



BGS INTERNATIONAL PUBLIC SCHOOL
SECTOR - 5, DWARKA, NEW DELHI-75
FINAL EXAMINATION (2022-23)

SUBJECT : MATHEMATICS (041)
CLASS : IX
SET : 2

SCHOOL CODE : 25279
TIME : 3 Hours
M.M : 80

General Instructions :

- i) This Question Paper has 5 sections A, B, C, D & E.
- ii) Section A - 20 MCQs carrying 1 mark each.
- iii) Section B - 5 Short Answer-I (SA-I) type questions carrying 2 marks each. An internal choice in 2 questions has been provided.
- iv) Section C - 6 Short Answer-II (SA-II) type questions carrying 3 marks each. An internal choice in 2 questions has been provided.
- v) Section D - 4 Long Answer (LA) type questions carrying 5 marks each. An internal choice in 2 questions has been provided.
- vi) Section E - 3 Case Based integrated units of assessment (4 marks each) with sub-parts of 1, 1 & 2 marks each respectively. An internal choice has been provided in the 2 marks question.
- vii) Graph sheet will be provided for graph question.
- viii) This paper consists of 7 pages.

SECTION A

(1 x 20 = 20 M)

- Q1. Which of the following equations represents a line parallel to x-axis ?
a) $3x + 2 = 0$ b) $3y + 2 = 0$ c) $3x + 2y = 0$ d) $3x - 2y = 0$
- Q2. One of the zeros of the polynomial $f(x) = 2x^2 + 7x - 4$ is
a) 2 b) $\frac{1}{2}$ c) $-\frac{1}{2}$ d) -2
- Q3. If the radius of a sphere is $2r$, then the volume will be
a) $\frac{4}{3}\pi r^3$ b) $4\pi r^3$ c) $\frac{8}{3}\pi r^3$ d) $\frac{32}{3}\pi r^3$
- Q4. An angle is equal to 5 times its complement, find the angle.
a) 50° b) 95° c) 75° d) 65°
- Q5. The value of $64^{-1/3}(64^{1/3} - 64^{2/3})$ is
a) 1 b) $\frac{1}{3}$ c) -3 d) -2

- Q6. A frequency polygon is constructed by plotting frequency of the class-interval & the
 a) upper limit of the class
 ✓ c) mid-value of the class
 b) lower limit of the class
 d) any value of the class
- Q7. In a bag there are 100 bulbs out of which 30 are bad ones. A bulb is taken out of the bag at random. The probability of the selected bulb to be good is
 a) 0.5
 ✓ b) 0.7
 c) 0.3
 d) none of these
- Q8. $\sqrt{11}$ is a polynomial of degree
 a) 2
 b) 0
 c) 1
 ✓ d) $\frac{1}{2}$
- Q9. If P is a point in the interior of a circle with centre O and radius r, then
 a) $OP = r$
 b) $OP > r$
 c) $OP \geq r$
 ✓ d) $OP < r$
- Q10. If $x - 3$ is a factor of $x^2 - ax - 15$ then a is equal to
 ✓ a) -2
 b) 5
 c) -5
 d) 3
- Q11. A right circular cylinder has
 a) only one face
 ✓ b) two faces
 c) three faces
 d) six faces
- Q12. If the mean of 6, 4, 7, p & 10 is 8. Find the value of p.
 a) 10
 b) 11
 c) 12
 ✓ d) 13
- Q13. If $(2\alpha + 1, \alpha - 1)$ is a solution of the equation $2x - 3y + 5 = 0$ then find the value of α
 a) -2
 ✓ b) -8
 c) -10
 d) -5
- Q14. If a wheel has six spokes equally spaced then find the measure of the angle between two adjacent spokes
 a) 10°
 b) 30°
 ✓ c) 45°
 d) 60°
- Q15. The area of the curved surface of a cone of radius $2r$ & slant height $\frac{l}{2}$ is
 ✓ a) $\pi r l$
 b) $2\pi r l$
 c) $\frac{1}{2}\pi r l$
 d) $\pi(r + l)r$
- Q16. A bag contains 4 black, 8 red & 3 white balls. A ball is drawn from the bag at random. What is the probability that the ball drawn is white?
 a) $\frac{4}{15}$
 ✓ b) $\frac{1}{5}$
 c) $\frac{8}{15}$
 d) $\frac{15}{8}$
- Q17. If two diameters of a circle intersect each other at right angles then the quadrilateral formed by joining their end points is a
 ✓ a) rhombus
 b) rectangle
 c) parallelogram
 d) square
- Q18. The ratio of the total surface area of a sphere & a hemisphere of same radius is
 a) 2 : 1
 b) 3 : 2
 c) 4 : 1
 ✓ d) 4 : 3

DIRECTION : (For Q19 & 20) In each of the following questions, a statement of Assertion is given followed by a corresponding statement of Reason just below it. Choose the correct option

Q19. Assertion : $\sqrt{2}$ is an irrational number

Reason : The decimal expansion of $\sqrt{2}$ is non-terminating, non-recurring.

