ESSENCE TEST-11

DATE : 01-09-19

9TH CLASS

CBSE(B2)

NUMBER SYSTEM, POLYNOMIAL,
LINES AND ANGLES & HERON'S FORMULA

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Best solution

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MARKS : 80 **MATHEMATICS** **TIME : 3 :00 HR.**

SECTION – (A)

1. The number obtained on rationalizing the denominator of $\frac{1}{\sqrt{7}-2}$ is **[1]**

   (a) $\frac{\sqrt{7}+2}{45}$ (b) $\frac{\sqrt{7}-2}{3}$ (c) $\frac{\sqrt{7}+2}{5}$ (d) $\frac{\sqrt{7}+2}{3}$

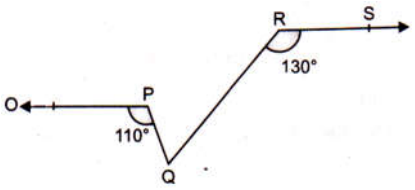
2. The sides of a triangle are 56 cm, 60 cm and 52 cm long. Then the area of the triangle is **[1]**

   (a) 1322 cm^2 (b) 1311 cm^2 (c) 1344 cm^2 (d) 1392 cm^2

3. If $x^{51} + 51$ is divided by x + 1, the remainder is **[1]**

   (a) 1 (b) 50 (c) 49 (d) -50

4. In figure, if OP||RS, $\angle OPQ = 110°$ and $\angle QRS = 130°$, then $\angle PQR$ is equal to **[1]**



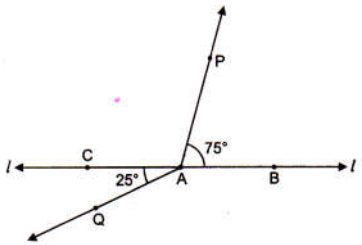
   (a) 40° (b) 50° (c) 60° (d) 70°

SECTION – (B)

5. If area of an equilateral triangle is $9\sqrt{3}\ cm^2$, find the length of each side of the triangle. **[2]**

6. If x be a positive real number such that $x^2 + \frac{1}{x^2} = \frac{50}{7}$, then evaluate $x + \frac{1}{x}$. **[2]**

7. In figure, ray AP stands on the line l. If ∠BAP = 75° and ∠CAQ = 25°, find reflex ∠PAQ. **[2]**



SECTION – (C)

8. Simplify: $\left\{\frac{2\sqrt{10} + 3\sqrt{10}}{5\sqrt{2}}\right\}^4$ **[3]**

9. Taking $\sqrt{3} = 1.732$ and $\sqrt{5} = 2.236$, evaluate $\frac{1}{4\sqrt{3} - 3\sqrt{5}}$ upto three decimal places. **[3]**

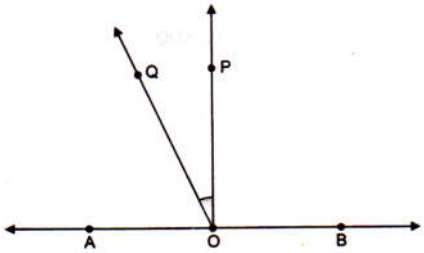
10. If $2^x = 3^y = 6^z$, show that $\frac{1}{z} = \frac{1}{x} + \frac{1}{y}$. **[3]**

11. Factorise: $x^3 - 23x^2 + 142x - 120$ **[3]**

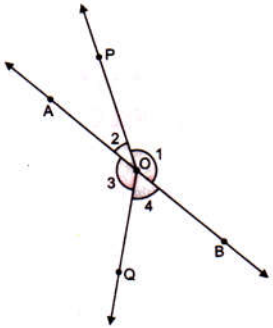
12. If a, b, c are non-zero real numbers such that $a^2 + b^2 + c^2 = ab + bc + ca$, then show that $a^3 + b^3 + c^3 = 3abc$. **[3]**

