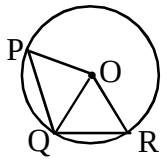
Q. 1. In the given figure besides, O is the centre of the circle. QR is a side of a regular decagon and PQ is a side of a regular hexagon. What could be the ratio of $\angle QOR : \angle QOP$



(1) 1 : 4 (2) 2 : 3 (3) 3 : 5 (4) 4 : 3

Q. 2. Which of the following is a singleton set?

(1) $A = \{ x \mid x \in N, 1 \leq x \leq 3\}$ (2) $A = \{ x \mid x \in N, x^2 - 9 = 0\}$

(3) $A = \{ x \mid x \in I, x^2 - 4x = 0 \}$ (4) $A = \{ x \mid x \in I, x^3 - 9x = 0\}$

Q. 3. When $4x^3 - ax^2 + bx - 4$ is divided by 'x – 2' and 'x + 1' the remainders are 20 and –13 respectively. Find the value of a and b.

(1) a = 3 & b = 2 (2) a = –3 & b = 2

(3) a = 3 & b = –2 (4) a = –3 & b = –2

Q. 4. If a + b = 16 and $a^2 + b^2 = 130$, then the value of $a^3 + b^3$ is:

(1) 1024 (2) 1072 (3) 1062 (4) 1064

Q. 5. Write the quadratic equation in the standard form for : $\frac{1}{x+1} - \frac{1}{x+3} = \frac{1}{x-3}$

(1) $x^2 - 3x - 9 = 0$ (2) $x^2 + x - 9 = 0$

(3) $x^2 + 2x + 9 = 0$ (4) $x^2 - 3x + 9 = 0$

Q. 6. The measure of the angles of a quadrilateral taken in order are 1 : 2 : 3 : 4, then the quadrilateral is a _____.

(1) rectangle (2) kite (3) parallelogram (4) trapezium

Q. 7. Δ ABC is an isosceles triangle with side AB = AC, side BA is produced to D such that AB= AD. Find m $\angle$ BCD.

(1) 90^o (2) 60^o (3) 45^o (4) 120^o

Q. 8. The perimeter of a rectangle is 39 cm. The ratio of the lengths of the two adjacent sides is 5 : 8. Find the breadth of the rectangle.

(1) 12 cm (2) 13 cm (3) 7.5 cm (4) 9 cm

Q. 9. Given that $\frac{35}{x-y} + \frac{33}{x+y} = 10$ and $\frac{45}{x-y} + \frac{66}{x+y} = 15$ Find the value of x and y

(1) x = 8 , y = 3 (2) x = 5 , y = 3 (3) x = 8 , y = 5 (4) x = 9 , y = 4

Q. 10. If log 2 = 0.3010 and log 3 = 0.4771, then find the value of $\log 5 + \log \sqrt{24}$

(1) 1.38905 (2) 0.93805 (3) 2.389 (4) 0.68905

Q. 11. The speeds of three cars are in the ratio 5 : 4 : 6. The ratio between the time taken by them to travel a same distance is :

(1) 5 : 4 : 6 (2) 6 : 4 : 5 (3) 10 : 12 : 15 (4) 12 : 15 : 10

Q. 12. If U = { x | x ∈ N, x is a one digit number}, A = { x | x ∈ N, x is an odd number} and B = { x | x ∈ N, x is an even prime number}, then what is the cardinal number of $(A \cap B)$ = ?

(1) 0 (2) 1 (3) 3 (4) 2

Q. 13. $\frac{5}{\sqrt{21 - 2\sqrt{104}}} - \frac{8}{\sqrt{18 + 2\sqrt{65}}} = ?$

(1) $\sqrt{11 + 2\sqrt{104}}$ (2) $\sqrt{13 + 2\sqrt{40}}$ (3) $\sqrt{40 + 2\sqrt{5}}$ (4) None of these

Q.14. $P(x) = 5x^2 + 2x + 1$; $Q(x) = 2x^2 + 3$; $R(x) = x^2 + 2x + 1$ and $(x) = P(x) - Q(x) + R(x)$ Find 5(x).

(1) $7x^2 + 4x + 5$ (2) $4x^2 + 4x + 5$ (3) $4x^2 + 4x$ (4) $4x^2 + 4x - 1$

Q. 15. Given that $x^2 + x - 1$ is a factor of $x^3 + ax^2 - 3x + c$. Find the values of 'a' and 'c'

(1) a = 1 , c = 1 (2) a = 1 , c = –2 (3) a = –1 , c = 2 (4) a = 1 , c = 2

Q. 16. If a = 3, b = 5 and c = 6, then find the value of : $\frac{ab + bc + ca - a^2 - b^2 - c^2}{3abc - a^3 - b^3 - c^3}$

(1) $\frac{1}{9}$ (2) $\frac{1}{11}$ (3) $\frac{1}{8}$ (4) $\frac{1}{14}$

Q. 17. Find the quadratic equation whose roots are $-2 - \sqrt{6}$ and $-2 + \sqrt{6}$

(1) $x^2 + 4x - 2 = 0$ (2) $x^2 - 4x - 2 = 0$ (3) $x^2 + 4x + 2 = 0$ (4) $x^2 - 4x + 2 = 0$

Q. 18. Express $\log_{10} \sqrt[5]{108}$ in terms of $\log_{10} 2$ and $\log_{10} 3$

(1) $(2 \log_{10} 2 + 3 \log_{10} 3)^5$ (2) $\frac{1}{5}(2 \log_{10} 2 + 3 \log_{10} 3)$

(3) $\frac{1}{5}(\log_{10} 2 + \log_{10} 3)$ (4) $(\log_{10} 2 + \log_{10} 3)$

Q. 19. The ratio of the sides of similar triangles is 2 : 3. If the area of the smaller triangle is 64 sq.cm. find the area of the larger triangle

(1) 144 sq.cm (2) 96 sq.cm (3) 84 sq.cm (4) 106 sq.cm

Q. 20. Evaluate : $\frac{5 \sin 66}{\cos 24} - \frac{2 \cot 85}{\tan 5}$ (1) 2 (2) 4 (3) 1 (4) 3

Q. 21. The ratio of the complementary angle to the supplementary angle of a given angle is 4 : 19. Find the ratio of the angle to its supplementary angle.

