BOARD OF SCHOOL EDUCATION HARYANA

Sample Paper (2024-25)

CLASS: 11th (Code: 835)

गणित

MATHEMATICS

[Time allowed: 3 hours] [Maximum Marks: 80]

निर्धारित समय : 3 घंटे **अधिकतम अंक: 80**

सामान्य निर्देश :

- इस प्रश्न- पत्र में कुल 38 प्रश्न हैं, जो कि पांच खंडों: अ, ब, स, द ल में बांटे गए हैं :

  खंड अ : इस खंड में 1 से 20 तक कुल 20 प्रश्न हैं, प्रत्येक प्रश्न 1 अंक का है।

  खंड ब : इस खंड में 21 से 25 तक कुल 05 प्रश्न हैं, प्रत्येक प्रश्न 2 अंक का है।

  खंड स : इस खंड में 26 से 31 तक कुल 06 प्रश्न हैं, प्रत्येक प्रश्न 3 अंक का है।

  खंड द : इस खंड में 32 से 35 तक कुल 04 प्रश्न हैं. प्रत्येक प्रश्न 5 अंक का है।

  खंड ल : इस खंड में 36 से 38 तक कुल 03 केस आधारित प्रश्न हैं, प्रत्येक प्रश्न 4 अंक का है।
- सभी प्रश्न अनिवार्य हैं।
- कुछ प्रश्नों में आंतरिक चयन का विकल्प दिया गया है, उनमें से एक ही प्रश्न को चुनना है।
- कैलकुलेटर के प्रयोग की अनुमति नहीं है।

General Instructions:

- This question paper consists of 38 questions in total which are divided into five sections: A, B, C, D, E :
  Section A: This section consists of twenty questions from **1 to 20**. Each question carries **1 mark.**
  Section B: This section consists of five questions from **21 to 25**. Each question carries **2 marks.**
  Section C: This section consists of six questions from **26 to 31**. Each question carries **3 marks.**
  Section D: This section consists of four questions from **32 to 35**. Each question carries **5 marks.**
  Section E: This section consists of three case based questions from **36 to 38**. Each question carries **4 marks.**

- All questions are compulsory.
- There are some questions where **internal choice** has been provided. Choose only one of them.
- Use of calculator is **not** permitted.

खंड – अ
SECTION – A

इस खंड में प्रत्येक प्रश्न 1 अंक का है।
This section comprises questions of 1 mark each.

1. यदि X= {a, b, c, d, e} और Y= {d, e, f, g} तब (X-Y) ∩ (X+Y) है
(A) ∅ (B) {a, b, c} (C) {f, g} (D) {a, b, c, f, g}

If X= {a, b, c, d, e} and Y= {d, e, f, g} then (X-Y) ∩ (X+Y) is
(A) ∅ (B) {a, b, c} (C) {f, g} (D) {a, b, c, f, g}

2. यदि A = {a, d}, B = {b, c, e}, C = {b, c, f}, तब A × (B –C)
(A) {(a, e), (d, e)} (B) {(e, a), (e, d)} (C) {(e, a), (d, e)} (D) {(a, e), (e, d)}

If A = {a, d}, B = {b, c, e}, C = {b, c, f}, then A × (B –C) is
(A) {(a, e), (d, e)} (B) {(e, a), (e, d)} (C) {(e, a), (d, e)} (D) {(a, e), (e, d)}

3. 75° का रेडियन माप होता है
(A) 75π (B) 5π/12 (C) 7π/12 (D) इनमें से कोई नहीं

75° in radian measure is
(A) 75π (B) 5π/12 (C) 7π/12 (D) none of these

4. i^{-35} का a + ib रूप है:
(A) i (B) 1/ i (C) i^5 (D) इनमें से कोई नहीं

a + ib form of i^{-35} is :
(A) i (B) 1/ i (C) i^5 (D) none of these

5. यदि $\frac{1}{8!} + \frac{1}{9!} = \frac{X}{10!}$ तो X का मान है
(A) 100 (B) 90 (C) 9 (D) 10

If $\frac{1}{8!} + \frac{1}{9!} = \frac{X}{10!}$ then value of x is:
(A) 100 (B) 90 (C) 9 (D) 10

6. 1 और 64 के बीच गुणोत्तर माध्य है :
(A) 1 (B) 64 (C) 8 (D) 16

The G.M. between 1 and 64 is :
(A) 1 (B) 64 (C) 8 (D) 16

7. x का वह मान जिसके लिए संख्याएँ -3/11, x, -11/3 गुणोत्तर श्रेणी में है
(A) 1 (B) ±1 (C) -1 (D) ±33

The value of x for which the numbers -3/11, x, -11/3 are in G.P.

(A) 1 (B) ±1 (C) -1 (D) ±33

8. sin (x +a) का अवकलज है:
(A) cos (x + a) (B) -cos (x + a) (C) –sec (x + a) (D) इनमें से कोई नहीं

The derivative of sin (x + a) is:

(A) cos (x + a) (B) -cos (x + a) (C) –sec (x + a) (D) None of them

9. यदि कुछ प्रेक्षणों का प्रसरण 25 है, तो उसका मानक विचलन है
(A) 2.5 (B) 5 (C) $\sqrt{5}$ (D) इनमें से कोई नहीं

If the variance of a data is 25, then its standard deviation is:
(A) 2.5 (B) 5 (C) $\sqrt{5}$ (D) None of these

10. किन्हीं दो घटनाओं A तथा B के लिए, यदि P(A∪ B) = P(A ∩ B), तो
(A) P(A) < P(B) (B) P(A) > P(B) (C) P(A) = P(B) (D) इनमें से कोई नहीं

If P(A∪B) = P(A∩B) for any two events A and B, then
(A) P(A) < P(B) (B) P(A) > P(B) (C) P(A) = P(B) (D) None of these

11. $(3x + 9)^9$ के प्रसार में कुल पदों की संख्या ज्ञात कीजिये।

Find the number of terms in the expansion of $(3x + 9)^9$.

12. वृत्त $x^2 + y^2 + 8x + 10y - 8 = 0$ का केंद्र तथा त्रिज्या ज्ञात कीजिए।

Find the centre and radius of the circle $x^2 + y^2 + 8x + 10y - 8 = 0$.

13. $\lim_{x \to a} \frac{x^n - a^n}{x - a}$ का मान लिखिए

Write the value of $\lim_{x \to a} \frac{x^n - a^n}{x - a}$.

14. निम्नलिखित आँकड़ों के लिए माध्यिका के सापेक्ष माध्य विचलन ज्ञात कीजिए: 3, 9, 5, 3, 12, 10, 18, 4, 7, 19, 21.