- (a) Both assertion and reason are true and reason is the correct explanation of assertion.
- (b) Both assertion and reason are true but reason is not the correct explanation of assertion.
- (c) Assertion is true but reason is false.
- (d) Assertion is false but reason is true.

Q20. Assertion : The value of k for which $(x - 2)$ is a factor of $f(x) = 2x^3 + 4x + 9 - k$ is 33.

Reason : If $f(x)$ is a polynomial of degree ≥ 1 and a is a real number, then $(x - a)$ is a factor of $f(x)$ if $f(a) = 0$

- (a) Both assertion and reason are true and reason is the correct explanation of assertion
- (b) Both assertion and reason are true but reason is not the correct explanation of assertion.
- (c) Assertion is true but reason is false.
- (d) Assertion is false but reason is true.

SECTION B

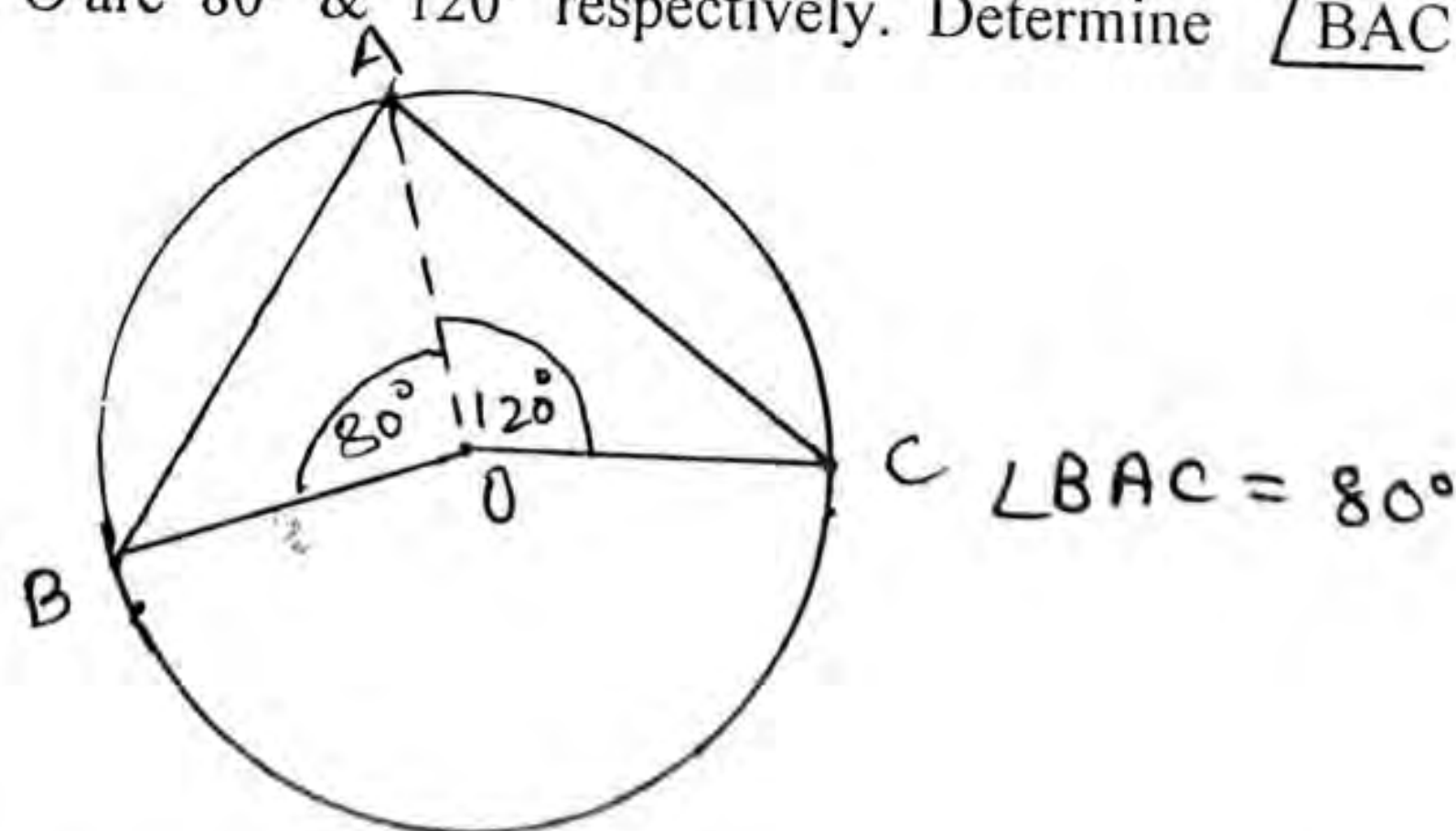
(2 X 5 = 10 M)