(1) 11 : 4 (2) 11 : 19 (3) 19 : 11 (4) 4 : 11

Q. 22. If $P = \frac{2}{\sqrt{5}-\sqrt{7}}$ and $Q = \frac{2}{\sqrt{5}+\sqrt{7}}$ then find the value of P – Q :

(1) $-2\sqrt{5}$ (2) -2 (3) $-2\sqrt{7}$ (4) $-4\sqrt{3}$

Q. 23. What is the difference of the remainders when $x^3 - 3x^2 + 5x - 1$ is divided by (x+1) and (x – 1) ?

(1) ± 15 (2) ± 12 (3) ± 22 (4) ± 25

Q. 24. Factorize : $a^2 + \frac{1}{a^2} + 2 - 3a - \frac{3}{a}$

(1) $(a - \frac{1}{a})\ (a - \frac{1}{a} - 3)$ (2) $(a + \frac{1}{a})\ (a - \frac{1}{a} - 3)$

(3) $(a + \frac{1}{a})\ (a + \frac{1}{a} - 3)$ (4) $(a - \frac{1}{a})\ (a + \frac{1}{a} + 3)$

Q. 25. Simplify : $\frac{2}{1+\frac{x}{y+z}} + \frac{2}{1+\frac{y}{z+x}} + \frac{2}{1+\frac{z}{x+y}}$ (1) 4 (2) 3 (3) 2 (4) 1

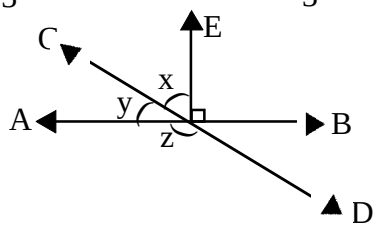
Q. 26. A rectangular tank is 15 m long and 12.5 m deep. If 750 cubic metres of water be drawn off the tank, the level of water in the tank goes down by 2.5 m. Find the total capacity of the tank.

(1) 7350 cu.m (2) 5350 cu.m (3) 5750 cu.m (4) 3750 cu.m

Q. 27. Find the value of $\log_{125} 3125 - \log_8 128$

(1) $-\frac{5}{3}$ (2) -1 (3) $-\frac{2}{3}$ (4) $-\frac{4}{3}$

Q. 28. In the adjoining figure, m $\angle$ BOE = 90^o
AB and CD are straight lines.
Find x and y if z = 3x



(1) $x = 45^o, y = 45^o$ (2) $x = 30^o, y = 60^o$
(3) $x = 40^o, y = 50^o$ (4) $x = 50^o, y = 40^o$

Q. 29. If $\tan\theta + \cot\theta = 2$, then find the value of $\tan^2\theta + \cot^2\theta$ = ?

(1) 1 (2) 2 (3) 3 (4) 4

Q. 30. The area of a rhombus is 240 sq.cm. and one of its diagonal is 30 cm. Find the perimeter of the rhombus.

(1) 32 cm (2) 68 cm (3) 16 cm (4) 64 cm

Q. 31. If A and B are disjoint sets, then $n(A \cup B) = ?$

(1) n(A) + n(B) (2) n(A) (3) n(B) (4) n(A) – n(B)

Q. 32. Compare the following: $\sqrt{3} + \sqrt{2} \square \frac{1}{\sqrt{3} - \sqrt{2}}$

(1) < (2) > (3) = (4) None of these

Q. 33. Which of the following is not a factor of $x^4 - 2x^3 - 44x^2 + 18x + 315$?

(1) (x – 3) (2) (x – 7) (3) (x + 1) (4) (x + 5)

Q. 34. The sum of two natural numbers is 21 and the sum of their squares is 261. Find the numbers.

(1) –15, –6 (2) 15, 6 (3) 18, 5 (4) 15, 12

Q. 35. At a shooting competition, a marksman receives 50 paise if he hits the mark and has to pay 20 paise if he misses it. He tried 60 shots and was paid Rs.1 and 30 paise How many times did he miss the mark?

(1) 51 (2) 21 (3) 31 (4) 41

Q. 36. What is the angle of elevation of the sun when the length of the shadow of a tree is equal to its height ?

(1) 45^o (2) 30^o (3) 60^o (4) 90^o

Q. 37. The area of a trapezium is 918 sq.cm. Its parallel sides are in the ratio 4 **:** 5. The height of the trapezium is 12 cm. Find the lengths of the parallel sides.

(1) 84cm &105cm (2) 80cm &100cm (3) 68cm &85cm (4) 76cm &95cm

Q. 38. If the arms of one angle are respectively parallel to the arms of another angle, then the two angles are :

(1) neither equal nor supplementary (2) not equal but supplementary
(3) equal but not supplementary (4) either equal or supplementary

Q. 39. Mrs. Joshi`s Academy has two classrooms A and B. If 10 students from class A are shifted to class B, the number of students in each class is the same. If 20 students are shifted from class B to class A, then the number of students in class A are double of that in class B. Find the total number of students in Mrs. Joshi`s Academy.

(1) 140 (2) 100 (3) 180 (4) 240

Q. 40. The angle between the hour hand and the minute hand at 1 : 37 is:

(1) 170^o (2) 173.5^o (3) 167.5^o (4) None of these