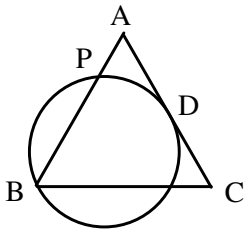
ACE OF PACE OBJECTIVE SECTION
(QUESTION PAPER)

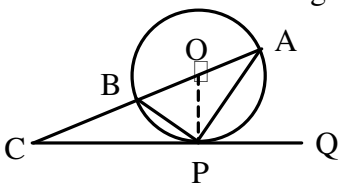
1. In the given figure, ABC is an isosceles triangle in which $AB = AC$. A circle through B touches AC at its mid point D and intersects AB at P.



Which of the following is correct?

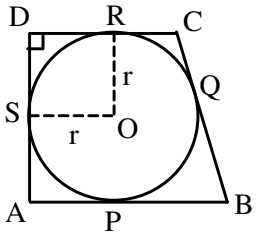
(A) $AP = \frac{3}{4}AB$ (B) $AP = \frac{2}{3}AB$ (C) $AP = \frac{4}{5}AB$ (D) $AP = \frac{1}{4}AB$

2. A tangent CQ touches a circle with centre O at P. Diameter AB is produced to meet the tangent at C. If $\angle ACP = a^0$ and $\angle BPC = b^0$, find the relation connecting a and b.



(A) $a^0 + b^0 = 180^0$ (B) $a^0 + 2b^0 = 90^0$ (C) $a^0 - b^0 = 60^0$ (D) $2a^0 + b^0 = 100^0$

3. In the given figure, ABCD is a quadrilateral in which, $\angle D = 90^0$ $\angle A = 90^o$. A circle C center at O and radius r touches the sides AB, BC, CD and DA at P, Q, R, S respectively. If $BC = 38$ cm, CD = 25 cm, and BP = 27 cm, find the value of r.



(A) 14 cm (B) 15 cm (C) 10 cm (D) 16 cm

4. If $p = 3$ and $q = 2$, then $(3p - 4q)^{q-p} \div (4p - 3q)^{2q-p} =$ _____

(A) 1 (B) 6 (C) $\frac{1}{6}$ (D) $\frac{2}{3}$

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5. $\left[\dfrac{(32)^{0.2}+(81)^{0.25}}{(256)^{0.5}-(121)^{0.5}}\right]=$ _____

(A) 2 (B) 5 (C) 1 (D) 11

6. $\sqrt{\dfrac{81}{64}\sqrt{\dfrac{81}{64}\sqrt{\dfrac{81}{64}\sqrt{\dfrac{81}{64}}}}\,.....\infty}=$

(A) $\dfrac{81}{64}$ (B) $\dfrac{9}{8}$ (C) $\dfrac{3}{2}$ (D) $\dfrac{3}{2\sqrt{2}}$

7. Krishna and Sudheer have some marbles with them. If Sudheer gives 10 marbles to Krishna, Krishna will have 40 more marbles than Sudheer. If Sudheer gives 40 marbles to Krishna, Krishna will have 5 times as many marbles as Sudheer. Find the number of marbles with Sudheer.

(A) 65 (B) 55 (C) 70 (D) 50

8. The number of solutions to the equation $\sqrt{x+5}+\sqrt{5-x}=4$ are _____

(A) 0 (B) 1 (C) 2 (D) None of these

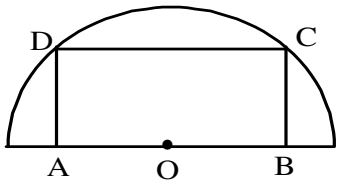
9. If $A=\{1,2,3,4\}$, then how many subsets of A contain the element 3?

(A) 24 (B) 28 (C) 8 (D) 16

10. If $A=\left\{n:\dfrac{n^3+5n^2+2}{n}\text{ is an integer and n itself is an integer}\right\}$, then the number of elements in the set A is

(A) 1 (B) 2 (C) 3 (D) 4

11. In the shown figure. ABCD is a rectangle inscribed in a semi circle. If the length and the breadth of the rectangle are in the ratio 2 : 1. What is the ratio of the perimeter of the rectangle to the diameter of the semicircle?



