INFINITY
THINK BEYOND............
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**Answer key prepared by**
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**Answer Key Practice Paper 2 -IX Mathematics**
**Mind Curves -Mid Term(By Deepika Bhati)**

Page No.
Date

## Section-A

1. (b) 1
2. (d) 0.075
3. (a) $\frac{\pi}{2}$
4. (d) (0, 0)
5. (c) $\angle B = \angle C = 45°$
6. (c) $2\sqrt{2}$ ~~(d) $21\sqrt{11}$ cm²~~
7.
8. (c) 90°
9. (a) $\frac{7}{5}$
10. (a) $x - \frac{1}{x} = 5$
11. (c) 2
12. (a) $9\sqrt{15}$ cm²
13. (a) $x = -4, y = -3$
14. (d) 72°
15. (a) I
16. (a) 150
17. (a) $x - 2$
18. (c) Square
19. (a) Both A and R are true and R is the correct explanation of A
20. (a) Both A and R are true and R is the correct explanation of A

# Section B

Q21 To find the value of x

$(x-2=0)$ By ~~[illegible]~~

$= x-2=0$

$x = 0+2$

$x = 2$

Let us take $2x^3 + ax^2 + 3x - 5$ as Polynomial I

So let us ~~take~~ put the value of x in Polynomial I

$= 2(2)^3 + a(2)^2 + 3(2) - 5$

Let us take $x^3 + x^2 - 2x + a$ as Polynomial 2

So let us put the value of x in Polynomial 2

$= (2)^3 + (2)^2 - 2(2) + a$

As we know Polynomial 1 = Polynomial 2 (Given)

So,

$2(2)^3 + a(2)^2 + 3(2) - 5 = (2)^3 + (2)^2 - 2(2) + a$

$= 2(8) + a(4) + 6 - 5 = 8 \cancel{+4} \cancel{-4} + a$

$= 16 + 4a + 1 = 8 + a$

$= 4a + 17 = 8 + a$

$= 4a - a = 8 - 17$

$= 3a = -9$

$a = \frac{-\cancel{9}}{\cancel{3}} = -3$

ii) To find the remainders in both the cases

we know that:

$a = -3$

$x = 2$

So in case of Polynomial 1

$$2x^3 + ax^2 + 3x - 5$$

$$2x^3 + ax^2 + 3x - 5$$

By Factor Theorem

$$= 2(2)^3 + (-3)(2)^2 + 3(2) - 5$$

$$= 16 + (-3)(4) + 6 - 5$$

$$= 16 - 12 + 6 - 5$$

$$= 4 + 1$$

$$= 5$$

∴ In Polynomial 1 the remainder is 5

In Polynomial 2

$$x^3 + x^2 - 2x + a$$

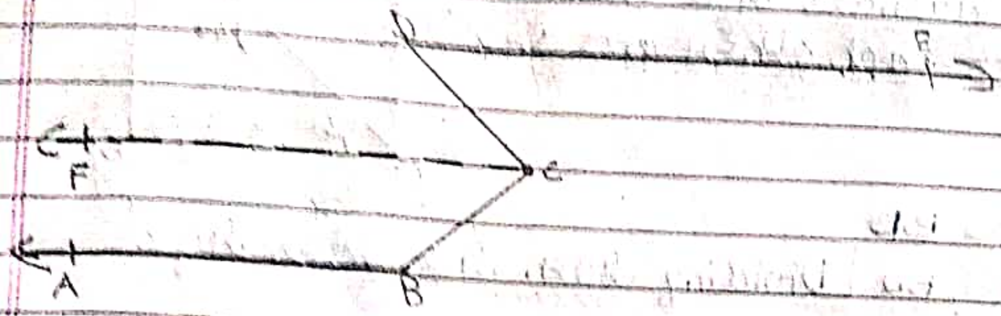
$$(2)^3 + (2)^2 - 2(2) + (-3)$$

$$= 8 \cancel{+ 4 - 4} - 3$$

$$= 5$$

Hence ~~Proved~~ Proved Polynomial 1 and Polynomial 2 both have same remainder which is 5

Q22.