Q21. Simplify $\frac{5^{n+3} - 6 \times 5^{n+1}}{9 \times 5^n - 2^2 \times 5^n}$

OR

Q21. Rationalise the denominator of $\frac{\sqrt{10} - \sqrt{5}}{\sqrt{2} - 1} \cdot \frac{\sqrt{15}}{3}$

Q22. In figure A, B & C are three points on a circle such that the angles subtended by the chords AB & AC at the centre O are 80° & 120° respectively. Determine $\angle BAC$



Q23. Find the remainder when $p(x) = 4x^3 - 12x^2 + 14x - 3$ is divided by $g(x) = x - \frac{1}{2}$ by remainder theorem. $\approx \frac{3}{2}$

Q24. If $(x - 1)^3 = 8$, what is the value of $(x + 1)^2$?

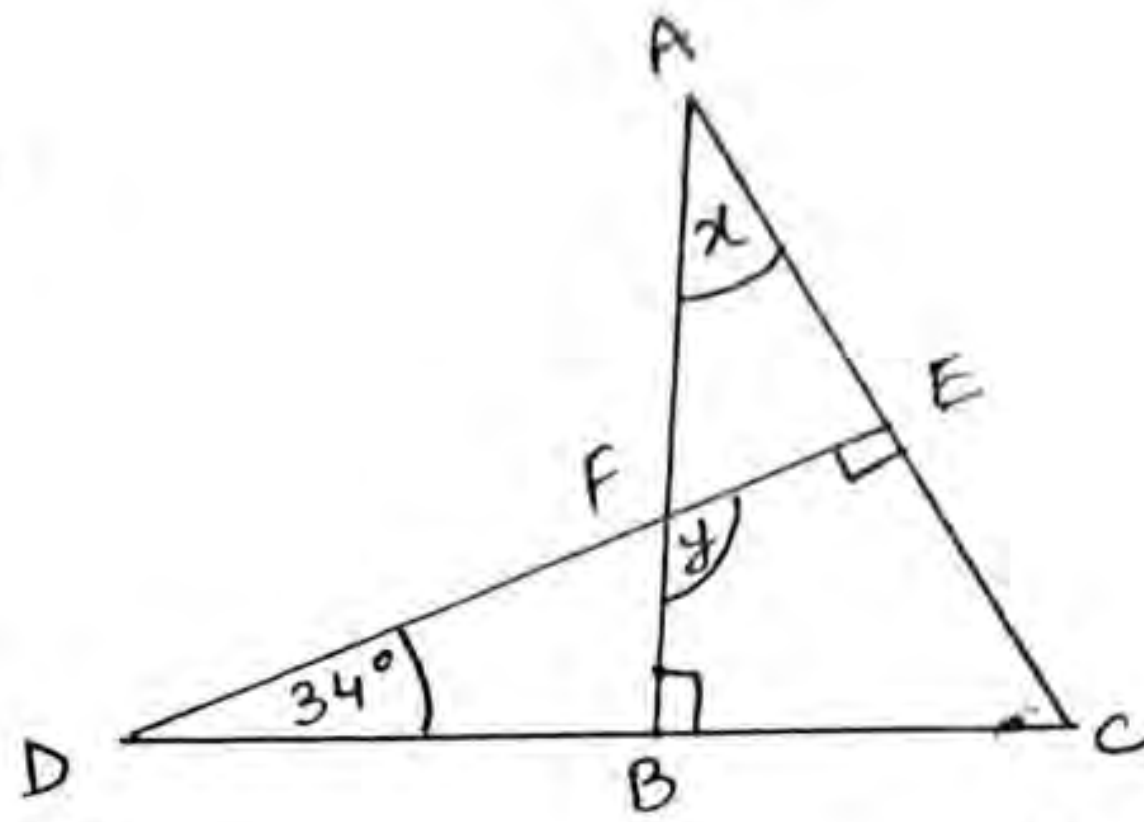
OR

Q24. Prove that $\left(\frac{x^a}{x^b}\right)^{\frac{1}{ab}} \cdot \left(\frac{x^b}{x^c}\right)^{\frac{1}{bc}} \cdot \left(\frac{x^c}{x^a}\right)^{\frac{1}{ac}} = 1$

Q25. In the figure, find the values of x & y

$$x = 44^\circ$$

$$y = 124^\circ$$

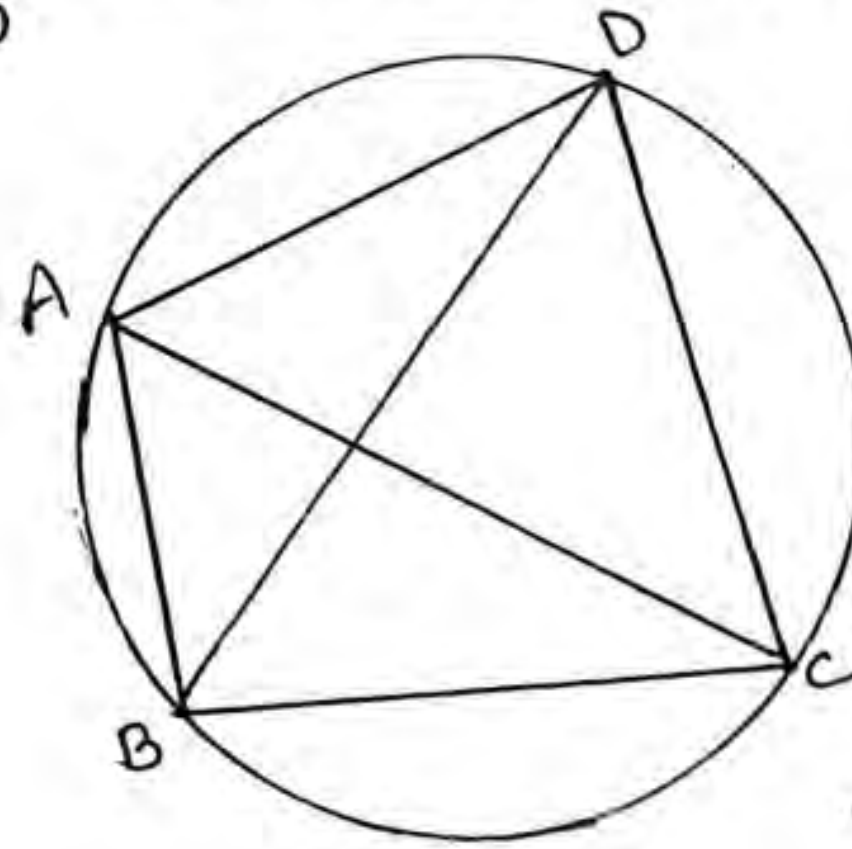


SECTION C

(3 X 6 = 18 M)

Q26. Find the value of $3\sqrt[3]{40} - 4\sqrt[3]{320} - \sqrt[3]{5}$ $9\sqrt[3]{5}$

Q27. In the figure ABCD is a cyclic quadrilateral in which AC & BD are its diagonals. If $\angle DBC = 55^\circ$ & $\angle BAC = 45^\circ$ find $\angle BCD$