(A) $3:\sqrt{2}$ (B) $2:\sqrt{3}$ (C) $2:\sqrt{5}$ (D) $3:\sqrt{5}$

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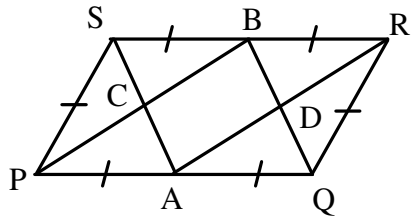
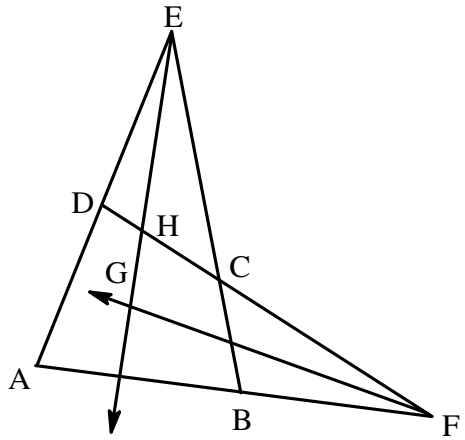
12. In the given figure, PQRS is a parallelogram. A and B are the midponts of $\overline{PQ}$ and $\overline{SR}$ respectively. If $PS = BR$, then the quadrilateral ADBC is a _____



(A) rhombus (B) trapezium (C) square (D) rectangle

13. In the given figure, ABCD is a cyclic quadrilateral, $\angle DAB = 50^0$ and $\angle ABC = 80^0$. $\overrightarrow{EG}$ and $\overrightarrow{FG}$ are the angle bisectors of $\angle DEC$ and $\angle BFC$. Find $\angle FHG$.

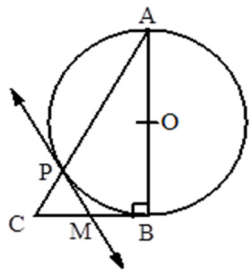


(A) 80^0 (B) 90^0 (C) 75^0 (D) 105^0

14. The number of diagonals of a regular polygon in which, each interior angle is 156^0, is_____
(A) 24 (B) 54 (C) 90 (D) 45

15. From each corner of a square sheet of side 8 cm, a square of side y cm is cut. The remaining sheet is folded into a cuboid. The minimum possible volume of the cuboid formed is M cubic cm. If y is an integer, then the value of M is _____
(A) 32 (B) 18 (C) 36 (D) 12

16. In $\Delta ABC, \angle B = 90^0$. The circle with diameter AB meet AC at P. The tangent at P meet BC at M. The ratio CM : BM is given by



(A) 2 : 3 (B) 1 : 2 (C) 1 : 1 (D) 2 : 1

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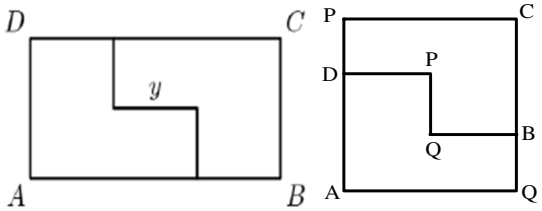
17. What is the unit digit of the expanded form of the number 7^{267}?
(A) 7 (B) 9 (C) 3 (D) 1

18. A rectangular poster is photocopied and enlarged. If its length is increased by 20% and breadth by30%, then its area is increased by
(A) 50% (B) 56% (C) 82% (D) 78%

19. The 8×18 rectangle ABCD is cut into two congruent hexagons, as shown, in such a way that the two hexagons can be repositioned without overlap to form a square. What is y?



(A) 6 (B) 7 (C) 8 (D) 9

20. Isabella's house has 3 bedrooms. Each bedroom is 12 feet long, 10 feet wide, and 8 feet high. Isabella must paint the walls of all the bedrooms. Doorways and windows, which will not be painted, occupy 60 square feet in each bedroom. How many square feet of walls must be painted?
(A) 678 (B) 768 (C) 786 (D) 876

21. All sides of the convex pentagon ABCDE are of equal length, and $\angle A = \angle B = 90^0$. What is the degree measure of $\angle E$?
(A) 90^0 (B) 108^0 (C) 150^0 (D) 144^0

22. When a bucket is two – third full of water, the bucket and water weight is a in kilograms. When the bucket is one-half full of water the total weight is b kilograms. In terms of a and b, what is the total weight in kilograms when the bucket is full of water?
(A) $\frac{2}{3}a + \frac{1}{3}b$ (B) $\frac{3}{2}a - \frac{1}{2}b$ (C) $\frac{3}{2}a + b$ (D) $3a - 2b$

23. Triangle ABC has AB = 13 and AC = 15, and the altitude to $\overline{BC}$ has length 12. What is the sum of the two possible values of BC?
(A) 15 (B) 16 (C) 17 (D) 18

24. A rectangular floor measures a by b feet, where a and b are positive integers with b > a. An artist paints a rectangle on the floor with the sides of the rectangle parallel to the sides of the floor. The unpainted part of the floor forms a border of width 1 foot around the painted rectangle and occupies half of the area of the entire floor. How many possibilities are there for the ordered pair (a, b)?
(A) 1 (B) 2 (C) 3 (D) 4

SPACE FOR ROUGH WORK

25. Kate rode her bicycle for 30 minutes at a speed of 16 mph, then walked for 90 minutes at a speed of 4 mph. What was her overall average speed in miles per hour?