Find the mean deviation about the mean for the following data: 3, 9, 5, 3, 12, 10, 18, 4, 7, 19, 21.

15. मान लीजिए कि U = {1, 2, 3, 4, 5, 6}, A = {2, 3} और B = {3, 4, 5}, तो (AUB)' = ……

Let U = {1, 2, 3, 4, 5, 6}, A = {2, 3} and B = {3, 4, 5}, then (A ∪ B)' = …….

16. cos (A - B), …… के समान हैं।

cos (A - B) is equal to …….. .

17. यदि C(n, a) = C(n, b), तो या तो a = b या n = a + b । (सत्य / असत्य)

If C(n, a) = C(n, b), then either a = b or n = a + b . (True/ False)

18. एक पासा फेंका जाता है. मान लीजिए कि A, 2 का गुणज प्राप्त करने की घटना है और B, 3 का गुणज प्राप्त करने की घटना है। तब A और B परस्पर अपवर्जी घटनाएँ हैं।)सत्य / असत्य(

A die is rolled. Let A be the event of getting a multiple of 2 and B be the event of getting a multiple of 3. Then A and B are mutually exclusive events. (True/ False)

प्रश्न संख्या 19 और 20 अभिकथन और तर्क आधारित प्रश्न हैं, जिनमें से प्रत्येक प्रश्न 1 अंक का है। दो कथन दिए गए हैं, एक को अभिकथन (A) और दूसरे को तर्क (R) अंकित किया गया है। इन प्रश्नो के सही उत्तर निचे दिए गए कोडो *(A), (B), (C)* और *(D)* में से चुनकर दीजिये।

(A) अभिकथन (A) और तर्क (R) दोनों सही है और तर्क (R), अभिकथन (A) की सही व्याख्या है।
(B) अभिकथन (A) और तर्क (R) दोनों सही है, परन्तु तर्क (R), अभिकथन (A) की सही व्याख्या ***नहीं*** करता है।
(C) अभिकथन (A) सही है तथा तर्क (R) गलत है।
(D) अभिकथन (A) गलत है तथा तर्क (R) सही है।

*Question number **19** and **20** are Assertion and Reason based questions carrying 1 mark each. Two statements are given, one labelled Assertion (A) and the other labeled Reason (R). Select the correct answer from the codes (A), (B), (C) and (D) as given below.*

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A)
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of the Assertion (A)
(C) Assertion (A) is true and Reason (R) is false.
(D) Assertion (A) is false and Reason (R) is true.

19. **अभिकथन (A):** यदि (x+1, y-2) = (3, 1), तो x = 3 और y = 2

तर्क (R): दो क्रमित युग्म समान होते हैं यदि उनके संगत घटक समान हो।

Assertion (A): If (x+1, y-2) = (3, 1), then x = 3 and y = 2.

Reason (R) : Two ordered pairs are equal if their corresponding elements are equal.

20. **अभिकथन (A):** बिंदु (-5, 2, 0), XY तल पर स्थित है।

तर्क (R): XY तल में एक बिंदु P(x, y, z) के निर्देशांक (0, 0, z) हैं।

Assertion (A): The point (-5, 2, 0) lies on the XY plane.

Reason (R) : The coordinates of a point P(x, y, z) in XY plane are (0, 0, z).

खंड– ब
SECTION – B

इस खंड में प्रत्येक प्रशन 2 अंक का है।
This section comprises questions of 2 marks each.

21. यदि A = {3,5,7,9, 11 }, B = {7, 9, 11, 13}, C = {11, 13, 15} और D = {15.17};
तो (AUD) ∩ (BUC) ज्ञात कीजिए।

If A = {3,5,7,9, 11 }, B = {7, 9, 11, 13}, C = {11, 13, 15} and D = {15.17};
find (AUD) ∩ (BUC)

22. Find the multiplicative inverse of $4 - 3i$.

$4 - 3i$ का गुणात्मक प्रतिलोम ज्ञात कीजिए।

अथवा / OR

$\frac{(3-2i)(2+3i)}{(1+2i)(2-i)}$ का संयुग्मी ज्ञात कीजिए।

Find the conjugate of $\frac{(3-2i)(2+3i)}{(1+2i)(2-i)}$

23. $\frac{5-2x}{3} \leq \frac{x}{6} - 5$ असमिका का हल ज्ञात कीजिए तथा संख्या रेखा पर आलेखित कीजिए।

Solve the inequality $\frac{5-2x}{3} \leq \frac{x}{6} - 5$ and show the graph of the solution on number line.

24. उस गुणोत्तर श्रेणी का 12वाँ पद ज्ञात कीजिए, जिसका 8वाँ पद 192 तथा सार्व अनुपात 2 है।

Find the 12^{th} term of a G.P. whose 8^{th} term is 192 and gthe common ratio is 2.

25. परवलय $y^2 = 12x$ के नाभि के निर्देशांक, अक्ष, नियता का समीकरण और नाभिलंब जीवा की लंबाई ज्ञात कीजिए।

Find the coordinates of the focus, axis, the equation of directrix and the length of the latus rectum of the parabola $y^2 = 12x$.

अथवा / OR

उस दीर्घवृत्त का समीकरण ज्ञात कीजिए, जिसके दीर्घ अक्ष की लंबाई 20 है तथा नाभियाँ (0,±5) हैं।

Find the equation of the ellipse, whose length of the major axis is 20and foci are (0, ± 5).

खंड– स
SECTION – C

इस खंड में प्रत्येक प्रशन 3 अंक का है।
This section comprises questions of 3 marks each.

26. (A ∪ B)' and A' ∪ B' में से प्रत्येक के लिए उपर्युक्त वेन आरेख खींचिए।

Draw appropriate Venn Diagram for (A ∪ B)' and A' ∪ B'.

27. $\sqrt{9 - x^2}$ वास्तविक फलन का प्रांत तथा परिसर ज्ञात कीजिए।

Find the domain and Range of the function $\sqrt{9 - x^2}$.

28. $\left(\frac{2}{x} - \frac{x}{2}\right)^5$; $x \neq 0$ का प्रसार ज्ञात कीजिए।

Expand: $\left(\frac{2}{x} - \frac{x}{2}\right)^5$; $x \neq 0$

अथवा / OR

$(98)^5$ की गणना कीजिए।

Compute $(98)^5$.

29. अनुक्रम 7, 77, 777, 7777, …….. के n पदों का योग ज्ञात कीजिय।

Find the sum of the sequence 7, 77, 777, 7777, …….. to n terms.

अथवा / OR

एक गुणोत्तर श्रेणी के तीन पदों का योगफल $\frac{39}{10}$ हैं तथा उनका गुणनफल 1 है। पदों तथा सार्व अनुपात को ज्ञात कीजिए।

The sum of first three terms of a G.P. is $\frac{39}{10}$ and their product is 1. Find the common ratio and the terms.