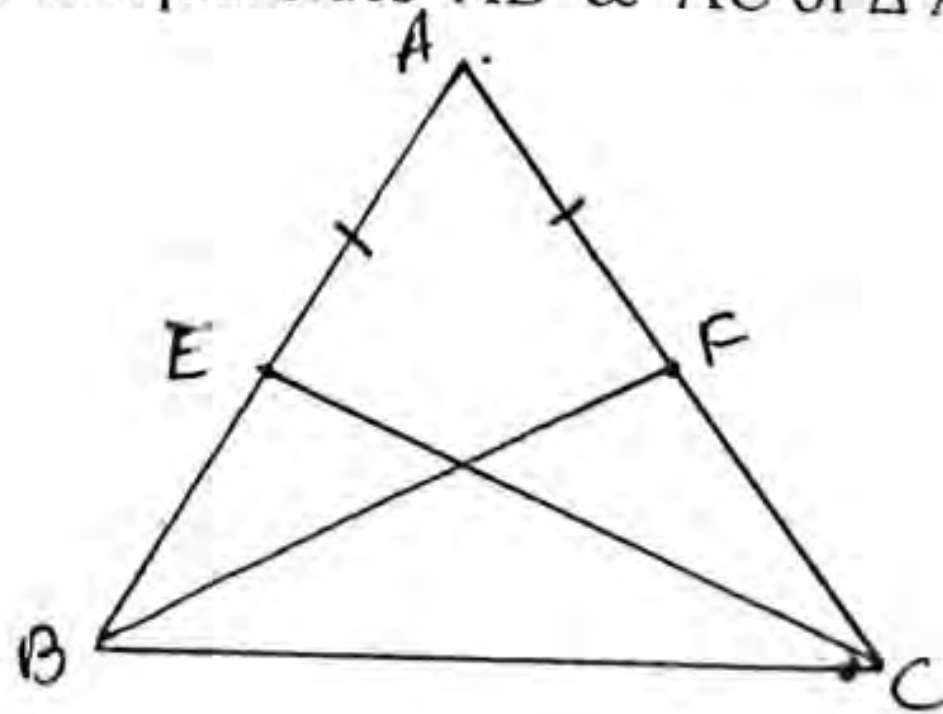


Q28. A cylindrical pillar is 50 cm in diameter & 3.5 m in height. Find the cost of painting the curved surface of the pillar at the rate of Rs 12.50 per m^2

OR

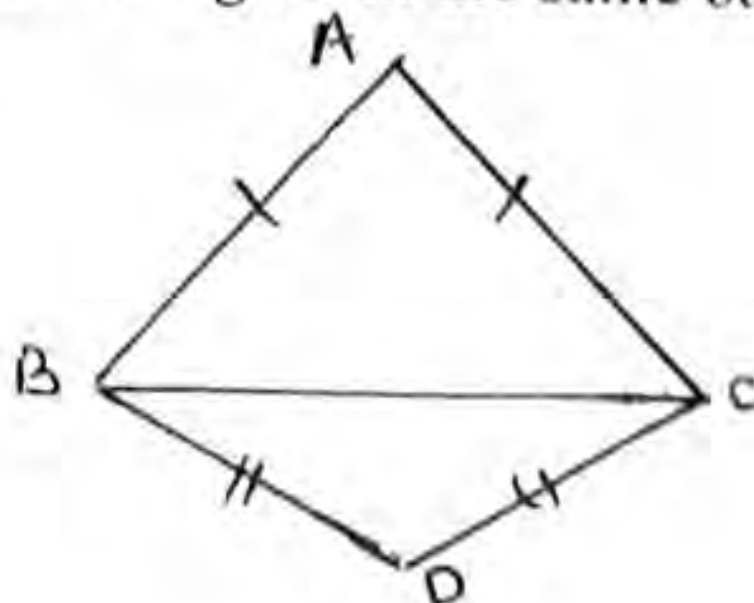
Q28. The volume of a cone is 18480 cm^3 . If the height of the cone is 40 cm. Find the radius of its base.

Q29. E & F are the mid-points of equal sides AB & AC of $\triangle ABC$. Show that $BF = CE$