(A) 7 (B) 9 (C) 10 (D) 12

26. The ratio $\frac{10^{2000}+10^{2002}}{10^{2001}+10^{2001}}$ is closest to which of the following numbers?

(A) 5 (B) 0.2 (C) 10 (D) 0.1

27. A triangle with side lengths in the ratio 3 : 4 : 5 is inscribed in a circle of radius 3. What is the area of the triangle?

(A) 8.64 (B) 12 (C) 5π (D) 17.28

28. Let a, b, c, d and e be distinct integers such that

$$(6-a)(6-b)(6-c)(6-d)(6-e)=45$$

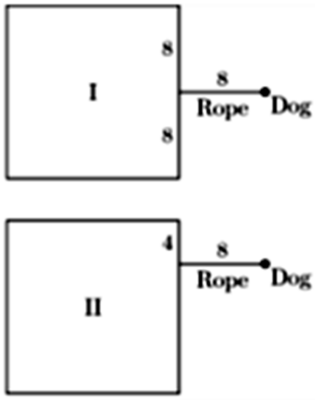
What is $a+b+c+d+e$?

(A) 5 (B) 17 (C) 25 (D) 33

29. The sum of four two-digit numbers is 221. None of the eight digits is 0 and no two of them are same. Which of the following is not included among the eight digits?

(A) 9 (B) 4 (C) 3 (D) 2

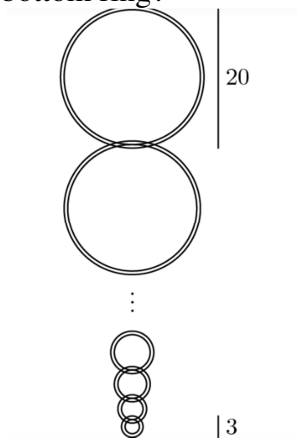
30. Rolly wishes to secure his dog with an 8-foot rope to a square shed that is 16 feet on each side. His preliminary drawings are shown. Which of these arrangements gives the dog the greater area to roam, and by how many square feet?



(A) I, by 8π (B) I, by 6π (C) II, by 4π (D) II, by 8π

SPACE FOR ROUGH WORK

31. A number of linked rings, each 1 cm thick, are hanging on a peg. The top ring has an outside diameter of 20 cm. The outside diameter of each of the outer rings is 1 cm less than that of the ring above it. The bottom ring has an outside diameter of 3 cm. What is the distance, in cm, from the top of the top ring to the bottom of the bottom ring?



(A) 171 (B) 173 (C) 182 (D) 188

32. Riya walks completely around the boundary of a square whose sides are each 5 km long. From any point on her path she can see exactly 1 km horizontally in all directions. What is the area of the region consisting of all points Riya can see during her walk, expressed in square kilometers and rounded to the nearest whole number

(A) 24 (B) 27 (C) 39 (D) 40

33. If $f(x) = x^{(x+1)} \times (x+2)^{(x+3)}$ then $f(0) + f(-1) + f(-2) + f(-3) =$

(A) $\frac{-8}{9}$ (B) $\frac{10}{9}$ (C) $\frac{8}{9}$ (D) 1

34. Given that $0 < a < b < c < d$, which of the following is the largest?

(A) $\frac{a+b}{c+d}$ (B) $\frac{a+d}{b+c}$ (C) $\frac{b+c}{a+d}$ (D) $\frac{c+d}{a+b}$

35. A father takes his twins and a younger child out to dinner on the twins' birthday. The restaurant charges Rs 495 for the father and Rs 45 for each year of a child's age, where age is defined as the age at the most recent birthday. If the bill is Rs 945, which of the following could be the age of the youngest child?

(A) 1 (B) 2 (C) 3 (D) 4

36. Rahul runs at a steady rate, and Priyanka runs m times as fast as Rahul, where m is a number greater than 1. If Priyanka gives Rahul a head start of h meters, how many meters must Priyanka run to overtake Rahul?