30. ऐसे बिंदुओं के समुच्चय का समीकरण ज्ञात कीजिए जो बिंदु (1, 2, 3) और (3,2,-1) से समदूरस्थ हैं।

Find the equation of the set of the points which are equidistant from the points (1, 2, 3) and (3, 2, -1)

31. एक प्रवेश परीक्षा को दो परीक्षणों के आधार पर श्रेणीबद्ध किया जाता है। किसी यादृच्छया चुने गए विद्यार्थी की पहले परीक्षण में उत्तीर्ण होने की प्रायकिता 0.8 है और दूसरे परीक्षण में उत्तीर्ण होने की

प्रायिकता 0.7 है। दोनों में से कम से कम एक परीक्षण उत्तीर्ण करने की प्रायिकता 0.95 है। दोनों परीक्षणों को उत्तीर्ण करने की प्रायिकता क्या है?

In an entrance test that is graded on the basis of two examinations, the probability of a randomly chosen student passing the first examination is 0.8 and the probability of passing the second examination is 0.7. The probability of passing atleast one of them is 0.95. What is the probability of passing both?

खंड– द
SECTION – D

इस खंड में प्रत्येक प्रशन 5 अंक का है।
This section comprises questions of 5 marks each.

32. (i) सिद्ध कीजिए $\frac{(\cos 7x + \cos 5x)}{(\sin 7x - \sin 5x)} = \cot x$ (2)

(ii) सिद्ध कीजिए $\sin x + \sin 3x + \sin 5x + \sin 7x = 4\cos x.\cos 2x.\sin 4x$ (3)

Prove that $\frac{(\cos 7x + \cos 5x)}{(\sin 7x - \sin 5x)} = \cot x$ (2)

Prove that $\sin x + \sin 3x + \sin 5x + \sin 7x = 4\cos x.\cos 2x.\sin 4x$ (3)

33. बिंदुओं (3, 4) और (-1, 2) को मिलाने वाली रेखाखंड के लंब समद्विभाजक रेखा का समीकरण ज्ञात कीजिए।

Find the equation of the right bisector of the line segment joining the points (3, 4) and (-1, 2).

अथवा /OR

(-3,5) से होकर जाने वाली और बिंदु (2, 5) और (-3, 6) से जाने वाली रेखा पर लंब रेखा का समीकरण ज्ञात कीजिए।

Find the equation of the line passing through (-3, 5) and perpendicular to the line through the points (2, 5) and (-3, 6).

34. प्रथम सिद्धांत से tan x का अवकलज ज्ञात कीजिए।

Find the derivative of tan x from first principle.

अथवा /OR

मान लीजिए $f(x)=\begin{cases} a + bx, & x < 1 \\ 4 & x = 1 \\ b - ax, & x > 1 \end{cases}$ और यदि $\lim_{x\to 1} f(x) = f(1)$ तो a और b के संभव मान क्या हैं?

Suppose $f(x)=\begin{cases} a+bx, & x<1 \\ 4, & x=1 \\ b-ax, & x>1 \end{cases}$ and if $\lim_{x\to 1} f(x) = f(1)$ what are possible values of a and b?

35. निम्नलिखित बंटन के लिए माध्य, प्रसरण व मानक विचलन ज्ञात कीजिए:

वर्ग	30-40	40-50	50-60	60-70	70-80	80-90	90-100
बारंबारता	3	7	12	15	8	3	2

Calculate mean, variance and standard deviation for the following distribution.

Classes	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	3	7	12	15	8	3	2

खंड– इ
SECTION – E

इस खंड में प्रत्येक प्रश्न 4 अंक का है।
This section comprises questions of 4 marks each.

Case Study – 1

36. त्रिकोणमिति में संयुक्त कोण सूत्रों को प्रदर्शित करने के लिए, महेश और सिराज ने दो कोण 'A' और 'B' का चयन किया, जैसे कि A, B $\in (0, \frac{\pi}{2})$ और sin A = $\frac{3}{5}$, cos B = $\frac{9}{41}$

उपरोक्त जानकारी के आधार पर निम्नलिखित प्रश्नों के उत्तर दीजिए।

(i) sin B + cos A का मान ज्ञात कीजिए। (2)

(ii) cos (A + B) का मान ज्ञात कीजिए। (2)

To demonstrate the compound angle formulae in trigonometry, Mahesh and Siraj selected two angles 'A' and 'B' such that A, B $\in (0, \frac{\pi}{2})$ and sin A = $\frac{3}{5}$, cos B = $\frac{9}{41}$.

Based on the above information, answer the following questions.

(i) Find the value of sin B + cos A . (2)

(ii) Find the value of cos (A + B). (2)

Case Study – 2

एक विद्यालय का विद्यालय सभा प्रभारी, सभा के लिए कक्षाएं बुलाने के संकेत उत्पन्न करना चाहता है। उसके पास 5 रंग के झंडे है अर्थात संकेत बनाने के लिए पीला, लाल, नारंगी, हरा और नीला।

उपरोक्त जानकारी के आधार पर निम्नलिखित प्रश्नों के उत्तर दीजिए:

(i) सभी 5 झंडों का उपयोग करके कितने अलग-अलग संकेत उत्पन्न किए जा सकते हैं? (1)

(ii) सभा के लिए मध्य भाग को बुलाने के लिए, उसे (केवल 2 झंडों का उपयोग करके अलग-अलग संकेत उत्पन्न करने होंगे। ऐसी कितनी व्यवस्थाएँ संभव हैं? $(1\frac{1}{2})$

(iii)वरिष्ठ वर्ग को सभा में बुलाने के लिए उसे 4 झंडों का प्रयोग कर अलग-अलग संकेत उत्पन्न करने होंगे। ऐसी कितनी व्यवस्थाएँ संभव हैं? $(1\frac{1}{2})$

The assembly incharge of a school wants to generate signals for calling classes for the assembly. He has got 5 coloured flags viz., Yellow, Red, Orange, Green and Blue to make signals.