Given: BA || DE

Construction: CF which is parallel to DE and BA

To prove: $\angle ABC + \angle BCD = 180^\circ + \angle CDE$

Proof:

Step1: $\angle ABC + \angle BCF = 180^\circ$ [co-interior angles]

Step2: $\angle FCD = \angle CDE$ [alternate interior angles]

Step3: $\angle BCD = \angle BCF + \angle FCD$

Step4: $\angle BCF = \angle BCD - \angle FCD$

Step5: $\angle ABC + \angle BCD - \angle FCD = 180^\circ$

$= \angle ABC + \angle BCF = 180^\circ$ [already proven] by 1

Step6: as we know $\angle CDE = \angle FCD$

so $\angle ABC + \angle BCD - \angle FCD = 180^\circ$.

$= \angle ABC + \angle BCD = 180^\circ + \angle FCD$

$= \angle ABC + \angle BCD = 180^\circ + \angle CDE$

Hence Proved

Q23 If a straight line falling on two straight lines makes the interior angles on the same side of it taken together less than two right angles, then the two straight lines, if produced idefinitely, meet on that side on which the sum of angles is less than two right angles.

Q24 Given: ① $\Delta ABC$ is an isosceles triangle.

② $AC = AB$

③ AD is altitude.

$\angle ADB = \angle ADC = 90^\circ$

To prove: i) AD bisects BC, i.e., $BD = CD$

ii) AD bisects $\angle A$, i.e., $\angle BAD = \angle CAD$

Proof:

In $\Delta ADB$ and $\Delta ADC$,

$\angle ADB = \angle ADC$ [Each $90^\circ$]

$AB = AC$ [Given]

$AD = AD$ [common]

By RHS congruency,

$\Delta ADB \cong \Delta ADC$

By CPCT

$BD = CD$

$\angle BAC = \angle CAD$

Hence Proved.

Q25 $2x + 5y = 8$

$2x = 8 - \cancel{2y}\ 5y$

$x = \frac{8 - 5y}{2}$ ($x$ in terms of $y$)

2 solutions

Put $y = 0$

$\frac{8 - 5(0)}{2}$

$= \frac{8 - 0}{2} = \frac{8}{2}$ 4

Solution 1 = (4, 0)

Solution 2

Put y as 2

$\therefore \frac{8-5(2)}{2} = \frac{8-10}{2} = \frac{-\cancel{2}}{\cancel{2}} = -1$

$\therefore$ Solution 2 = (-1, 2)

Section C

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$(2x-5y)^3 - (2x+5y)^3$

$\cancel{8x^3 - 125y^3 + 3(2x)^2(5y) + 3(2x)(5y)^2 - 8x^3 - 125y^3}$
$- 3(2x)^2 5y - \cancel{3(2x)(5y)^2}$

$= -250y^3 - 60x^2y - 60x^2y$

$= -250y^3 - 120x^2y$

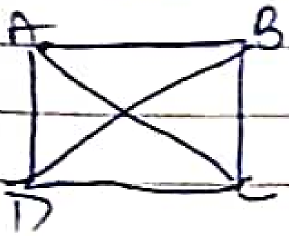
27 $a = 6 - \sqrt{35}$ $\qquad \frac{1}{a} = 6 + \sqrt{35}$

$a^2 = 36 + 35 - 12\sqrt{35}$

$\frac{1}{a^2} = 36 + 35 + 12\sqrt{5}$

$a^2 + \frac{1}{a^2} = 142$

28. Let ABCD be a parallelogram




Given: $AC = BD$

To prove: ABCD is a rectangle.

Proof: In $\Delta ADC$ & $\Delta BDC$

$AD = BC$ (opp sides)

$DC = DC$ common

$BD = AC$ (given)

By SSS cong.

$\Delta ABC \cong \Delta ABD$

By CPCT $\angle D = \angle C$

& $\angle D + \angle C = 180^\circ$ (co-int)

$\Rightarrow \angle D = 90^\circ$

Thus ABCD is a rectangle.

Q9

In $\Delta ABE$ & $\Delta CBD$

$AB = CB$ (given)

$\angle D = \angle D$ common

$\angle x = \angle y$ given

$180 - \angle x = 180 - \angle y$

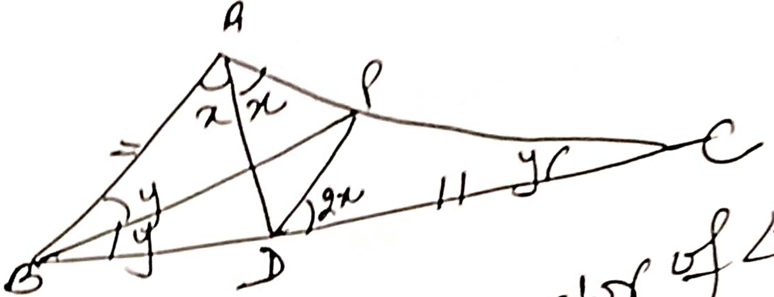
$\angle AEB = \angle BDC$

By AAS cong. rule

$\Delta ABE \cong \Delta CBD$

By CPCT $AE = CD$.

