Answer Key

Practice Paper 1 -IX Mathematics

Mind Curves -Mid Term

Section: A

(Multiple Choice Questions- 1 Mark each)

1.	(c)	(a + b – 1)(a–b)
2.	(c)	√7
3.	(d)	5
4.	(b)	4
5.	(c)	55°
6.	(a)	1320 sq.m
7.	(d)	27
8.	(b)	ASA
9.	(a)	5√6
10.	(b)	48°, 60°, 120°, 132°
11.	(a)	Remains the same
12.	(b)	900√3 cm2
13.	(c)	Third quadrant
14.	(c)	60°
15.	(c)	(0,1)
16.	(c)	145°
17.	(a)	equal
18.	(d)	(0, -5)
19.	(b)	both Assertion and reason are correct but reason is not correct explanation for Assertion
20.	(a)	both Assertion and reason are correct and reason is correct explanation for Assertion

SECTION: B

(VSA Questions of 2 marks each)

21. Formula used:

$(a+b)^2 = a^2 + 2ab + b^2$

Calculations:

Squaring the given equation,

$\Rightarrow (3x)^2 + 2 \times (3x) \times (2y) + (2y)^2 = (12)^2$

$\Rightarrow 9x^2 + 4y^2 + 12xy = 144$

Substituting the value of xy,

$\Rightarrow 9x^2 + 4y^2 + 12 \times 6 = 144$

$\Rightarrow 9x^2 + 4y^2 + 72 = 144$

$\therefore 9x^2 + 4y^2 = 72$

22. In the figure, AB and CD intersect each other at O

$\angle AOC + \angle BOE = 70°$ and $\angle BOD = 40°$

Now, AB is a line

$\therefore \angle \mathrm{AOC} + \angle \mathrm{BOE} + \angle \mathrm{COE} = 180°$

(Angles on a line are supplementary)

$\Rightarrow 70° + \angle COE = 180°$

$\Rightarrow \angle COE = 180° - 70° = 110°$

Also, $\angle AOC = \angle BOD$ (Vertically opposite angles)

$\Rightarrow \angle \mathrm{AOC} = 40°$

$\therefore \angle \mathrm{BOE} = 70° - 40° = 30°$

Hence, relfex $\angle \mathrm{COE} = 360° - \angle \mathrm{COE}$

$= 360° - 110° = 250°$

OR

$\angle \mathrm{POY} = 90°$

$\angle \mathrm{POX} + \angle \mathrm{POY} = 180°$ (Linear pair)

$\angle \mathrm{POX} + 90° = 180°$

$\Rightarrow \angle \mathrm{POX} = 90°$

$\mathrm{a} : \mathrm{b} = 2 : 3$

Let $\mathrm{a} = 2\mathrm{x}°$

and $\mathrm{b} = 3\mathrm{x}°$

$\angle \mathrm{POX} = \mathrm{a} + \mathrm{b} = 5\mathrm{x}$

$90° = 5\mathrm{x}$

$\Rightarrow \mathrm{x} = 18°$

$\angle \mathrm{MOX} = \mathrm{b} = 3\mathrm{x} = 54°$

$\angle \mathrm{MOX} + \angle \mathrm{NOX} = 180°$ (Linear pair)

$\mathrm{b} + \mathrm{c} = 180°$

$54° + c = 180°$

$c = 180° - 54° = 126°$

23. Let the polynomials $p(x) = 5x - 4x^2 + 3$

(i) $p(0) = 5(0) - 4(0)^2 + 3$

$= 0 - 0 + 3$

$= 3$

(ii) $p(-1) = 5(-1) - 4(-1)^2 + 3$

$= -5 - 4 + 3$

$= -6$

24. $A((-3,0); B(5,-3); C(5,0); D(0,0)$

25. As given AC = BC.......eq (1)

From equation (1)

AC = BC

Adding AC on both sides,

AC + AC = BC + AC

2AC = AB($\because$ BC + AC = AB)

$\therefore$ AC $= \frac{1}{2}$AB

SECTION: C

(VSA Questions of 3 marks each)

26. So, By Factoring $25x^2 - 35x + 12$, the Length and Breadth can be obtained.

$\rightarrow 25x^2 - 35x + 12 = 0$

$\rightarrow 25x^2 - 15x - 20x + 12 = 0$

$\rightarrow 5x(5x - 3) - 4(5x - 3) = 0$

$\rightarrow (5x - 3)(5x - 4) = 0$

So, the Length and Breadth are $(5x - 3)(5x - 4)$.

