TIRUVALLUR DISTRICT

FIRST REVISION TEST - 2025

Standard X

Reg.No. | | | | | | |

MATHEMATICS

Time : 3:00 hrs **Marks : 100**

Part - A

I. Choose the correct answer: **14 x 1 = 14**

1. If there are 1024 relations from a set A = {1,2,3,4,5} to a set B, then the number of elements in B is
   a) 3 b) 2 c) 4 d) 8
2. If {(a, 8), (6, b)} represents an identity function, then the value of a and b are repectively
   a) (8,6) b) (8,8) c) (6,8) d) (6,6)
3. The HCF of numbers of the form 2^m and 3^n is
   a) 2 b) 3 c) 1 d) 4
4. The value of $(1^3 + 2^3 + 3^3 + ... + 15^3) - (1 + 2 + 3 + ... 15)$ is
   a) 14400 b) 14200
   c) 14280 d) 14520
5. Which of the following should be added to make x^4+64 a perfect square
   a) $4x^2$ b) $16x^2$ c) $8x^2$ d) $-8x^2$
6. If A is 2 x 3 matrix and B is 3x4 matrix, how many columns does AB have?
   a) 3 b) 4 c) 2 d) 5
7. Two poles of heights 6 m and 11 m stand vertically on a plane ground. If the distance between their feet is 12 m, What is the distance between their tops ?
   a) 13 m b) 14 m c) 15 m d) 12.8 m
8. If ΔABC is an isosceles triangle with $\angle C = 90°$ and AC = 5cm, then AB is
   a) 2.5 cm b) 5 cm c)10cm d) $5\sqrt{2}$ cm
9. The straight line given by the equation X = 11
   a) parallel to X axis b) parallel to Y axis
   c) passes through the origin d) passes through the point (0, 11)
10. If two non-vertical lines are perpendicular If and only if
    a) $m_1 = m_2$ b) $m_1 \neq m_2$ c) $m_1 m_2 = -1$ d) $m_1 m_2 = 1$
11. If the ratio of the height of a tower and the length of its shadow is $\sqrt{3} : 1$, then the angle of elevation of the sun has measure
    a) 45° b) 30° c) 90° d) 60°

12. The height of a right circular cone whose radius is 5 cm and slant height is 13 cm will be

a) 12 cm b) 10 cm c) 13 cm d)5 cm

13. The ratio of the volumes of a cylinder, a cone and a sphere, if each has the same diameter and same height is

a) 1:2:3 b) 2:1:3 c) 1:3:2 d) 3:1:2

14. If the mean and coefficient variation of a data are 4 and 87.5%, then the standard deviation is

a) 3.5 b) 3 c) 4.5 d) 2.5

Part - B

II. Answer any 10 questions. (Q.No.28 is compulsory) **10 x 2 = 20**

15. If A X B= {(3,2) (3,4) (5,2) (5,4)} then find A and B
16. Find k if fof(k) = 5 where f(k) = 2k – 1
17. If $13824 = 2^a \times 3^b$, then find 'a' and 'b'.
18. Find the 8th term of the GP 9, 3, 1,...
19. Find the square root of the following expression : $\frac{400x^4y^{12}z^{16}}{100x^8y^4z^4}$
20. Determine the nature of roots for the following quadratic equation $15x^2 + 11x + 2 = 0$
21. In ΔABC, D and E are point on the sides AB and AC respectively. Show that DE || BC. If AB = 12 cm, AD = 8 cm, AE = 12 cm and AC = 18 cm.
22. A man goes 18 m due east and then 24 m due north. Find the distance of his current position from the starting point?
23. Find the equation of a straight line which has slope $-\frac{5}{4}$ and passing though the point (–1, 2).
24. Show that the st - lines 2x + 3y – 8 = 0 and 4x + 6y + 18 = 0 are parallel.
25. A player sitting on the top of a tower of height 20 m observes the angle of depression of a ball laying on the ground as 60°. Find the distance between the foot of the tower and the ball. $(\sqrt{3} = 1.732)$
26. Find the volume of a cylinder whose height is 2 m and whose base area is 250 m^2.
27. A die is rolled and a coin is tossed simultaneously. Find the probability that the die shows an odd number and the coin shows a head.
28. If $A = \begin{bmatrix} 5 & -4 \\ 6 & -5 \end{bmatrix}$, Show that $A^2 = I$