Or




Given (i) AD is bisector of $\angle A$

(ii) $AB = CD$

(iii) $\angle B = 2\angle C$

join PD

Cont: BP angle bisector of $\angle B$,

Let $\angle B = 2y$

$\angle C = \frac{\angle B}{2} = \frac{2y}{2} = y$

$\Rightarrow \angle PCD = \angle PBD = y$

$\Rightarrow PC = BP$ (side opp to equal sides are equal)

In $\triangle ABP$ & $\triangle DCP$

$AB = CD$ given.

$\angle ABP = \angle DCP = y$

$BP = PC$

By SAS cong. $\triangle ABP \cong \triangle DCP$

By CPCT

$\angle BAP = \angle CDP = 2x$

$AP = DP$

$\Rightarrow \angle PAD = \angle ADP = 2x$.

In $\triangle ABD$, By ext. angle pro

$\cancel{x} + 2y = 2x + \cancel{x}$

$2y = 2x$

$y = x$.

In $\triangle ABC$, By ASP

$\angle BAC = 72°$

30. $a+b+c = 5 \Rightarrow$ Sq both sides

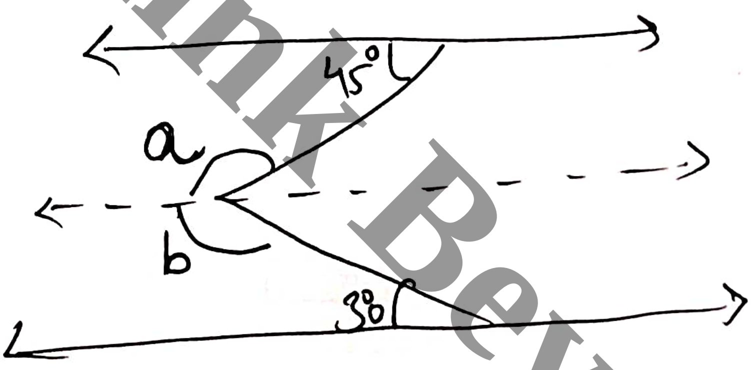
$\boxed{ab+bc+ca = 10.}$ $\quad (a+b+c)^2 = 25$

$$a^2+b^2+c^2+2(ab+bc+ca) = 25$$

$$a^2+b^2+c^2 = 25-2(10)$$
$$= 5.$$

$$a^3+b^3+c^3-3abc = (a+b+c)(a^2+b^2+c^2-ab-bc-ca)$$
$$= 5(5-(ab+bc+ca))$$
$$= 5(5-10)$$
$$= 5(-5)$$
$$= -25.$$

31.




$a+45^\circ = 180^\circ$ co-int

$a = 180-45$

$= 135$

$b+30^\circ = 180^\circ$ (co int)

$b = 150^\circ$

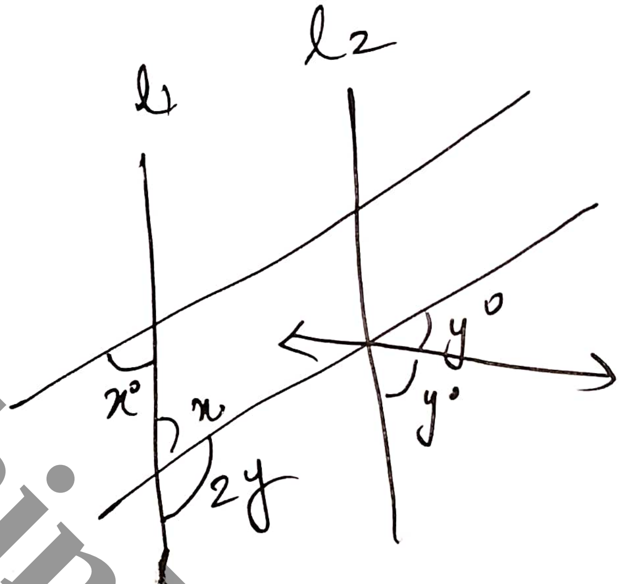
$\therefore x = 150+135 = 185^\circ$

32)