(A) hm (B) $\frac{h}{h+m}$ (C) $\frac{h}{m-1}$ (D) $\frac{hm}{m-1}$

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37. The difference between a two-digit number and the number obtained by reversing its digits is 5 times the sum of the digits of either number. What is the sum of the smallest such two digit number and its reverse?

(A) 44 (B) 55 (C) 99 (D) 110

38. Two non-zero real numbers, a and b, satisfy ab = a – b. Which of the following is a possible value of $\frac{a}{b}+\frac{b}{a}-ab$?

(A) 2 (B) $-\frac{1}{2}$ (C) $\frac{1}{3}$ (D) $\frac{1}{2}$

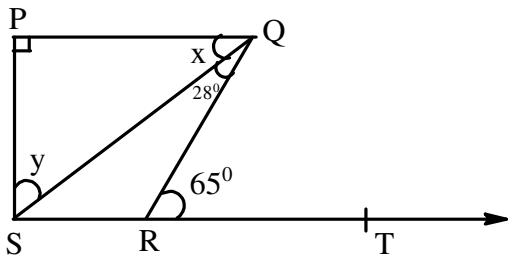
39. Find the sum of all prime numbers between 1 and 100 that are simultaneously 1 greater than a multiple of 4 and 1 less than a multiple of 5.

(A) 118 (B) 187 (C) 158 (D) 245

40. What is the largest number of acute angles that a convex hexagon can have?

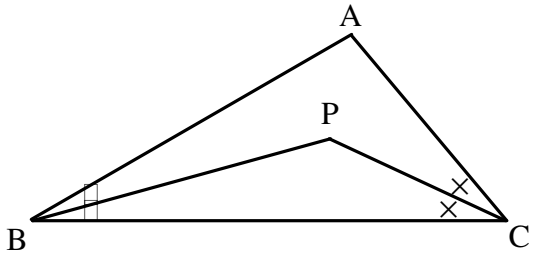
(A) 2 (B) 3 (C) 4 (D) 5

41. In figure, if $PQ \perp PS, PQ \| SR, \angle SQR = 28^0$ and $\angle QRT = 65^0$, then the values of x and y are:



(A) $52^0, 55^0$ (B) $37^0, 53^0$ (C) $53^0, 34^0$ (D) None of these

42. In the figure, $AB > AC$, PB and PC are bisectors of $\angle B$ and $\angle C$ respectively. Then



(A) $PB > PC$ (B) $PB < PC$ (C) $PB = PC$ (D) None of these

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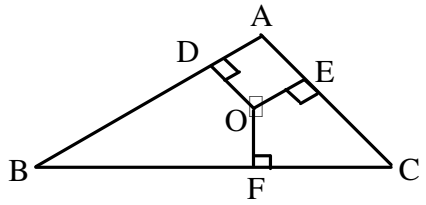
43. OD, OE and OF are congruent perpendicular to the three sides of the triangle. What is the relationship between $m\angle BAC$ and $m\angle BOC$?



(A) $m\angle BAC = 180 - m\angle BOC$ (B) $m\angle BOC = 90 + \frac{1}{2} m\angle BAC$

(C) $m\angle BAC = 90 + \frac{1}{2} m\angle BOC$ (D) $m\angle BOC = 2m\angle BAC$

44. If one angle of parallelogram is 30^0 less than twice the smallest angle, then measure of each angle will be

(A) $60^0, 80^0, 80^0, 140^0$ (B) $70^0, 110^0, 70^0, 110^0$

(C) $60^0, 120^0, 60^0, 120^0$ (D) $75^0, 105^0, 75^0, 105^0$

45. The side of a triangle are in the ratio 3 : 4 : 5 and its semiperimeter is 24 cm, then the area of triangle in square units will be

(A) 12 (B) 24 (C) 30 (D) 40

46. A man sold an article for Rs 80 and made a profit of 25%. How much did the article cost him

(A) Rs 55 (B) Rs 60 (C) Rs 64 (D) Rs 100

47. Find the length of the bridge, which a train 130 m long travelling at 45 km per hour can cross in 20 sec

(A) 115 m (B) 120 m (C) 245 m (D) 250 m

48. The average of 3 numbers is 17 and that of the first two is 16. Find the third number.

(A) 15 (B) 16 (C) 17 (D) 19

49. The sum of two numbers is 80. If their sum is 4 times their difference, and the greater number is k times the smaller, then k is

(A) 2 (B) 1.5 (C) 5/3 (D) 4

50. In year N, the 300th day of the year is a Tuesday. In year N + 1, the 200th day is also a Tuesday. On what day of the week did the 100th day of year N – 1 occur?

(A) Thursday (B) Friday (C) Saturday (D) Sunday

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