Based on the above information answer the following questions:

(i) How many different signals can be generated by using all 5 flags? (1)

(ii) To call the middle section for the assembly, he has to generate different signals by using 2 flags only. How many such arrangements are possible? $(1\frac{1}{2})$

(iii)To call the senior section for the assembly, he has to generate different signals by using 4 flags only. How many such arrangements are possible? $(1\frac{1}{2})$

Case Study – 3

37. तेज़ तूफ़ान के कारण एक बिजली का तार टूट कर ज़मीन पर गिर गया और नीचे दिखाए अनुसार एक गणितीय आकृति का आकार लेते हुए मुड़ गया है।

उपरोक्त जानकारी के आधार पर, निम्नलिखित प्रश्नों के उत्तर दें:

(i) उस आकृति का नाम जिसमें तार मुड़ा हुआ है।

(a) वृत्त (b) परवलय (c) दीर्घवृत्त (d) अतिपरवलय (1)

(ii)इस प्रकार बनी आकृति का समीकरण है:

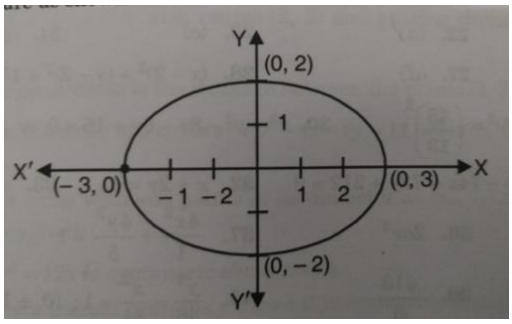
(a) $\frac{x^2}{9}+\frac{y^2}{4}=1$ (b) $\frac{x^2}{4}+\frac{y^2}{9}=1$ (c) $\frac{x^2}{9}-\frac{y^2}{4}=1$ (d) इनमें से कोई नहीं (1)

(iii) इस प्रकार बनी आकृति की उत्केंद्रता है:

(a) $\frac{2}{3}$ (b) $\frac{\sqrt{x}}{\sqrt{3}}$ (c) $\frac{\sqrt{5}}{3}$ (d) $\frac{\sqrt{5}}{4}$ (1)

(iv) इस प्रकार बनी आकृति के नाभिलम्ब जीवा की लंबाई है:

(a) 9 (b) $\frac{8}{3}$ (c) -4 (d) इनमें से कोई नहीं (1)



Due to heavy storm, an electric wire got broken and fell on the ground and is bent taking a shape of a mathematical figure as shown below.

Based on the above information, answer the following questions.

(i) Name of the shape in which wire is bent.

(a) circle (b) parabola (c) ellipse (d) hyperbola (1)

(ii)The equation of the shape so formed is:

(a) $\frac{x^2}{9}+\frac{y^2}{4}=1$ (b) $\frac{x^2}{4}+\frac{y^2}{9}=1$ (c) $\frac{x^2}{9}-\frac{y^2}{4}=1$ (d) none of these (1)

(iii) The eccentricity of the shape so formed is:

(a) $\frac{2}{3}$ (b) $\frac{\sqrt{x}}{\sqrt{3}}$ (c) $\frac{\sqrt{5}}{3}$ (d) $\frac{\sqrt{5}}{4}$ (1)

(iv) The length of the latus rectum of the shape so formed is:

(a) 9 (b) $\frac{8}{3}$ (c) -4 (d) none of these (1)

BOARD OF SCHOOL EDUCATION HARYANA
Practice Paper -XI
(2024-25)

Marking Scheme

MATHEMATICS

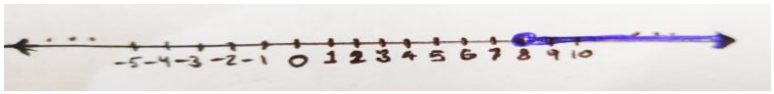
CODE: 835

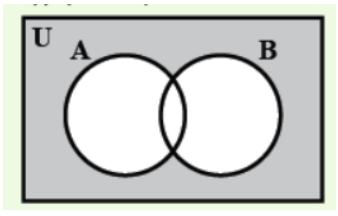
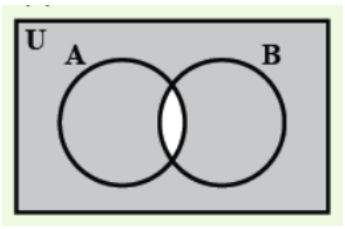
⇨ Important Instructions: ● All answers provided in the Marking scheme are SUGGESTIVE
● Examiners are requested to accept all possible alternative correct answer(s).

	SECTION – A (1Mark × 20Q)	
Q. No.	**EXPECTED ANSWERS**	**Marks**
Question 1.	If X= {a, b, c, d, e} and Y= {d, e, f, g} then (X-Y) ∩ (X+Y) is	
Solution:	(B) {a, b, c}	**1**
Question 2	If A = {a, d}, B = {b, c, e}, C = {b, c, f}, then A × (B –C) is	
Solution:	(A) {(a, e), (d, e)}	**1**
Question 3	75° in radian measure is	
Solution:	(B) $5\pi/12$	**1**
Question 4.	a + ib form of i^{-35} is :	
Solution:	(A) i	**1**
Question 5.	If $\frac{1}{8!} + \frac{1}{9!} = \frac{X}{10!}$ then value of x is:	
Solution:	(A) 100	**1**
Question 6.	The G.M. between 1 and 64 is :	
Solution:	(C) 8	**1**
Question 7.	The value of x for which the numbers -3/11, x, -11/3 are in G.P	
Solution:	(B) ±1	**1**
Question 8.	The derivative of sin (x + a) is:	
Solution:	(A) cos (x + a)	**1**

Question 9.	If the variance of a data is 25, then its standard deviation is:	
Solution:	(B) 5	**1**
Question10.	If P(A∪B) = P(A∩B) for any two events A and B, then	
Solution:	(C) P(A) = P(B)	**1**
Question11.	Find the number of terms in the expansion of $(3x + 9)^9$.	
Solution:	9 + 1 = 10	**1**
Question12.	Find the centre and radius of the circle $x^2 + y^2 + 8x + 10y - 8 = 0$.	
Solution:	Centre (-4 , -5) and Radius is 7	**1**
Question13.	Write the value of $\lim_{x \to a} \frac{x^n - a^n}{x - a}$.	
Solution:	$\lim_{x \to a} \frac{x^n - a^n}{x - a} = n.a^{n-1}$	**1**
Question14.	Find the mean deviation about the mean for the following data: 6, 7, 10, 12, 13, 4, 8, 12 .	
Solution:	Mean of the given data is $\bar{x} = \frac{6+7+10+12+13+4+8+12}{8} = 9$ Deviations from mean ($x_i - \bar{x}$) are -3, -2, 1, 3, 4, -5, -1, 3 Absolute deviations i.e. $\lvert x_i - \bar{x} \rvert$ are 3, 2, 1, 3, 4, 5, 1, 3 Mean Deviation = $\frac{\sum_{i=1}^{8} \lvert xi - \bar{x} \rvert}{n} = \frac{3+2+1+3+4+5+1+3}{8} = \frac{22}{8} = 2.75$	**1**
Question15.	Let U = {1, 2, 3, 4, 5, 6}, A = {2, 3} and B = {3, 4, 5}, then (A ∪ B)' = …….	
Solution:	(A ∪ B)' = {2, 3, 4, 5}' = {1}	**1**
Question16.	cos (A - B) is equal to …….. .	
Solution:	cos (A - B) = cosA. cosB + sinA. sinB	**1**
Question17.	If C(n, a) = C(n, b), then either a = b or n = a + b . (True/ False)	
Solution:	True	**1**
Question18.	A die is rolled. Let A be the event of getting a multiple of 2 and B be the event of getting a multiple of 3. Then A and B are mutually exclusive events. (True/ False)	