$l_1 \parallel l_2$

$l_3 \parallel l_4$

$$\boxed{x + 2y = 180^\circ}$$



Answer key

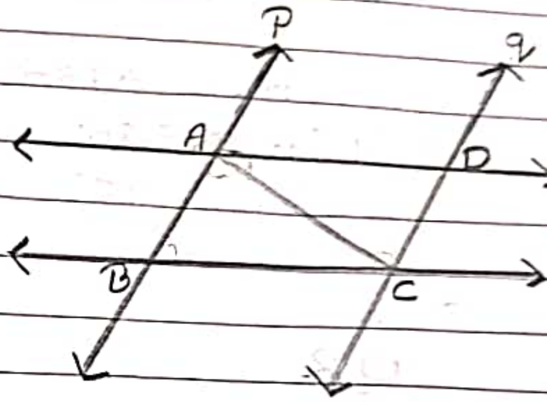
Practice Paper 2

SECTION E

Q36 (i) Ans $\angle BAC = 30°$

$\angle BAC = \angle ACD$ (Alternate Interior angle)
$30° = \angle ACD$

(ii) Ans Given,




$\angle BAC = \angle ACD$
$P \parallel Q$
$L \parallel m$

To prove: $\triangle ABC \cong \triangle CDA$ and $AB = CD$

Proof: In $\triangle ABC$ and $\triangle CDA$

$P \parallel Q$ and $L \parallel m$
So,
$\angle BAC = \angle ACD$ (Given)
$AC = AC$ (common)
$\angle BCA = \angle DAC$ (Given)

By ASA congruency rule
$\triangle ABC \cong \triangle CDA$

So By CPCT

$CD = AB = 2\,Km$

$\therefore$ Distance between A and B is 2 Km.

(iii) $\angle B = 45°$

$\angle A + \angle B = 180°$ (consecutive interior angle)

$\angle A + 45° = 180°$

$\angle A = 180° - 45° = 135°$

$\angle B + \angle C = 180°$ (consecutive interior angle)

$45° + \angle C = 180°$

$\angle C = 180° - 45°$

$\angle C = 135°$

OR

Proved in part (ii)

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Ans(i) The expression is


$= 2(5x+2+5x) - 2(2x+x) + [-2(3x+x)]$

$= 20x + 4 - 6x - 8x$

$20x - 6x - 8x = -4$

$20x - 14x = -4$

$6x = -4$

$x = \frac{-4}{6}$

$x = \frac{-2}{3}$

(ii) Coefficient of $x$

Window — $2(2x+x) = 6x$ coefficient 6

Door — $2(3x+x) = 8x$ coefficient 8

(iii) $2(5x+2+5x) - 2(2x+x) - 2(3x+x)$

$x = 100$

$2(10x+2) - 2(3x) - 2(4x)$

$2(10(100)+2) - 2(300) - 2(4(100))$

$2(1002) - 2(300) - 2(400)$

$2004 - 600 - 800$

$2004 - 1400$

$= 604$

Or

$p(x) = 20x+4$

$g(x) = 14x$

$20x+4=14x$

$20\left(-\frac{2}{3}\right)+4 = 14\left(-\frac{2}{3}\right)$

$-\frac{40}{3}+4 = -\frac{28}{3}$

$-\frac{40}{3}+\frac{28}{3}+4$

$-\cancel{\frac{12}{3}}^{4}+4$

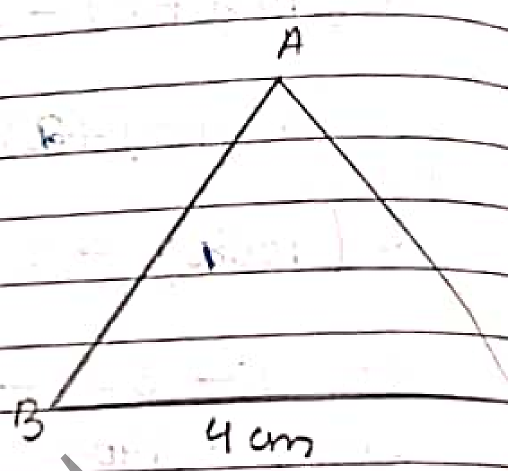
$-4+4=0$

$\therefore$ ~~$-\frac{2}{3}$ is~~ $g(x)$ is a factor of $h(x)$

Q38
Ans Given,

$\Delta ABC$ is an isosceles triangle

$BC = 4cm$ (unequal side)