Part - C

III. Answer any 10 questions. (Q.No.42 is compulsory) 10 x 5 = 50

29. Let A = {3,4,7,8} and B = {1,7,10}, which of the following sets are relation from A to B?
    i) R_1 = {(3,7), (4,7), (7,10), (8,1)}
    ii) R_2 = {(3,1), (4,12)}
    iii) R_3 = {(3,7),(4,10),(7,7),(7,8),(8, 11),(8,7),(8,10)}
30. A = {1,2,3,4} and B = {2,5,8,11,14} be two sets. f: A → B be a function given by f(x) = 3x – 1, Represent this function
    i) by arrow diagram
    ii) in a table form
    iii) as a set of ordered pair
    iv) In a graphical form.
31. The sum of first n, 2n, and 3n terms of an A.P are S_1, S_2 and S_3 respectively. Prove that $S_3 = 3(S_2 - S_1)$
32. Rekha has 15 square colour papers of sizes 10 cm, 11 cm, 12 cm,...24 cm. How much area can be decorated with these colour papers?
33. Find the values of m and n if the following polynomial is perfect square.
    $36x^4 - 60x^3 + 61x^2 - mx + n$
34. If the roots of the equation $x^2 + 6x - 4 = 0$ are α, β. Find the quadratic equation whose roots are
    i) α^2 and β^2
    ii) $\alpha^2\beta$ and $\beta^2\alpha$
35. State and prove Thales Theorem (Basic Proportionality Theorem).
36. Without using Pythagoras theorem, show that the points (1, –4), (2, –3) and (4, –7) form a right angled triangle.
37. A(–3, 0), B(10, –2) and C(12, 3) are the vertices of ΔABC. Find the equation of the altitude through A and B.
38. From the top of a lighthouse, the angle of depression of two ships on the opposite sides of it are observed to be 30° and 60° If the height of the lighthouse is h meters and the line joining the ships passess through the foot of the lighthouse, show that the distance between the ships is $\frac{4h}{\sqrt{3}}$ m.
39. A right circular cylindrical container of base radius 6 cm and height 15 cm is full of ice cream. The ice cream is to be filled in cones of height 9 cm and base radius 3cm, having a hemispherical cap. Find the number of cones needed to empty the container.

40. A hollow metallic cylinder whose external radius is 4.3 cm and internal radius is 1.1 cm and whole length is 4 cm is melted and recast into a solid cylinder of 12 cm long. Find the diameter of a solid cylinder.

41. Two unbiased dice are rolled once. Find the probability of getting
    i) a boublet (equal numbers on both dice)
    ii) the product as a Prime number
    iii) the sum as a prime number
    iv) the sum as 1

42. Find the value of k, if the area of a quadrilateral is 28 sq.units, whose vertices taken in order (–4, –2), (–3, k), (3, –2) & (2,3)

Part - D

IV. Answer all the questions. **2 x 8 = 16**

43. a) Discuss the nature of the roots of the given quadratic equation $X^2 - 8X + 16 = 0$ by using graph.

(OR)

b) A Two wheeler parking zone near bus stand charges as below.

Time (hr) (X)	4	8	12	24
Amount ₹ (Y)	60	120	180	360

Check if the amount charged are in direct variation or in inverse variation to the parking time. Graph the data. Also
    i) Find the amount to be paid when parking time is 6 hrs.
    ii) Find the parking duration when the amount Paid is ₹150.

44. a) Construct ΔABC of base BC = 8 cm, $\angle A = 60°$ and the angle bisector of $\angle A$ meets BC at D Such that BD = 6 cm.

(OR)

b) Take a point which is 11 cm away from the center of a circle of radius 4 cm and draw the two tangents to the circle from that point.

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TIRUVALLUR DISTRICT

FIRST REVISION TEST - 2025

10th standard - Mathematics - Answer key

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PODATURPET, TIRUVALLUR DISTRICT.