Solution:	False	**1**
Question19.	**Assertion (A):** If (x+1, y-2) = (3, 1), then x = 3 and y = 2. **Reason (R) :** Two ordered pairs are equal if their corresponding elements are equal.	
Solution:	(D) Assertion (A) is false and Reason (R) is true.	**1**
Question20.	**Assertion (A):** The point (-5, 2, 0) lies on the XY plane. **Reason(R):**The coordinates of a point P(x, y, z) in XY plane are (0, 0, z).	
Solution:	(C) Assertion (A) is true and Reason (R) is false.	**1**
	SECTION – B (2Marks × 5Q)	
Question21.	If A = {3,5,7,9, 11 }, B = {7, 9, 11, 13}, C = {11, 13, 15} and D = {15.17}; find (AUD) ∩ (BUC)	
Solution:	A U D = {3, 5, 7, 9, 11, 13 } B U C = {7, 9, 11, 13, 15 } ∴ (AUD) ∩ (BUC) = {7, 9, 11, 13 }	**1** **1**
Question22.	Find the multiplicative inverse of $4 - 3i$.	
Solution:	Multiplicative Inverse of $4 - 3i = \frac{1}{4-3i}$ ⇨ M.I. $= \frac{1}{4-3i} \times \frac{4+3i}{4+3i}$ ⇨ $= \frac{4+3i}{(4)^2-(3i)^2}$ ⇨ $= \frac{4+3i}{16-9i^2}$ ⇨ $= \frac{4+3i}{16+9} = \frac{4}{25} + \frac{3i}{25}$	**1** **1**
OR Question22.	Find the conjugate of $\frac{(3-2i)(2+3i)}{(1+2i)(2-i)}$	
Solution:	Given $\frac{(3-2i)(2+3i)}{(1+2i)(2-i)} = \frac{6+9i-4i-6i^2}{2-i+4i-2i^2}$ ⇨ $= \frac{6+5i+6}{2+3i+2}$ ⇨ $= \frac{12+5i}{4+3i}$ ⇨ $= \frac{12+5i}{4+3i} \times \frac{4-3i}{4-3i}$	

	⇨ $= \frac{48 - 36i + 20i - 15i^2}{16 - 12i + 12i - 9i^2} = \frac{48 - 16i + 15}{16 + 9} = \frac{63}{25} - \frac{16i}{25}$ ∴ Conjugate of $\frac{(3-2i)(2+3i)}{(1+2i)(2-i)} = \frac{63}{25} + \frac{16i}{25}$	$1\frac{1}{2}$ $\frac{1}{2}$
Question23.	Solve the inequality $\frac{5-2x}{3} \leq \frac{x}{6} - 5$ and show the graph of the solution on number line.	
Solution:	We have $\frac{5-2x}{3} \leq \frac{x}{6} - 5$ ⇨ $\frac{5-2x}{3} \leq \frac{x-30}{6}$ Multiply on both side by 6, we have ⇨ $2(5 - 2x) \leq x - 30$ ⇨ $10 - 4x \leq x - 30$ ⇨ $-5x \leq -40$ ⇨ $5x \geq 40$ ⇨ $x \geq 8$ Graph of the solution on number line  	$1\frac{1}{2}$ $\frac{1}{2}$
Question24.	Find the 12^{th} term of a G.P. whose 8^{th} term is 192 and the common ratio is 2.	
Solution:	We have, $a_8 = 192$ $r = 2$ ⇨ $ar^7 = 192$ ⇨ $a(2)^7 = 192$ ⇨ $a = \frac{192}{128} = \frac{3}{2}$ ∴ $a_{12} = a.r^{11} = \frac{3}{2}.(2)^{11}$ $a_{12} = 3.(2)^{10} = 3.(1024) = 3072$	$\frac{1}{2}$ $\frac{1}{2}$ 1
Question25.	Find the coordinates of the focus, axis, the equation of directrix and the length of the latus rectum of the parabola $y^2 = 12x$.	
Solution:	Equation of parabola is $y^2 = 12x$ Comparing with $y^2 = 4ax$, we have $4a = 12 \Rightarrow a = 3$	

	The coefficient of x is +ve so it is a right handed parabola. This parabola is symmetrical about x-axis as it involves y^2 Thus the focus is (3, 0) Equation of directrix x = -3 Length of latus rectum is 4a = 4 × 3 = 12	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
OR Question25.	Find the equation of the ellipse, whose length of the major axis is 20 and foci are $(0, \pm 5)$.	
Solution:	Since the foci are on y-axis, the major axis is along the y-axis. So equation of ellipse is of the form $\frac{x^2}{b^2} + \frac{y^2}{a^2} = 1$ Given that a = semi major axis =20/2 = 10 And the relation $c^2 = a^2 - b^2$, where c = 5 from foci $(0, \pm 5)$ gives $5^2 = 10^2 - b^2$ i.e. $b^2 = 75$ Therefore, the equation of the ellipse is $\frac{x^2}{75} + \frac{y^2}{100} = 1$	1 1
	SECTION – C (3Marks × 6Q)	
Question26.	Draw appropriate Venn Diagram for (A ∪ B)' and A' ∪ B'.	
Solution:	Venn Diagram of (A ∪ B)'  Venn Diagram of A' ∪ B'  	$1\frac{1}{2}$ $1\frac{1}{2}$