Perimeter = **2**(Length + Breadth)

$\rightarrow$ Perimeter = 2(5x − 3 + 5x − 4)

$\rightarrow$ Perimeter = 2(10x − 7)

27. $(5 + \sqrt{3})/(7 - 4\sqrt{3}) = a + \sqrt{3b}$

$(5+\sqrt{3})(7+4\sqrt{3})/(7-4\sqrt{3})(7+4\sqrt{3}) = a+\sqrt{3b}$ [Rationalizing the denominator]

$(35+20\sqrt{3}+7\sqrt{3}+12)/(49-48) = a+\sqrt{3b}$

$(47+27\sqrt{3})/1 = a+\sqrt{3b}$

$47+27\sqrt{3} = a+\sqrt{3b}$

By comparing LHS and RHS,

$a=47, b=27$

OR

$x = 2+\sqrt{3}$

$\frac{1}{x} = \frac{1}{2+\sqrt{3}} = \frac{1(2-\sqrt{3})}{(2+\sqrt{3})(2-\sqrt{3})}$

(Rationalising the denominator)

$= \frac{2-\sqrt{3}}{(2)^2-(\sqrt{3})^2} = \frac{2-\sqrt{3}}{4-3} = 2-\sqrt{3}$

$\therefore x+\frac{1}{x} = 2+\sqrt{3}+2-\sqrt{3} = 4$

Cubing both sides,

$\left(x+\frac{1}{x}\right)^3 = (4)^3$

$\Rightarrow x^3+\frac{1}{x^3}+3\left(x+\frac{1}{x}\right) = 64$

$\Rightarrow x^3+\frac{1}{x^3}+3x4 = 64$

$\Rightarrow x^3+\frac{1}{x^3}+12 = 64$

$\Rightarrow x^3+\frac{1}{x^3} = 64-12 = 52$

Hence $x^3+\frac{1}{x^3} = 52$

28. $a = 4b$ and $2c = b+75°$ (vert. opp $\angle s$)

Also $a+2c = 180°$ (Q is a straight line)

$\Rightarrow 4b+b+75° = 180°$

$\Rightarrow 5b = 105° \Rightarrow b = 21°$

$\therefore a = 4\times 21° = 84°$ and

$\Rightarrow c = \frac{(21°+75°)}{2} = \frac{96°}{2} = 48°$

Hence, option A is correct.

29. (i) In $\triangle ABD$ and $\triangle BAC$,

$AD = BC$ (Given)

$\angle DAB = \angle CBA$ (Given)

$AB = BA$ (Common)

$\therefore \triangle ABD \cong \triangle BAC$ (By SAS congruence rule)

(ii) Since $\triangle ABD \cong \triangle BAC$,

$\therefore BD = AC$(ByCPCT)

(iii) Since $\triangle ABD \cong \triangle BAC$,

$\angle ABD = \angle BAC$(ByCPCT)

30. From the question, we have

$(x+y+z)^2 = x^2 + y^2 + z^2 + 2(xy + yz + zx)$

$(15)^2 = 83 + 2(xy + yz + zx)$

$2(xy + yz + zx) = 225 - 83$

$2(xy + yz + zx) = 142$

$(xy + yz + zx) = 71$

Again,

$\because x^3 + y^3 + z^3 - 3xyz = (x+y+z)[(x^2 + y^2 + z^2) - (xy + yz + zx)]$

$= (15) \times [83 - 71]$

$= 15 \times 12$

$= 180$

Hence, the value of $x^3 + y^3 + z^3 - 3xyz$ is 180 .

31. From the question, we have

$(x+y+z)^2 = x^2 + y^2 + z^2 + 2(xy + yz + zx)$

$(15)^2 = 83 + 2(xy + yz + zx)$

$2(xy + yz + zx) = 225 - 83$

$2(xy + yz + zx) = 142$

$(xy + yz + zx) = 71$

Again,

$\because x^3 + y^3 + z^3 - 3xyz = (x+y+z)[(x^2 + y^2 + z^2) - (xy + yz + zx)]$

$= (15) \times [83 - 71]$

$= 15 \times 12$

= 180

Hence, the value of $x^3 + y^3 + z^3 - 3xyz$ is 180 .