$AB = BC = x$

Perimeter $= 20$ cm

(i) $x+x+4 = 20$

$2x = 20-4$

$2x = 16$

$x = \frac{16}{2}$

$x = 8cm$

∴ measure of equal side is 8 cm

(ii) Given,

AB = 8 cm

AC = 8 cm

BC = 4 cm

By Heron's Formula

$S = \frac{a+b+c}{2} = \frac{8+8+4}{2} = \frac{20}{2} = 10$

$\sqrt{10(10-8)(10-8)(10-4)} = \sqrt{10(2)(2)(6)} = \sqrt{2^2 \times 2^2 \times 5 \times 3} = 4\sqrt{15}$

Semi perimeter = 10 cm

Area = $4\sqrt{15}$ cm$^2$

(iii) Given,

Side ratio = 3:5:7

Perimeter = 300 m

let ratio be $x$

$3x + 5x + 7x = 300$

$15x = 300$

$x = \frac{300}{15}$

$x = 20$ cm

$1^{st}$ side $= 3 \times 20 = 60m$

$2^{nd}$ side $= 5 \times 20 = 100m$

$3^{rd}$ side $= 7 \times 20 = 140m$

Semiperimeter $= \frac{a+b+c}{2} = \frac{60+100+140}{2} = \frac{300}{2} = 150$

Area $= \sqrt{s(s-a)(s-b)(s-c)} = \sqrt{150\,(150-100)(150-60)(150-140)}$

$\sqrt{150\,(50)\,(90)\,(10)} = \sqrt{50 \times 3 \times 50 \times 90 \times 10} = \sqrt{50^2 \times 3^2 \times 10^2 \times 3}$

$= 50 \times 3 \times 10\sqrt{3}$

$= 1500\sqrt{3}\ m^2$ is the area

OR

Given,

$BC = 4cm$ (From part (i))

Area $= 4\sqrt{15}\,cm^2$

By,

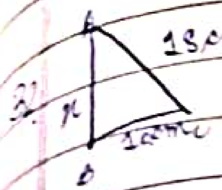
$\frac{1}{2} \times b \times h =$

$4\sqrt{15} = \frac{1}{2} \times 4 \times h$

$4\sqrt{15} = 2h$

Date

## Section-D

31. 


Perimeter = Sum of all sides

$42 = 18 + 10 + x$

$42 - 28 = x$

$14 = x$

$14 = AB$

Semi Perimeter $= s = \frac{42}{2} = 21$

Area $= \sqrt{s(s-AC)(s-BC)(s-AB)}$

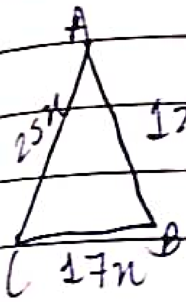
$= \sqrt{21(21-18)(21-10)(21-14)}$

$= \sqrt{21 \times 3 \times 11 \times 7}$

$= \sqrt{3 \times 3 \times 7 \times 7 \times 11}$

$= 21\sqrt{11}\ cm^2$

Or




Let sides be $12x$, $17x$ & $25x$.

Perimeter $= 540$

$540 = AB + BC + CA$

$540 = 12x + 17x + 25x$

$540 = 54x$

$\frac{\cancel{540}^{20}}{\cancel{54}} = x$

$10\ cm = x$

$S = \frac{\cancel{540}^{270}}{\cancel{2}} = 270$

$AB = 12x = 120$

$BC = 17x = 170$

$CA = 25x = 250$

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

$= \sqrt{270(270-250)(270-120)(270-170)}$

$= \sqrt{270 \times 20 \times 150 \times 100}$

$= \sqrt{3 \times 90 \times 3 \times 50 \times 5 \times 4 \times 10 \times 10}$

$= 3 \times 10 \sqrt{3 \times 5 \times 2 \times 3 \times 5 \times 2 \times 5 \times 5 \times 2 \times 2}$