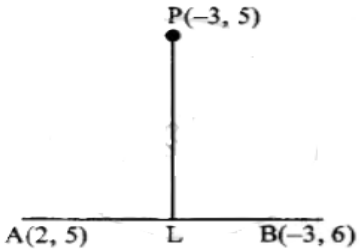
Question27.	Find the domain and Range of the function $\sqrt{9-x^2}$.	
Solution:	Here $y = \sqrt{9-x^2}$ y will have real values if $9-x^2 \geq 0$ $\Rightarrow \quad x^2 - 9 \leq 0$ $\Rightarrow (x-3)(x+3) \leq 0$ $\Rightarrow \ -3 \leq x \leq 3 \quad \Rightarrow \ x \in [-3, 3]$ Domain = [-3, 3] Also, $y^2 = 9 - x^2$ $\Rightarrow x^2 = 9 - y^2$ $\Rightarrow \quad x = \pm\sqrt{9-y^2}$ Clearly x is defined when $9 - y^2 \geq 0$ i.e., when $y^2 - 9 \leq 0$ $\Rightarrow (y-3)(y+3) \leq 0$ $\Rightarrow -3 \leq y \leq 3 \quad \Rightarrow \quad y \in [-3, 3]$ But $y = \sqrt{9-x^2} \geq 0$ for all $x \in [-3, 3]$ i.e., y attains only non-negative values. $\therefore y \in [0, 3]$ for all $x \in [-3, 3]$ $\therefore$ Range = [0, 3].	$1\frac{1}{2}$ $1\frac{1}{2}$
Question28.	Expand: $\left(\frac{2}{x} - \frac{x}{2}\right)^5$; $x \neq 0$	
Solution:	$\left(\frac{2}{x} - \frac{x}{2}\right)^5 = {}^5C_0\left(\frac{2}{x}\right)^5\left(\frac{-x}{2}\right)^0 + {}^5C_1\left(\frac{2}{x}\right)^4\left(\frac{-x}{2}\right)^1 + {}^5C_2\left(\frac{2}{x}\right)^3\left(\frac{-x}{2}\right)^2 + {}^5C_3\left(\frac{2}{x}\right)^2\left(\frac{-x}{2}\right)^3 + {}^5C_4\left(\frac{2}{x}\right)^1\left(\frac{-x}{2}\right)^4 + {}^5C_5\left(\frac{2}{x}\right)^0\left(\frac{-x}{2}\right)^5$ $= \frac{32}{x^5} + 5.\left(\frac{16}{x^4}\right)\left(\frac{-x}{2}\right) + 10\left(\frac{8}{x^3}\right)\left(\frac{x^2}{4}\right) + 10\left(\frac{4}{x^2}\right)\left(\frac{-x^3}{8}\right) + 5\left(\frac{2}{x}\right)\left(\frac{x^4}{16}\right) - \frac{x^5}{32}$ $= \frac{32}{x^5} - \frac{40}{x^3} + \frac{20}{x} - 5x + \frac{5x^3}{8} - \frac{x^5}{32}$	$1\frac{1}{2}$ $1\frac{1}{2}$
OR Question28.	Compute $(98)^5$.	
Solution:	$(98)^5 = (100-2)^5$ $= {}^5C_0\,(100)^5(2)^0 + {}^5C_1\,(100)^4(2)^1 + {}^5C_2\,(100)^3(2)^2 + {}^5C_3(100)^2(2)^3 + {}^5C_4\,(100)^1(2)^4 + {}^5C_5(100)^0(2)^5$ = 10000000000 + 1000000000 + 40000000 + 800000 +8000 + 32 = 11040808032	**2** **1**

Question29.	Find the sum of the sequence 7, 77, 777, 7777, …….. to n terms.	
Solution:	This is not a GP., however, we can relate it to a GP. by writing the terms as S_n = 7+77+777 + 7777 + ... to n terms $= \frac{7}{9}$ [9 + 99 + 999 + 9999 +... to n term] $= \frac{7}{9}$ [$(10^1 - 1) + (10^2 - 1) + (10^3 - 1) + (10^4 - 1)$ +...n terms] $= \frac{7}{9}$ [$(10+10^2+10^3$+...n terms) - (1+1+1+...n terms)] It is a G.P. where a = 10 and r = 10 > 1 $\therefore\ S_n = \frac{a(r^n - 1)}{r - 1}$ $= \frac{7}{9}\left[\frac{10(10^n - 1)}{10 - 1} - n\right] = \frac{7}{9}\left[\frac{10(10^n - 1)}{9} - n\right]$	**1** **1** **1**
OR Question 29	The sum of first three terms of a G.P. is $\frac{39}{10}$ and their product is 1. Find the common ratio and the terms.	
Solution:	Let three terms in G.P. are $\frac{a}{r}$, a , ar $\therefore\ \frac{a}{r} \times a \times ar = 1 \Rightarrow a^3 = 1 \Rightarrow a = 1$ $\therefore$ three terms now are $\frac{1}{r}$, 1 , r A.T.Q. $\frac{1}{r} + 1 + r = \frac{39}{10}$ $\Rightarrow \frac{1+r+r^2}{r} = \frac{39}{10}$ $\Rightarrow 10r + 10r + 10r^2 = 39r$ $\Rightarrow 10r^2 - 29r + 10 = 0$ $\Rightarrow 10r^2 - 25r - 4r + 10 = 0$ $\Rightarrow (10r - 2)(r - 5) = 0$ $\Rightarrow r = \frac{1}{5}$ or 5 $\therefore$ if common ratio $r = \frac{1}{5}$, term are 5, 1, $\frac{1}{5}$ if common ratio r = 5 , terms are $\frac{1}{5}$, 1, 5	**1** $\frac{1}{2}$ $1\frac{1}{2}$

Question30.	Find the equation of the set of the points which are equidistant from the points (1, 2, 3) and (3, 2, -1)	
Solution:	Let P(x, y, z) be any point which is equidistant from the points A(1, 2, 3) and B(3, 2, -1). $\therefore$ PA = PB $\Rightarrow$ $PA^2 = PB^2$ $\Rightarrow$ $(x - 1)^2 + (y - 2)^2 + (z - 3)^2 = (x -3)^2 + (y - 2)^2 + (z + 1)^2$ $\Rightarrow$ $x^2 + 1 - 2x + y^2 + 4 - 4y + z^2 + 9 -6z = x^2 + 9 - 6x + y^2 + 4 - 4y + z^2 + 1 + 2z$ $\Rightarrow$ $-2x - 6z = -6x + 2z$ $\Rightarrow$ $4x - 8z = 0$ $\Rightarrow$ $x - 2z = 0$	**1** **2**
Question31.	In an entrance test that is graded on the basis of two examinations, the probability of a randomly chosen student passing the first examination is 0.8 and the probability of passing the second examination is 0.7. The probability of passing atleast one of them is 0.95. What is the probability of passing both?	
Solution:	Let P(A) be the probability of passing the first exam => P(A) = 0.8 Let P(B) be the probability of passing the first exam => P(B) = 0.7 $\therefore$ Probabilty of passing atleast one of them = $P(A \cup B) = 0.95$ $\therefore$ Probabilty of passing both = $P(A \cap B)$ We know, $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ $0.95 = 0.8 + 0.7 - P(A \cap B)$ $P(A \cap B) = 1.5 - 0.95 = 0.55$ $\therefore$ Probabilty of passing both = $P(A \cap B) = 0.55$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ **1**