SECTION D

(Long answer type questions of 4 marks each)

32. Let $ABCD$ be a rhombus-shaped field.

For $\triangle BCD$,

Semi-perimeter, $s = \frac{(48+30+30)}{2} = 54 \text{ m}$

By Heron's formula,

Area of triangle $= \sqrt{s(s-a)(s-b)(s-c)}$

Therefore the area of

$\triangle BCD = [\sqrt{54(54-48)(54-30)(54-30)}]\text{m}^2$

$= \sqrt{54(6)(24)(24)} = 432 \text{ m}^2$

Area of field $= 2 \times$ Area of $\triangle BCD$

$= (2 \times 432)\text{m}^2 = 864 \text{ m}^2$

Area of grazing for 1cow $= \frac{864}{18} = 48 \text{ m}^2$

Each cow will get 48 m^2 area of grass field.

33. L.H.S

$= \frac{1}{1+\frac{x^a}{x^b}} + \frac{1}{1+\frac{x^b}{x^a}}$

$= \frac{x^b}{x^b+x^a} + \frac{x^a}{x^a+x^b}$

$= \frac{x^b+x^a}{x^a+x^b}$

= 1

= R.H. S.

33. (i) In $\triangle$ ABD and $\triangle$ ACD,

AD = AD (Common)

AB = AC (given)

BD = CD (given)

Therefore, $\triangle \text{ABD} \cong \triangle \text{ACD}$ (by SSS congruence rule)

$\angle BAD = \angle CAD (CPCT)$

$\angle BAP = \angle CAP$

(ii) In $\triangle ABP \& \triangle ACP$,

$AP = AP($ Common $)$

$\angle BAP = \angle CAP$

(Proved above)

$AB = AC$ (given)

Therefore,

$\triangle ABP \cong \triangle ACP$

(by SAS congruence rule).

(iii) $\angle BAD = \angle CAD$ (proved in part i)

Hence, AP bisects $\angle A$.

also, In $\triangle BPD$ and $\triangle CPD$,

$PD = PD($ Common $)$

$BD = CD$ (given)

$BP = CP(\triangle ABP \cong \triangle ACP$ so by CPCT.

Therefore, $\triangle BPD \cong \triangle CPD$ (by SSS congruence rule.)

Thus, $\angle BDP = \angle CDP$ (by CPCT.)

Hence, we can say that AP bisects $\angle A$ as well as $\angle D$.

(iv) $\angle BPD = \angle CPD$

(by CPCT as $\triangle BPD \cong \triangle CPD$)

$\& BP = CP (CPCT)$

also,

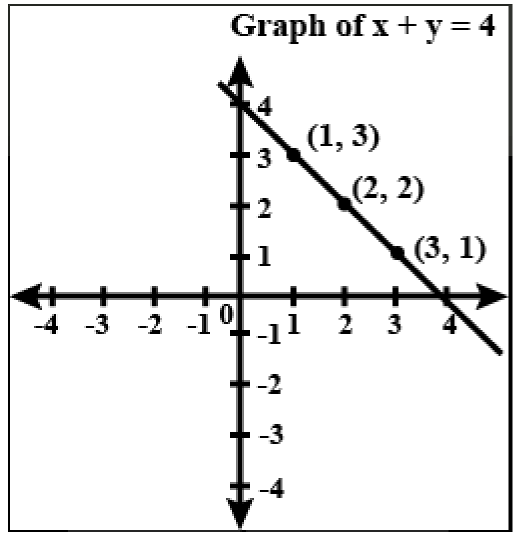
$\angle BPD + \angle CPD = 180^{\circ}$ (BC is a straight line.)

$\Rightarrow 2\angle BPD = 180^{\circ}$

$\Rightarrow \angle BPD = 90^{\circ}$

Hence,

AP is the perpendicular bisector of BC.



35. $x + y = 4$

$x = 4 - y$

If $y = 1$

$x = 4 - 1$

$x = 3$

If $y = 2$

$x = 4 - 2$

$x = 2$

If $y = 3$

$x = 4 - 3$

= 1

∴ The coordinates are (3,1), (2,2), (1,3)

SECTION E

(4 Marks each)

36. (i) $5x + 2y = 100$

(ii) 3

OR

(ii) 5

(iii) (0,10)

37. (i) 7200 sq. m

(ii) $7200 - 24X4 = 7200 - 96 = 7104$ sq unut

or 96 sq feet

(iii) Rs 7248

38. (i) (4,1)

(ii) 3 km Or 4 sq m

or

(iii) $H(4, -1), S(7, -1), O(7, -5)$ along x axis

H(−4,1), S(−7,1), O(−7,5) along Y axis