13. In figure, ray OP is perpendicular to the line AB at O. Another ray OQ is lying in between OA and OP. **[3]**

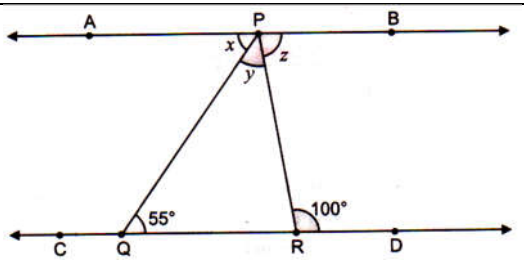
    Prove that $\angle POQ = \frac{1}{2}\{\angle BOQ - \angle AOQ\}$



14. In figure if $\angle 1 + \angle 2 = \angle 3 + \angle 4$, prove that AOB is a straight line. **[3]**



15. In figure, AB||CD, $\angle PQR = 55°$ and $\angle PRD = 100°$, find the angles x, y and z. **[3]**



16. A rhombus has perimeter 120 m and one of its diagonal is 50 m. Find the area of the rhombus. **[3]**

17. The perimeter of a triangle is 120 m and its sides are in the ratio 5 : 12 : 13. Find the length of the altitude of the triangle corresponding to the longest side. **[3]**

SECTION – (D)

18. Prove that $\frac{1}{1+x^{a-b}}+\frac{1}{1+x^{b-a}}=1$. **[4]**

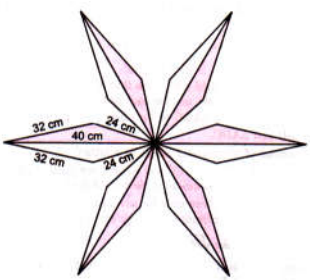
19. If $a+8\sqrt{5}\,b=\frac{8+\sqrt{5}}{8-\sqrt{5}}-\frac{8-\sqrt{5}}{8+\sqrt{5}}$, determine the rational numbers a and b. **[4]**

20. Simplify: $\frac{\left(\frac{81}{16}\right)^{\frac{-3}{4}}\times\left(\frac{25}{9}\right)^{\frac{-3}{2}}\times\left(\frac{2}{5}\right)^{-3}}{(125)^{\frac{2}{3}}\times(8)^{\frac{4}{3}}}$ **[4]**

21. Express $0.6+0.\overline{6}+0.4\overline{6}$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$. **[4]**

22. Without finding the cubes, factorise: $(x-2y)^3+(2y-3z)^3+(3z-x)^3$. **[4]**

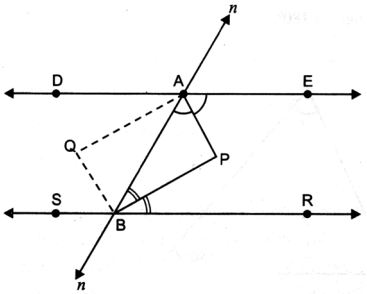
23. A floral design on a floor is made up of 12 tiles which are triangular, the sides of the triangular tiles are 24 cm, 32 cm and 40 cm as shown in figure. The tiles are polished at the rate of Rs. 1.20 per 10 cm^2. Find the cost of polishing the tiles. **[4]**



24. If $x+\frac{1}{x}=5$, evaluate $x^6+\frac{1}{x^6}$. **[4]**

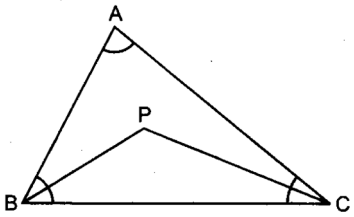
25. Two triangular walls of a flyover has been used for advertisements from both sides. The sides of each wall are 100 m, 80 m and 40 m. The advertisements yield an earning of Rs. 120 per m^2 per year. Find the amount of revenue earned in one year. (Take $\sqrt{231}=15.2$) **[4]**

26. in figure, DE||SR, AP and BP are bisectors of $\angle$EAB and $\angle$RBA respectively. Prove that $\angle$APB = 90°. Further, if AQ and BQ are bisectors of $\angle$DAB and $\angle$SBA respectively, prove that AQBP is a rectangle. **[4]**



27. In figure, bisectors of angle ∠ABC and ∠ACB meet at P. Prove that

$\angle PBC + \angle PCB = 90^\circ - \frac{1}{2} \angle BAC.$ **[4]**



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