PART - A

1) b) 2 2) a) (8,6) 3) c) 1 4) c) 14280

5) b) $16x^2$ 6) b) 4 7) a) 13m 8) d) $5\sqrt{2}$ cm

9) b) Parallel to y-axis 10) c) $m_1 m_2 = -1$ 11) d) 60°

12) a) 12cm 13) d) 3:1:2 14) a) 3.5

PART - B

15) $A = \{3, 5\}$ $B = \{2, 4\}$

16) $f \circ f(k) = 5$

$f[2k-1] = 5$

$2(2k-1) - 1 = 5$

$4k - 2 - 1 = 5$

$4k = 8$

$\boxed{k = 2}$

17)

2	13824
2	6912
2	3456
2	1728
2	864
2	432
2	216
2	108
2	54
3	27
3	9
	3

$13824 = 2^9 \times 3^3$

$\therefore a = 9, \quad b = 3$

18) $9, 3, 1, \ldots$

$a = 9 \quad r = \frac{1}{3} \quad t_n = ar^{n-1}$

$t_8 = 9\left(\frac{1}{3}\right)^{8-1} = 9\left(\frac{1}{3}\right)^7 = 3^2 \cdot \frac{1}{3^7} = \frac{1}{3^5} = \frac{1}{243}$

19) $\sqrt{\frac{400 a^4 y^{12} z^{16}}{100 x^8 y^4 z^4}} = \frac{20 x^2 y^6 z^8}{10 x^4 y^2 z^2} = 2\left|\frac{y^4 z^6}{x^2}\right|$

20) $15x^2 + 11x + 2 = 0$

$a = 15 \quad b = 11 \quad c = 2$

$\Delta = b^2 - 4ac = 11^2 - 4(15)(2) = 121 - 120 = 1 > 0$

Roots are real and unequal

மூலங்கள் மெய் மற்றும் சமமில்லை.

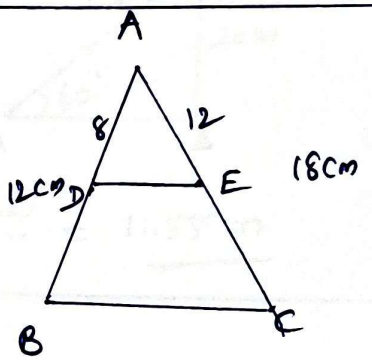
21)

$\frac{AD}{AB} = \frac{8}{12} = \frac{2}{3}$

$\frac{AE}{AC} = \frac{12}{18} = \frac{2}{3}$

$\frac{AD}{AB} = \frac{AE}{AC}$

$\Rightarrow DE \| BC$



22)

In ΔABC

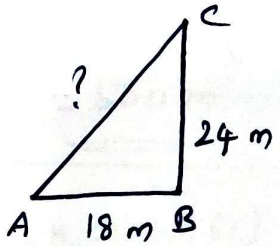
$AC^2 = AB^2 + BC^2$

$= 18^2 + 24^2$

$= 324 + 576$

$= 900 = 30^2$

$AC = 30$ m



23) $m = -\frac{5}{4}$ $(-1, 2)$ $x_1\ y_1$

Equation of a st. line

$y - y_1 = m(x - x_1)$

$y - 2 = -\frac{5}{4}(x + 1)$

$4y - 8 = -5x - 5$

$5x + 4y - 3 = 0$

24) $2x + 3y - 8 = 0$

Slope $m_1 = \frac{-a}{b} = \frac{-2}{3}$

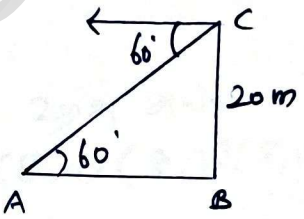
$4x + 6y + 18 = 0$

Slope $m_2 = \frac{-a}{b} = \frac{-4}{6} = -\frac{2}{3}$

$m_1 = m_2$

St. lines are parallel.

25)



In $\triangle ABC$,

$\tan 60^\circ = \frac{20}{AB}$

$AB = \frac{20}{\sqrt{3}} = \frac{20\sqrt{3}}{3} = \frac{20(1.732)}{3} = 11.55\ m$

26) Volume of cylinder $= \pi r^2 h$

2 cylinders

$= 250 \times 2 = 500\ m^3$

27) $S = \{1H, 1T, 2H, 2T, 3H, 3T, 4H, 4T, 5H, 5T, 6H, 6T\}$

$n(S) = 12$

$A = \{1H, 3H, 5H\}$ $n(A) = 3$

$P(A) = \frac{n(A)}{n(S)} = \frac{3}{12} = \frac{1}{4}$

28) $A^2 = A \cdot A = \begin{pmatrix} 5 & -4 \\ 6 & -5 \end{pmatrix}\begin{pmatrix} 5 & -4 \\ 6 & -5 \end{pmatrix}$

$= \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} = I$ //

PART - C

29) $A = \{3, 4, 7, 8\}$ $B = \{1, 7, 10\}$

$A \times B = \{(3,1)(3,7)(3,10)(4,1)(4,7)(4,10)$
$(7,1)(7,7)(7,10)(8,1)(8,7)(8,10)\}$

(i) $R_1 = \{(3,7)(4,7)(7,10)(8,1)\} \subseteq A \times B$

$\therefore R_1$ is a relation R_1 ஒரு உறவு

(ii) $R_2 = \{(3,1)(4,12)\}$ $(4,12) \notin A \times B$.