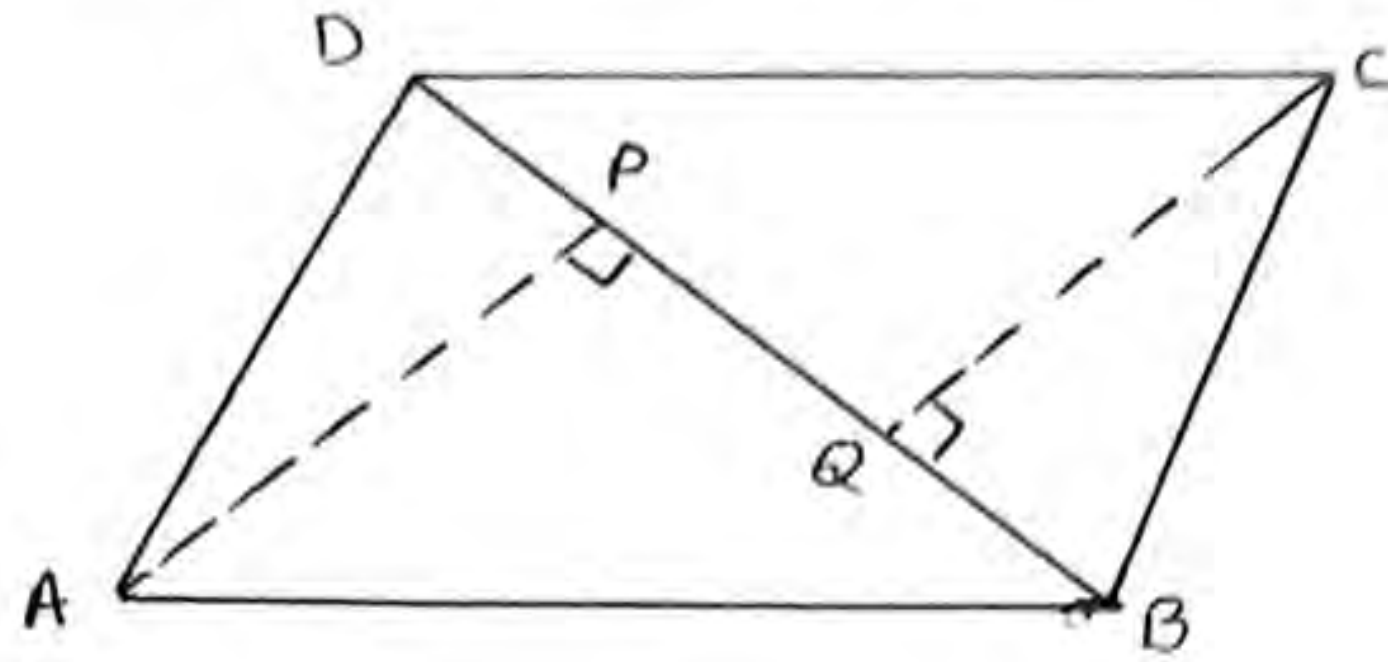


OR

Q29. ABC and DBC are two isosceles triangles on the same base BC. Show that $\angle ABD = \angle ACD$



- Q30. ABCD is a parallelogram & AP & CQ are perpendiculars from vertices A & C on diagonal BD. Show that
 a) $\Delta APB \cong \Delta CQD$
 b) $AP = CQ$



- Q31. If diagonals of a cyclic quadrilateral are diameters of the circle through the vertices of the quadrilateral, prove that it is rectangle. Draw figure also.

SECTION D

(5 X 4 = 20 M)

- Q32. a) Factorise by using suitable identity $\left(\frac{1}{4}a - \frac{1}{2b} + 1\right)^2$ Write the identity also.
 b) Prove that $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$

OR

- Q32. If $x^2 + \frac{1}{x^2} = 98$ then find the value of $x^3 + \frac{1}{x^3}$

- Q33. Curved surface area of a cone is 308 cm^2 and its slant height is 14 cm. Find
 a) radius of the base
 b) total surface area of the cone

OR

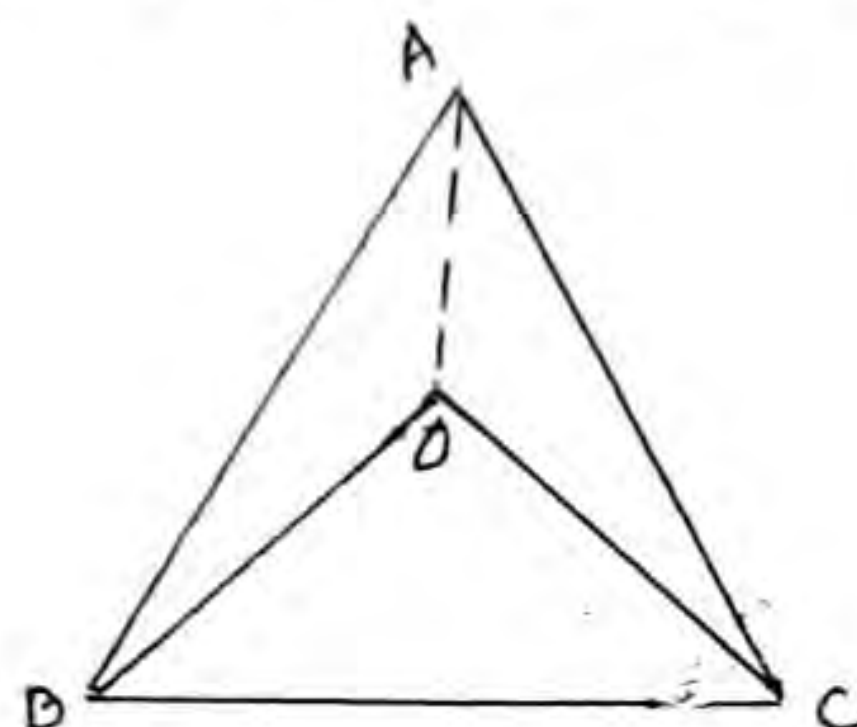
- Q33. The diameter of a metallic ball is 4.2 cm. What is the mass of the ball if the density of the metal is 8.9 g per cm^3 .