	SECTION – D (5Marks × 4Q)	
Question32.	(i) Prove that: $\frac{(\cos 7x + \cos 5x)}{(\sin 7x - \sin 5x)} = \cot x$ (ii) Prove that: $\sin x + \sin 3x + \sin 5x + \sin 7x = 4\cos x.\cos 2x.\sin 4x$	
Solution: (i)	$\frac{(\cos 7x + \cos 5x)}{(\sin 7x - \sin 5x)} = \cot x$ L.H.S. $= \frac{(\cos 7x + \cos 5x)}{(\sin 7x - \sin 5x)}$ Using $\cos C + \cos D = 2\cos\left(\frac{C+D}{2}\right).\cos\left(\frac{C-D}{2}\right)$ and $\sin C - \sin D = 2\cos\left(\frac{C+D}{2}\right).\sin\left(\frac{C-D}{2}\right)$, we have	**1**
	⇨ $= \frac{2\cos\left(\frac{7x+5x}{2}\right)\cos\left(\frac{7x-5x}{2}\right)}{2\cos\left(\frac{7x+5x}{2}\right)\sin\left(\frac{7x-5x}{2}\right)}$ ⇨ $= \frac{2.\cos 6x.\cos x}{2.\cos 6x.\sin x} = \frac{\cos x}{\sin x} = \cot x$ ⇨ L.H.S. = R. H.S.	**1**
Solution:(ii)	L.H.S. = $\sin x + \sin 3x + \sin 5x + \sin 7x$ => $= (\sin 7x + \sin x) + (\sin 5x + \sin 3x)$ [rearranging] Using $\sin C + \sin D = 2\sin\left(\frac{C+D}{2}\right).\cos\left(\frac{C-D}{2}\right)$	**$\frac{1}{2}$**
	We have, $= [\ 2\sin\left(\frac{7x+x}{2}\right).\cos\left(\frac{7x-x}{2}\right)\ ] + [\ 2\sin\left(\frac{5x+3x}{2}\right).\cos\left(\frac{5x-3x}{2}\right)\ ]$ $= 2\sin 4x.\cos 3x + 2\sin 4x.\cos x$ $= 2\sin 4x\ (\cos 3x + \cos x)$ Using $\cos C + \cos D = 2\cos\left(\frac{C+D}{2}\right).\cos\left(\frac{C-D}{2}\right)$	**$1\frac{1}{2}$**
	We have, $= 2\sin 4x\ [\ 2\cos\left(\frac{3x+x}{2}\right).\cos\left(\frac{3x-x}{2}\right)\ ]$ $= 2\sin 4x\ [\ 2\cos 2x.\cos x\ ]$ $= 4\sin 4x.\cos 2x.\cos x$ = R.H.S.	**1**

Question33.	Find the equation of the right bisector of the line segment joining the points (3, 4) and (-1, 2).	
Solution:	Let the given points be A (3, 4) and B (-1, 2). Let M be the midpoint of AB. $\therefore$ Coordinates of M = $\left(\frac{3-1}{2}, \frac{4+2}{2}\right) = (1, 3)$ And, slope of AB = $\frac{2-4}{-1-3} = \frac{1}{2}$ Let m be the slope of the right bisector of the line joining the points (3, 4) and (-1, 2). $\therefore$ m × Slope of AB = - 1 $m \times \frac{1}{2} = -1$ ⇨ m = - 2 So, the equation of the line that passes through M (1, 3) and has slope -2 is $y - 3 = -2(x - 1)$ ⇨ $2x + y - 5 = 0$ Hence, the equation of the right bisector of the line segment joining the points (3, 4) and (-1, 2) is **2x + y - 5 = 0**	**1** **1** **1** $\mathbf{\frac{1}{2}}$ $\mathbf{1\frac{1}{2}}$
OR Question33.	Find the equation of the line passing through (-3, 5) and perpendicular to the line through the points (2, 5) and (-3, 6).	
Solution:	Slope of the line passing through the points A(2. 5) and B(-3, 6) $m_1 = \frac{y_2 - y_1}{x_2 - x_1}$ $m_1 = \frac{6-5}{-3-2} = \frac{1}{-5}$ $m_1 = -\frac{1}{5}$	$\mathbf{\frac{1}{2}}$

	 P(-3,5) A(2, 5) B(-3,6) If PL is perpendicular to AB from the point P(-3, 5), then consider its slope as m_2 . Lines PL and AB are mutually perpendicular if, Slope of PL x Slope of AB = -1 => $m_1 \times m_2 = -1$ In other words, $m_2 \times (-\frac{1}{5}) = -1$ $\therefore \quad m_2 = 5$ The slope of PL is 5 and it passes through P(-3, 5), then the equation of PL is, $(y - y_1) = m_2 (x - x_1)$ or $(y - 5) = 5(x + 3)$ $y - 5 = 5x + 15$ $5x - y + 20 = 0$	**1** **1** **1** **$1\frac{1}{2}$**
Question34.	Find the derivative of tan x from first principle.	
Solution:	Let f(x) = tanx , the $\frac{d(f(x))}{dx} = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$ $= \lim_{h \to 0} \frac{\tan(x+h) - \tan(x)}{h}$ $= \lim_{h \to 0} \frac{1}{h} \left[\frac{\sin(x+h)}{\cos(x+h)} - \frac{\sin(x)}{\cos(x)}\right]$ $= \lim_{h \to 0} \frac{1}{h} \left[\frac{\sin(x+h)\cos(x) - \cos(x+h)\sin(x)}{\cos(x+h)\cos(x)}\right]$ $= \lim_{h \to 0} \frac{1}{h} \left[\frac{\sin(x+h-x)}{\cos(x+h)\cos(x)}\right]$ [Using formula for sin(A - B)]	**1** **2**

	$= \lim_{h \to 0} \frac{1}{h} \left[\frac{\sin(h)}{\cos(x+h)\cos(x)} \right]$ $= \lim_{h \to 0} \frac{\sin(h)}{h} \times \lim_{h \to 0} \left[\frac{1}{\cos(x+h)\cos(x)} \right]$ $= 1 \cdot \left[\frac{1}{\cos^2 x} \right]$ $= \sec^2 x$	**2**
OR **Question34.**	Suppose $f(x) = \begin{cases} a + bx, & x < 1 \\ 4 & x = 1 \\ b - ax, & x > 1 \end{cases}$ and if $\lim_{x \to 1} f(x) = f(1)$ what are possible values of a and b?	
Solution:	Here, limit exist at $x \to 1$ i.e., LHL = RHL = f(1) = 4 ...(1) LHL at $x \to 1$ $= \lim_{x \to 1-} f(x)$ $= \lim_{h \to 0} f(1-h)$ $= \lim_{h \to 0} [a + b(1-h)]$ $= a + b\,(1-0)$ $= a + b$ ...(2) RHL at $x \to 1$ $= \lim_{x \to 1+} f(x)$ $= \lim_{h \to 0} f(1+h)$ $= \lim_{h \to 0} [b - a(1+h)]$ $= b - a\,(1+0)$ $= b - a$ …(3)	$1\frac{1}{2}$ $1\frac{1}{2}$

From (1) and (2)

$a + b = 4$

From (1) and (3)

$b - a = 4$

Adding both $a + b + b - a = 4 + 4$ 1

$2b = 8$

$b = 4$

Also,

$a + b = 4$

$a + 4 = 4$ 1

$a = 0$

Question35. Calculate mean, variance and standard deviation for the following distribution.