$\therefore R_2$ is not a relation.
R_2 ஒரு உறவு அல்ல.

(iii) $R_3 = \{(3,7)(4,10)(7,7)(7,8)(8,11)(8,7)(8,10)\}$.

$(7,8), (8,11) \notin A \times B$

$\therefore R_3$ is not a relation. R_3 - உறவு அல்ல.

30) $f(x) = 3x - 1$

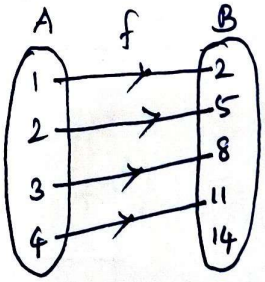
$f(1) = 3(1) - 1 = 2$

$f(2) = 3(2) - 1 = 5$

$f(3) = 3(3) - 1 = 8$

$f(4) = 3(4) - 1 = 11$

(i) Arrow diagram அம்புக்குறி வரை



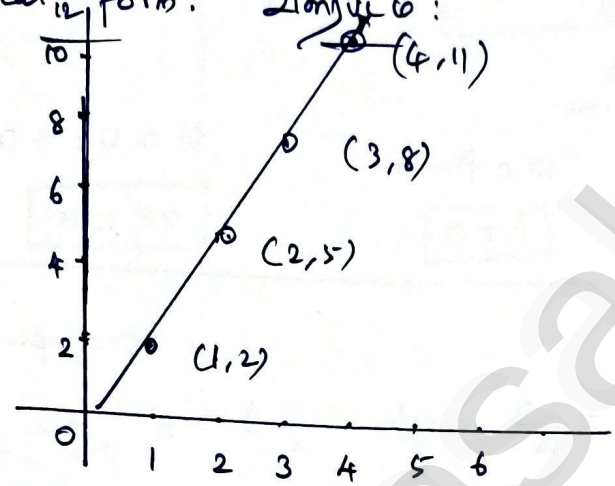
(ii) A Table form: அட்டவணை வடிவம்:

x :	1	2	3	4
$f(x)$:	2	5	8	11

(iii) Set of ordered pair வரிசை இணைகளின் கணம்:

$$f = \{(1,2)\ (2,5)\ (3,8)\ (4,11)\}$$

(iv) Graphical form: வரைபட வடிவம்:



31) $S_1 = \frac{n}{2}[2a+(n-1)d]$ $S_2 = \frac{2n}{2}[2a+(2n-1)d]$

$S_3 = \frac{3n}{2}[2a+(3n-1)d]$

$S_2 - S_1 = \frac{2n}{2}[2a+(2n-1)d] - \frac{n}{2}[2a+(n-1)d]$

$= \frac{n}{2}\{[4a+2(2n-1)d] - [2a+(n-1)d]\}$

$= \frac{n}{2}[2a+(3n-1)d]$

$3(S_2-S_1) = \frac{3n}{2}[2a+(3n-1)d] = S_3$

32) $10^2 + 11^2 + 12^2 + \ldots + 24^2$

$= (1^2+2^2+\ldots+24^2) - (1^2+2^2+\ldots+9^2)$

$= \frac{24(24+1)[2(24)+1]}{6} - \frac{9(9+1)[2(9)+1]}{6}$

$= 4900 - 285 = 4615$

33)

$6x^2 - 5x + 3$

$6x^2$ | $36x^4 - 60x^3 + 61x^2 - mx + n$

$(-)\ 36x^4$

$12x^2 - 5x$ | $-60x^3 + 61x^2$

$(+)\ -60x^3 + 25x^2$ $(-)$

$12x^2 - 10x + 3$ | $36x^2 - mx + n$

$(-)\ 36x^2 - 30x + 9$ $(+)\ (-)$

0

$-m + 30 = 0$

$\boxed{m = 30}$

$n - 9 = 0$

$\boxed{n = 9}$

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34) $x^2 + 6x - 4 = 0$

$\alpha + \beta = -b/a = -6, \quad \alpha\beta = c/a = -4.$

(i) $\alpha^2 + \beta^2 = (\alpha+\beta)^2 - 2\alpha\beta = (-6)^2 - 2(-4) = 44$

$\alpha^2\beta^2 = (\alpha\beta)^2 = (-4)^2 = 16.$

The quadratic equation is (இருபடி சமன்பாடு)