- Q34. Construct a frequency polygon on graph sheet for the given data

Class interval	Frequency
150-160	5
160-170	15
170-180	20
180-190	25
190-200	25
200-210	5

Q35. In an isosceles triangle ABC, with $AB = AC$, the bisectors of $\angle B$ & $\angle C$ intersect each other at O. Join A to O. Show that

- a) $OB = OC$
b) AO bisects $\angle A$

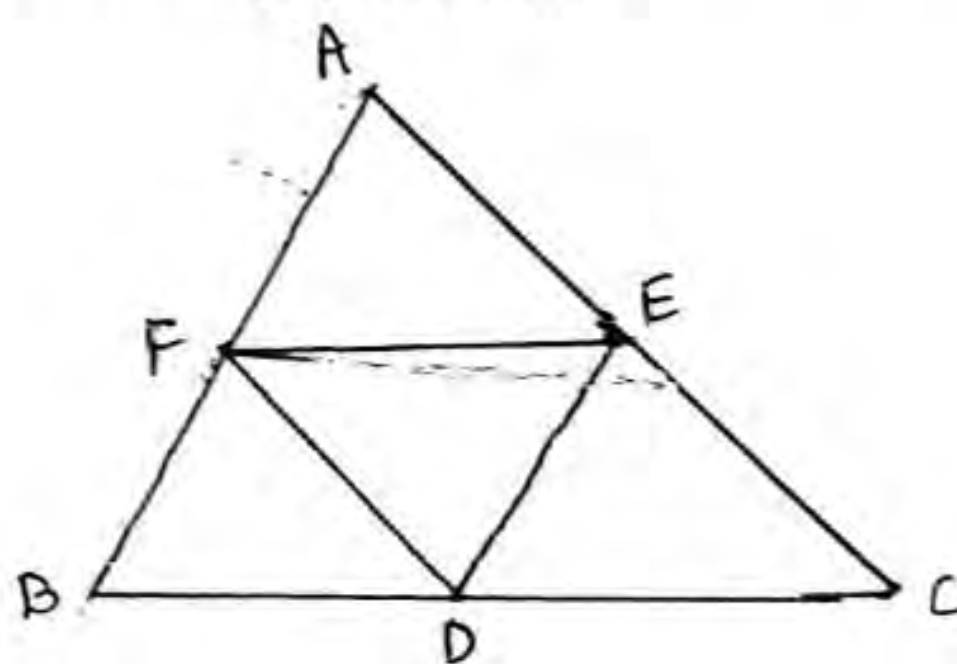


SECTION E

(4 X 3 = 12 M)

Q36. Case Study - 1

A metal marker has a triangular shaped metal. He welded another triangle on the mid-points of that metal as shown in the figure. In the figure D, E & F are mid-points of BC, AC & AB. Read the figure and answer the following questions.



- a) DE is equal and parallel to which line & why? *mp t*
b) What is the sum of adjacent angles of a parallelogram? *+ 50200 180°*
c) BDEF is which type of quadrilateral and why?

OR

Identify the correct relation.

- i) $FD = \frac{1}{2} AB$
iii) $AB - DE = AC$

- ii) $AE + FD = AC$
iv) none of these

Q37. Case Study - 2

In a class of 50 students second language opted by the students is as follows

Sanskrit	-	14
Japanese	-	08
French	-	12
Urdu	-	06

Rest of them opted for German. A student is selected at random.