$= 3 \times 10 \times 3 \times 5 \times 5 \times 2 \times 2 = 9000\ cm^2$

33. $\frac{1}{3-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2} = 5$

LHS :-

$\frac{1}{3-\sqrt{8}} \times \frac{3+\sqrt{8}}{3+\sqrt{8}} = \frac{3+2\sqrt{2}}{1}$

$\frac{1}{\sqrt{8}-\sqrt{7}} \times \frac{\sqrt{8}+\sqrt{7}}{\sqrt{8}+\sqrt{7}} = \frac{2\sqrt{2}+\sqrt{7}}{1}$

$\frac{1}{\sqrt{7}-\sqrt{6}} \times \frac{\sqrt{7}+\sqrt{6}}{\sqrt{7}+\sqrt{6}} = \frac{\sqrt{7}+\sqrt{6}}{1}$

$\frac{1}{\sqrt{6}-\sqrt{5}} \times \frac{\sqrt{6}+\sqrt{5}}{\sqrt{6}+\sqrt{5}} = \frac{\sqrt{6}+\sqrt{5}}{1}$

$\frac{1}{\sqrt{5}-2} \times \frac{\sqrt{5}+2}{\sqrt{5}+2} = \frac{\sqrt{5}+2}{1}$

$3+\cancel{2\sqrt{2}}-\cancel{2\sqrt{2}}-\cancel{\sqrt{7}}+\cancel{\sqrt{7}}+\cancel{\sqrt{6}}-\cancel{\sqrt{6}}-\cancel{\sqrt{5}}+\cancel{\sqrt{5}}+2$

$= 3+2$

$= 5$

RHS :- 5

Hence, Proved

LHS=RHS

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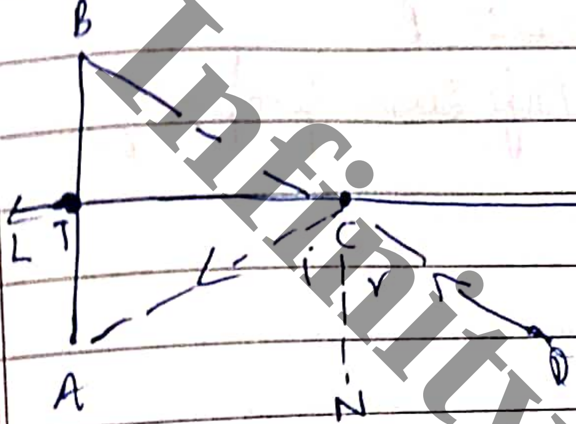



Given :- AB ∥ CN
and ∠i = ∠r.

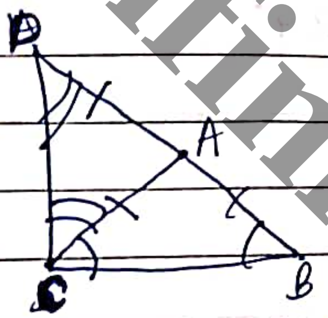
To Prove :- AT = BT

∠TAC = ∠ACN = ∠i (alt. int)
∠TBC = ∠DCN = ∠r (corr.)
as, i = r so, ∠TBC = ∠TAC

In △BCT & △ACT :-
∠TAC = ∠TBC (Proved)
∠BTC = ∠CTA (90°)
TC = TC (common)
∴ △BCT ≅ △ACT (by AAS)

By CPCT, BT = AT

35.




Given: - $\Delta ABC$ is isosceles $\Delta$ so $AB = AC$

$AD = AB$

To prove: $\angle BCD$ is a right angle.

(I) - $AB = AC$ so $\angle ACB = \angle ABC$ (by opp. angles are equal as sides are equal)

(II) - $AD = AC$, since $AB = AC$

$\angle ACD = \angle ADC$ (opp. sides are equal)

Adding I and II :-

$\angle ACB + \angle ACD = \angle ABC + \angle ADC$

$\angle BCD = \angle ABC + \angle BDC$ (Since, $\angle ADC = \angle ABC$)

Add $\angle BCD$ on both sides :-

$\angle BCD + \angle BCD = \angle BCD + \angle DBC + \angle DCB$

$2\angle BCD = 180^\circ$ (by Angle sum property)

$\angle BCD = \frac{\cancel{180}^{90}}{\cancel{2}}$

$\angle BCD = 90^\circ$

$\therefore \angle BCD = 90^\circ$