$x^2 - (\alpha^2 + \beta^2)x + \alpha^2\beta^2 = 0$

$\boxed{x^2 - 44x + 16 = 0}$

(ii) $\alpha^2\beta + \beta^2\alpha = \alpha\beta(\alpha+\beta) = (-4)(-6) = 24$

$(\alpha^2\beta)(\beta^2\alpha) = \alpha^3\beta^3 = (\alpha\beta)^3 = (-4)^3 = -64$

The quadratic equation is, (இருபடி சமன்பாடு)

$x^2 - (\alpha^2\beta + \beta^2\alpha)x + (\alpha^2\beta)(\beta^2\alpha) = 0$

$\boxed{x^2 - 24x - 64 = 0}$

35) State and prove Thales theorem
தேற்றம் கூற்று மற்றும் நிரூபி. - நிரூபணம்.

36) A(1,-4) B(2,-3) C(4,-7)

Slope of AB அல்லது சாய்வு $m_1 = \frac{y_2-y_1}{x_2-x_1} = \frac{-3+4}{2-1} = 1$

slope of BC அல்லது சாய்வு $m_2 = \frac{-7+3}{4-2} = \frac{-4}{2} = -2$

Slope of CA அல்லது சாய்வு $m_3 = \frac{-7+4}{4-1} = \frac{-3}{3} = -1$

$m_1 \times m_3 = 1 \times -1 = -1$

$\therefore$ $AB \perp CA \Rightarrow \angle A = 90^\circ$

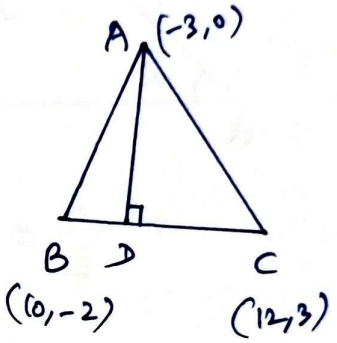
$\therefore$ Points A, B and C form a right angled $\triangle$
A, B மற்றும் C ஆகிய புள்ளிகள் செங்கோண முக்கோணம் அமைக்கும்.

37)

Slope of BC அல்லது சாய்வு $= \frac{y_2-y_1}{x_2-x_1}$

$= \frac{3+2}{12-10}$

$m = \frac{5}{2}$



$BC \perp AD$

$\therefore$ Slope of AD அல்லது சாய்வு $= -1/m = \frac{-1}{(5/2)} = -2/5$

Equation of the altitude AD
குத்துக்கோடு AD அல்லது சமன்பாடு

A(-3,0)
x_1 y_1

$y - y_1 = -1/m\,(x - x_1)$

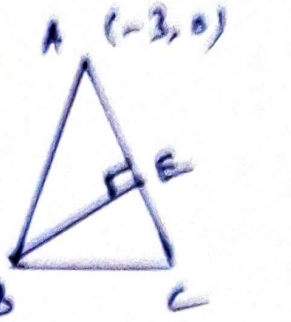
$y - 0 = -\frac{2}{5}(x+3)$

$5y = -2x - 6$

$\boxed{2x + 5y + 6 = 0}$

Slope of AC = $\frac{y_2 - y_1}{x_2 - x_1}$

$m = \frac{3-0}{12+3} = \frac{3}{15} = \frac{1}{5}$



$AC \perp BE$

Slope of BE = $\frac{-1}{m} = \frac{-1}{(\frac{1}{5})} = -5$

Equation of the altitude BE

B (10, -2)
x_1 y_1

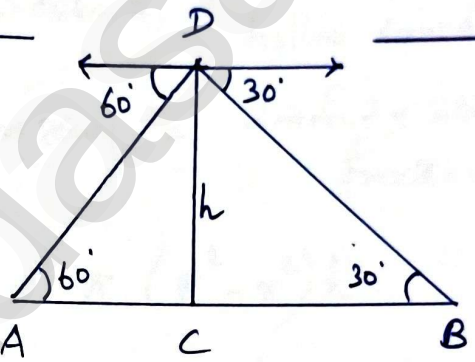
$y - y_1 = \frac{-1}{m}(x - x_1)$

$y + 2 = -5(x - 10)$

$y + 2 = -5x + 50$

$\boxed{5x + y - 48 = 0}$

38)