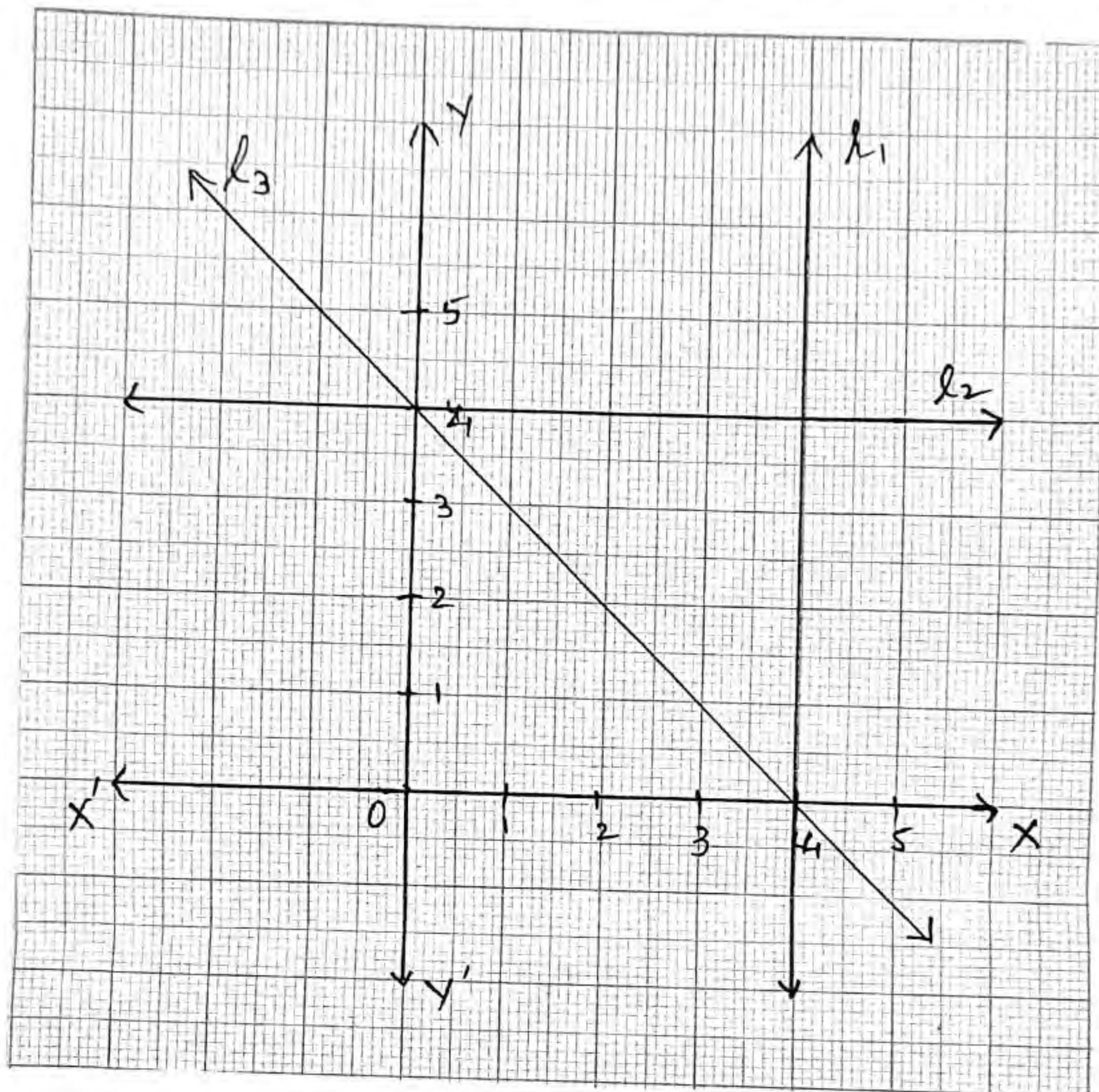
- a) Find the probability that the student opts for French. *$\frac{12}{50} = \frac{6}{25}$*
b) How many students opted for German? *$\frac{10}{50} = \frac{1}{5}$*
c) Find the probability that the student does not opt for Japanese. *$\frac{42}{50} = \frac{21}{25}$*

OR

Find the probability that the student either opts for Sanskrit or for German.

Q38. Case Study - 3

Roshni is a student of class IX. She was given an assignment on graphs of three linear equations. On the basis of above information she was asked to answer the following questions.



- Write the equation of the line l_1 $x = 4$
- At which point line l_3 meets x-axis? $(0, 4)$
- Find the area of the triangle bounded by x-axis, y-axis and the line l_3

OR

8

Intersection of which two lines makes an angle of 90° ?