Classes	30- 40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	3	7	12	15	8	3	2

Solution: From the given data, we construct the following table.

Class	**Frequency f_i**	**Midpoint x_i**	**$f_i x_i$**	**$(x_i - \bar{x})^2$**	**$f_i(x_i - \bar{x})^2$**
30 – 40	3	35	105	729	2187
40 – 50	7	45	315	289	2023
50 – 60	12	55	660	49	588
60 – 70	15	65	975	9	135
70 – 80	8	75	600	169	1352
80 – 90	3	85	255	529	1587
90 – 100	2	95	190	1089	2178
	50		3100		10050

$3\frac{1}{2}$

	Thus Mean $\bar{x} = \frac{1}{N}\sum_{i=1}^{i=7} f_i x_i$ $= \frac{3100}{50} = 62$ Variance (σ^2) = $\frac{1}{N}\sum_{i=1}^{i=7} f_i\,(x_i - \bar{x})^2$ $= \frac{10050}{50} = 201$ and Standard deviation(σ) = $\sqrt{201}$ = 14.18	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
	SECTION – E (4Marks × 3Q)	
Question36.	To demonstrate the compound angle formulae in trigonometry, Mahesh and Siraj selected two angles 'A' and 'B' such that A, B ∈ (0, $\frac{\pi}{2}$) and sin A = $\frac{3}{5}$, cos B = $\frac{9}{41}$. *Based on the above information, answer the following questions.* (i) Find the value of sin B + cos A . (2) (ii) Find the value of cos (A + B). (2)	
Solution:	Given, sin A = $\frac{3}{5}$ and cos B = $\frac{9}{41}$ we know, cos A = $\sqrt{1 - \sin^2 A}$ So, cos A= $\sqrt{1 - \left(\frac{3}{5}\right)^2} = \sqrt{\frac{16}{25}} = \frac{4}{5}$ Also sin B = $\sqrt{1 - \cos^2 B}$ So, sin B= $\sqrt{1 - \left(\frac{9}{41}\right)^2} = \sqrt{\frac{1681-81}{1681}} = \sqrt{\frac{1600}{1681}} = \frac{40}{41}$ So, sin B = $\frac{40}{41}$ Thus sin B + cos A = $\frac{40}{41} + \frac{4}{5}$ ⇨ sin B + cos A = $\frac{200+164}{205}$	**1**

	⇨ sin B + cos A = $\frac{364}{205}$	**1**
	ii) cos (A + B) = cos A × cos B - sin A × sin B = $(\frac{3}{5})(\frac{9}{41})$ - $(\frac{4}{5})(\frac{40}{41})$ = $\frac{27}{205}$ - $\frac{160}{205}$ = - $\frac{27-133}{205}$ = - $\frac{133}{205}$	$\frac{1}{2}$ **1** $\frac{1}{2}$
Question37.	The assembly incharge of a school wants to generate signals for calling classes for the assembly. He has got 5 coloured flags viz., Yellow, Red, Orange, Green and Blue to make signals. *Based on the above information answer the following questions:* (i) How many different signals can be generated by using all 5 flags? (1) (ii) To call the middle section for the assembly, he has to generate different signals by using 2 flags only. How many such arrangements are possible? $(1\frac{1}{2})$ (iii)To call the senior section for the assembly, he has to generate different signals by using 4 flags only. How many such arrangements are possible? $(1\frac{1}{2})$	
Solution: (i)	Total number of different flags given = 5 Number of ways to generate a signal of 5 flags together = $^5P_5$ = $\frac{5!}{(5-5)!}$ = 5! = 120ways	**1**

(ii)	To call the middle section for the assembly, a signal of only two flags is to be generated. Number of ways to generate a signal of 2 flags together = $^5P_2$ $= \frac{5!}{(5-2)!}$ $= \frac{5!}{3!}$ $= \frac{5.4.3!}{3!} = 5.4 = 20$ways	$1\frac{1}{2}$
(iii)	To call the senior section for the assembly, a signal of only four flags is to be generated. Number of ways to generate a signal of 4 flags together = $^5P_4$ $= \frac{5!}{(5-4)!}$ $= \frac{5!}{1!}$ $= \frac{5.4.3!}{1!} = 5! = 120$ways	$1\frac{1}{2}$
Question 38.	Due to heavy storm, an electric wire got broken and fell on the ground and is bent taking a shape of a mathematical figure as shown below. *Based on the above information, answer the following questions.* (i) Name of the shape in which wire is bent. (a) circle (b) parabola (c) ellipse (d) hyperbola (ii)The equation of the shape so formed is: (a) $\frac{x^2}{9} + \frac{y^2}{4} = 1$ (b) $\frac{x^2}{4} + \frac{y^2}{9} = 1$ (c) $\frac{x^2}{9} - \frac{y^2}{4} = 1$ (d) none of these (iii) The eccentricity of the shape so formed is: (a) $\frac{2}{3}$ (b) $\frac{\sqrt{x}}{\sqrt{3}}$ (c) $\frac{\sqrt{5}}{3}$ (d) $\frac{\sqrt{5}}{4}$ (iv) The length of the latus rectum of the shape so formed is: (a) 9 (b) $\frac{8}{3}$ (c) -4 (d) none of these.	

Solution: (i)	(c) ellipse	**1**
(ii)	(a) $\frac{x^2}{9}+\frac{y^2}{4}=1$	**1**
(iii)	(c) Here a = 3 and b = 2 Eccentricity e = $\frac{\sqrt{a^2-b^2}}{a}$ ⇨ e = $\frac{\sqrt{3^2-2^2}}{3}=\frac{\sqrt{5}}{3}$	**1**
(iv)	(b) The length of the latus rectum = $\frac{2b^2}{a}$ $=\frac{2(2)^2}{3}=\frac{8}{3}$	**1**