A, B - Ships

CD - Lighthouse

In $\triangle ACD$

$\tan 60° = \frac{h}{AC} \Rightarrow AC = \frac{h}{\sqrt{3}}$ m

In $\triangle BCD$

$\tan 30° = \frac{h}{BC} \Rightarrow \frac{1}{\sqrt{3}} = \frac{h}{BC} \Rightarrow BC = h\sqrt{3}$ m

$AB = AC + BC = \frac{h}{\sqrt{3}} + h\sqrt{3} = \frac{4h}{\sqrt{3}}$ m

39)

Number of cones needed = $\frac{\text{Volume of Cylinder}}{\text{Volume of Icecream cone}}$

$$= \frac{\pi r^2 h}{\frac{1}{3}\pi r_1^2 h_1 + \frac{2}{3}\pi r_1^3}$$

$$= \frac{\pi \times 6 \times 6 \times 15}{\pi\left[\frac{1}{3} \times 3 \times 3 \times 3^3 + \frac{2}{3} \times 3 \times 3 \times 3\right]}$$

$$= \frac{6 \times 6 \times 15}{3 \times 3\,[9+2]} = 2 \times 2 \times 3$$

$$= 12$$

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40)

Volume of solid cylinder = Volume of a hollow cylinder

திண்ம உருளையின் கனஅளவு = உள்ளீடற்ற உருளையின் கனஅளவு.

$$\pi r^2 h = \pi (R^2 - r^2) h$$

$$\pi r^2 \times 12^3 = \pi (4.3^2 - 1.1^2) 4$$

$$r^2 = \frac{18.49 - 1.21}{3} = \frac{17.28}{3}$$

$$r^2 = 5.76$$

அதாவது $r = 2.4$ cm

விட்டம் $d = 2r = 2(2.4) = 4.8$ cm

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41)

$S = \{(1,1)(1,2)(1,3)(1,4)(1,5)(1,6)$
$(2,1)(2,2)(2,3)(2,4)(2,5)(2,6)$
$(3,1)(3,2)(3,3)(3,4)(3,5)(3,6)$
$(4,1)(4,2)(4,3)(4,4)(4,5)(4,6)$
$(5,1)(5,2)(5,3)(5,4)(5,5)(5,6)$
$(6,1)(6,2)(6,3)(6,4)(6,5)(6,6)\}$ $\quad n(S) = 36$.

(i) $A = \{(1,1)(2,2)(3,3)(4,4)(5,5)(6,6)\}$

$n(A) = 6$ $\quad P(A) = \frac{n(A)}{n(S)} = \frac{6}{36} = \frac{1}{6}$

(ii) $B = \{(1,2)(1,3)(1,5)(2,1)(3,1)(5,1)\}$

$n(B) = 6$ $\quad P(B) = \frac{n(B)}{n(S)} = \frac{6}{36} = \frac{1}{6}$

(iii) $C = \{(1,1)(1,2)(1,4)(1,6)(2,1)(2,3)(2,5)$
$(3,2)(3,4)(4,1)(4,3)(5,2)(5,6)(6,1)(6,5)\}$

$n(C) = 15$ $\quad P(C) = \frac{n(C)}{n(S)} = \frac{15}{36} = \frac{5}{12}$

(iv) $D = \{\}$ $\quad n(D) = 0$

$P(D) = 0$

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42)

Area of quadrilateral formula using

$$= \frac{1}{2}\begin{Bmatrix} x_1 & x_2 & x_3 & x_4 & x_1 \\ y_1 & y_2 & y_3 & y_4 & y_1 \end{Bmatrix} = 28$$

$$\Rightarrow \frac{1}{2}\begin{Bmatrix} -4 & -3 & 3 & 2 & -4 \\ -2 & k & -2 & 3 & -2 \end{Bmatrix} = 28$$

$$(-4k + 6 + 9 - 4) - (6 + 3k - 4 - 12) = 56$$

$$-4k + 11 - 3k + 10 = 56$$

$$-7k = 56 - 21$$

$$-7k = 35$$

$$\boxed{k = -5}$$

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