SUMMATIVE ASSESSMENT – I, 2015-16
MATHEMATICS
Class – IX

hoursTime Allowed: 3 hours   **Maximum Marks: 90**

General Instructions:
1.   All questions are **compulsory**.
2.   The question paper consists of **31** questions divided into **four sections A, B, C and D**. **Section-A** comprises of **4** questions of **1 mark** each; **Section-B** comprises of **6** questions of **2 marks** each; **Section-C** comprises of **10** questions of **3 marks** each and **Section-D** comprises of **11** questions of **4 marks** each.
3.   There is no overall choice in this question paper.
4.   Use of calculator is not permitted.

SECTION-A

Question numbers **1** to **4** carry one mark each.

1. $0.13, 0.13\overline{15}, 0.\overline{1315}, 0.3013001300013\ldots$ 1

Identify an irrational number among the following numbers :

$0.13, 0.13\overline{15}, 0.\overline{1315}, 0.3013001300013\ldots$

2.   If $2x + 1$ is one factor of the polynomial $2x^2 - x - 1$, then find the other factor.   1

3.   Which of the following congruence rules holds for triangles ?   1

ASS, SAS or SSA.

4.   Find the reflection of the point $(4, -4)$ in x-axis.   1

Question numbers 5 to 10 carry two marks each.

5. Simplify : $\left(\sqrt{5} + \sqrt{2}\right)^2$ 2

6. If $a + b = 10$ and $ab = 16$, then find $a^2 + b^2$.   2

7. In the given figure, if point C lies between A and B, then prove that AB > AC. Which Euclid's   2
   axiom is applied by you ?

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   A     C      B
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8.   2

9. Plot the points $(3, -5)$ and $(-3, 5)$ and join them.   2

10. Using Heron's formula, calculate the area and altitude of an equilateral triangle of side 80 cm.   2
    (Use $\sqrt{3} = 1.73$)

SECTION-C

Question numbers **11** to **20** carry three marks each.

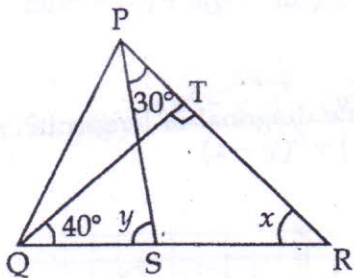11. If $a = 1 + \sqrt{7}$, find the value of $\dfrac{-6}{a}$

3

12. Rationalise the denominator of $\dfrac{4}{2+\sqrt{3}+\sqrt{7}}$

3

13. If the polynomials $px^3 + 4x^2 + 3x - 4$ and $x^3 - 4x + p$ are divided by $x - 3$, then the remainder in each case is the same. Find the value of p.
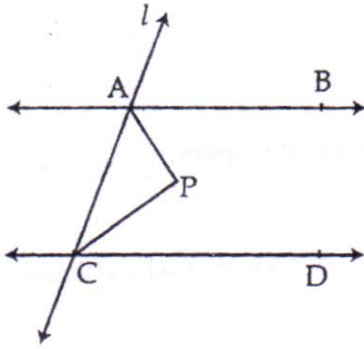
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14. Expand $\left(4 - \dfrac{1}{3x}\right)^3$.

3

15. In a triangle ABC, BO and CO are the bisector of $\angle ABC$ and $\angle ACB$, If $\angle ABC = \angle ACB$ and $\angle ABO = \angle ACO$, show that $\angle CBO = \angle BCO$.
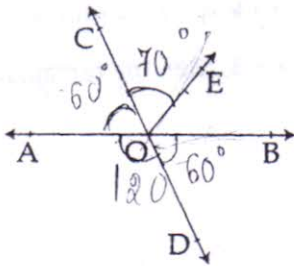
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16. In the given figure, if QT⊥PR, $\angle TQR = 40°$ and $\angle SPR = 30°$, find x and y.

3

17. In the figure, AB∥CD and a transversal l cuts AB and CD at A and C respectively. Bisectors of $\angle A$ and $\angle C$ intersect each other at P. Prove that $\angle APC = 90°$.

3

18   Lines AB and CD intersect at O as shown in the figure. If $\angle AOC + \angle BOE = 110°$ and $\angle BOD = 60°$, find   3
      $\angle BOE$.

19   P is the point (4, 5). PQ is drawn perpendicular to x-axis, meeting it at Q. Then,   3

      (a)   what are the co-ordinates of Q ?

      (b)   what is the length of PQ ?

      (c)   how far is Q from the origin ?

20   ABCD is a rhombus with each side of length 10 cm and one diagonal of length 16 cm. Find   3
      the area of the rhombus.

Question numbers **21** to **31** carry four marks each.

21 Prove that $\dfrac{1}{3+\sqrt{7}}+\dfrac{1}{\sqrt{7}+\sqrt{5}}+\dfrac{1}{\sqrt{5}+\sqrt{3}}+\dfrac{1}{\sqrt{3}+1}=1$ 4

22 Give an example of two irrational numbers whose : 4

 (i)   difference is an irrational number

 (ii)   sum is an irrational number

 (iii) product is an irrational number

 (iv)   division is an irational number

 Justify also.

23 Prove that : 4

$$(x+y)^3+(y+z)^3+(z+x)^3-3(x+y)(y+z)(z+x)=2(x^3+y^3+z^3-3xyz)$$

24 Factorise : $2x^4+x^3-14x^2-19x-6$. 4

25 Using factor theorem, show that $(m-n)$, $(n-p)$ and $(p-m)$ are factors of 4
$m(n^2-p^2)+n(p^2-m^2)+p(m^2-n^2)$.

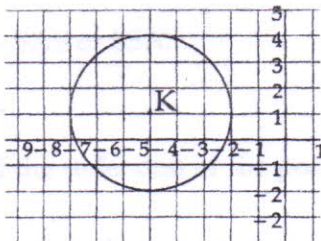26 Simplify : $\dfrac{(x^2-y^2)^3+(y^2-z^2)^3+(z^2-x^2)^3}{(x-y)^3+(y-z)^3+(z-x)^3}$ 4

27   4

A circular pond in a village is full of fishes. Rohan everyday feeds the fishes. What value is he exhibiting by doing so ? With centre as K in the figure how many circles can be drawn ? State Euclid Axiom which supports this statement. Also give two axioms of Euclids.
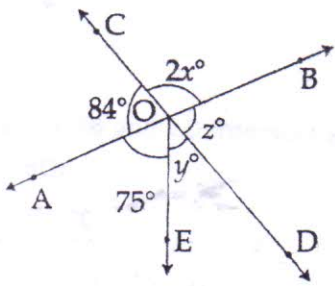Postulate

28   Sunil and Shyam have the same weight. If they each gain weight by 4 5 kg, how will their new weights be compared using the axioms ? Write the Euclid's axiom that best supports your answer. Also give two more axioms other than the axiom used in the above situation.
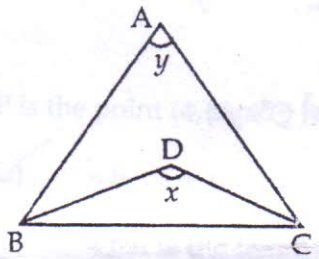
29   In the given figure, lines AB and CD intersect each other at O. Find the values of x, y and z.   4

30   In $\triangle ABC$ of the figure, BD and CD are internal bisectors of $\angle B$ and $\angle C$ respectively. Prove 4 that $180° + y = 2x$.

31   The angles of a triangle are $(x-40)°$, $(x-20)°$ and $\left(\dfrac{x}{2} - 10\right)°$. Find the value of x and then the 4 angles of the triangle.

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