac{2\alpha}{3}$

8. If $\sin\alpha \sec(30^\circ+\alpha) = 1$ $(0 < \alpha < 60^\circ)$; then the value of $\sin\alpha + \cos 2\alpha$ is

(a) 1 (b) $\frac{2+\sqrt{3}}{2\sqrt{3}}$ (c) 0 (d) $\sqrt{2}$

9. If A, B and C be the angles of a triangle; then of the following the incorrect relation is:

(a) $\sin\left(\frac{A+B}{2}\right) = \cos\frac{C}{2}$ (b) $\cos\left(\frac{A+B}{2}\right) = \sin\frac{C}{2}$

(c) $\tan\left(\frac{A+B}{2}\right) = \sec\frac{C}{2}$ (d) $\cot\left(\frac{A+B}{2}\right) = \tan\frac{C}{2}$

10. If $\sin\theta + \cos\theta = p$ and $\sec\theta + \operatorname{cosec}\theta = q$; then $q(p^2-1) = ?$

(a) p (b) $2p$ (c) $3p$ (d) $2p^2$

11. If $\operatorname{cosec}\theta - \sin\theta = l$ and $\sec\theta - \cos\theta = m$; then $l^2m^2(l^2+m^2+3)+3 = ?$

(a) 1 (b) -1 (c) 2 (d) 4

12. If $x\sin^3\theta + y\cos^3\theta = \sin\theta\cos\theta$ and $x\sin\theta = y\cos\theta$; then $x^2+y^2 = ?$

(a) 0 (b) 2 (c) 4 (d) 1

13. If $\sin\theta$ and $\cos\theta$ are the roots of the equation $ax^2 - bx + c = 0$; then

(a) $a^2+b^2+2ac=0$ (b) $a^2-b^2+2ac=0$

(c) $a^2+c^2+2ab=0$ (d) $a^2-b^2-2ac=0$

14. If $T_n = \sin^n\theta + \cos^n\theta$; then $\frac{T_3 - T_5}{T_1} = ?$

(a) $\sin\theta \cdot \cos\theta$ (b) $\sin\theta$ (c) $\cos\theta$ (d) $\sin^2\theta \cdot \cos^2\theta$

15. If $3\sin\theta + 5\cos\theta = 5$; then $5\sin\theta - 3\cos\theta = ?$

(a) 3 (b) -3 (c) 4 (d) ± 3

16. If $x = a\sec\theta \cdot \cos\phi$; $y = b\sec\theta \cdot \sin\phi$ and $z = c\tan\theta$; then $\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = ?$

(a) 2 (b) -2 (c) -1 (d) 1

17. If $\cos\theta + \cos^2\theta = 1$; then find the Value of $\sin^{12}\theta + 3\sin^{10}\theta + 3\sin^8\theta + \sin^6\theta + 2\sin^4\theta + 2\sin^2\theta - 2$.

(a) 1 (b) 2 (c) 3 (d) 4

18. If $\tan\theta - \cot\theta = a$ and $\cos\theta - \sin\theta = b$; then the Value of $(a^2+4)(b^2-1)^2$ is :

(a) 4 (b) 1 (c) 2 (d) 3

19. If $\sec x + \cos x = 3$; then $\tan^2 x - \sin^2 x$ is

(a) 5 (b) 13 (c) 9 (d) 4

20. Find the Value of :

$2\left(\sin^6\theta + \cos^6\theta\right) - 3\left(\sin^4\theta + \cos^4\theta\right) + 1$ is

(a) 4 (b) 0 (c) 1 (d) 2

21. If θ be a positive acute angle satisfying $\cos^2\theta + \cos^4\theta = 1$, then the value of $\tan^2\theta + \tan^4\theta$ is

(a) $\frac{3}{2}$ (b) 1 (c) $\frac{1}{2}$ (d) 0

22. The simplified value of $(\sec\theta - \cos\theta)^2 + (\operatorname{cosec}\theta - \sin\theta)^2 - (\cot\theta - \tan\theta)^2$ is

(a) 0 (b) $\frac{1}{2}$ (c) 1 (d) 2

23. If θ be an acute angle and $7\sin^2\theta + 3\cos^2\theta = 4$ then the value of $\tan\theta$ is:

(a) $\sqrt{3}$ (b) $\frac{1}{\sqrt{3}}$ (c) 1 (d) 0

24. If $\frac{\sin\phi + \cos\phi}{\sin\phi - \cos\phi} = 3$; then the value of $\sin^4\phi - \cos^4\phi$ is

(a) $\frac{1}{5}$ (b) $\frac{2}{5}$ (c) $\frac{3}{5}$ (d) $\frac{4}{5}$

25. If $\cos^2\alpha + \cos^2\beta = 2$; then the value of $\tan^3\alpha + \sin^5\beta$ is:

(a) -1 (b) 0 (c) 1 (d) $\frac{1}{\sqrt{3}}$

26. A person of height 2m wants to get a fruit which is on a pole of height $\left(\frac{10}{3}\right)$ m. If he stands at a distance of $\left(\frac{1}{\sqrt{3}}\right)$ m from the foot of the pole, then the angle at which he should throw the stone, so that it hits the fruit is

(a) 60° (b) 45° (c) 90° (d) 30°

27. A straight highway leads to the foot of a 50 m tall tower. From the top of the tower the angles of depression of two cars on the highway are 30° and 60°. What is the distance between the two cars?

(a) $\frac{100}{\sqrt{3}}$ m (b) $100\sqrt{3}$ m (c) $\frac{50}{\sqrt{3}}$ m (d) $50\sqrt{3}$ m

28. From the top of a pillar of height 20m the angles of elevation and depression of the top and bottom of another pillar are 30° and 45° respectively. The height of the second pillar (in metre) is :

(a) $\frac{20}{\sqrt{3}}(\sqrt{3}-1)$ (b) $\frac{20}{\sqrt{3}}(\sqrt{3}+1)$

(c) $20\sqrt{3}$ (d) $\frac{20}{\sqrt{3}}$