Questions

Second : Trigonometry

(1) Complete the following table :

The angle / Ratio	$42° \, 12'$	……………	……………	……………
Sin	……………	0.3214	……………	……………
Cas	……………	……………	0.5321	……………
Tan	……………	……………	……………	2.0625

(2) Complete the following :

1) $46° \, 36' \, 24''$ = …………. In degrees.

2) 44.125° = ………… in degrees, minutes, seconds.

3) If tan θ = 1.42 where θ is the measure of an acute angle. Then θ =….….…

4) If Sin θ = 0.63 where θ is the measure of an acute angle, then θ = …..

5) If Sin x = $\frac{1}{2}$ where x is an acute angle then m (∠ x) = ……..

6) If cos $\frac{x}{2} = \frac{\sqrt{3}}{2}$ where x is an acute angle then m (∠ x) = …….

7) Sin 60° + Cos 30° - Tan 60° = ……….

8) Cos 60° + Sin 30° - Tan 45° = ……....

9) 2 sin 30° x Cos 60° - Tan 45° = ……....

10) $\text{Sin}^2 30° + \text{Cos}^2 30°$ = ……….

11) If tan (x + 10) = $\sqrt{3}$ where x is an acute angle then m (∠ x) = …….

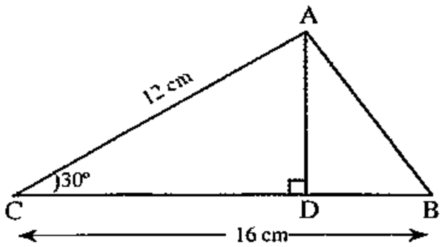
12) If tan 3x = $\sqrt{3}$ where x is an acute angle then m (∠ x) = ……..

(3) In the opposite figure:-

ABC is a triangle, $\overline{AD} \perp \overline{BC}$,

AC = 12 cm, BC = 16 cm and m (∠ C) = 30°

Complete the following



∵ sin 30 = $\frac{AD}{\dots\dots\dots}$

∴ AD = ……….. x Sin 30° = ………. cm

∵ The area of Δ ABC = ……… x AD x BC

∴ The area of Δ ABC = ……… x ……… x ……… = ………cm^2

Can you calculate the height of the triangle which is drawn from the point B on $\overleftrightarrow{AC}$? Explain your answer showing the steps of solution

(4) Choose the correct answer form those given:-

1) 4 cos 30° Tan 60° = ………

a) 3 b) $2\sqrt{3}$ c) 6 d) 12

2) If cos 2x = $\frac{1}{2}$ where x is an acute angle then m (∠ x) = ………..

a) 15° b) 30° c) 45° d) 60°

3) If tan $\frac{3x}{2}$ = 1 where x is acute angle then m (∠ x) = ……..

a) 10° b) 30° c) 45° d) 60°

4) 2 Tan 45 - $\frac{1}{\text{Cos } 60°}$ = …………

a) zero b) $\frac{1}{2}$ c) $\frac{\sqrt{3}}{2}$ d) 1

5) If cos $\frac{x}{2}$ = $\frac{\sqrt{3}}{2}$ where x is an acute angle then sin x = ……….

a) $\frac{1}{2}$ b) $\frac{1}{\sqrt{3}}$ c) $\frac{2}{\sqrt{3}}$ d) $\frac{\sqrt{3}}{2}$

6) In Δ ABC :

If m (∠ A) = 85° , Sin B = Cos B , then m (∠ C) = ………….

a) 30° b) 45° c) 50° d) 60°

(5) Find the value of the following:-

1) (cos 30° - cos 60°) (sin 30° + sin 60°)

2) $\frac{1}{4}\sin^2 45° \tan^2 60° - \frac{1}{3}\sin^2 60° \tan^2 30°$

3) Sin 45° cos 45° + sin 30° cos 60° - $\cos^2$ 30°

4) $\frac{\sin 30° \cos 45° + \cos 30° \sin 45°}{\sin 45° \cos 60° + \cos 45° \sin 60°}$

(6) Prove that:

1) cos 60° = 2 $\cos^2$ 30° -1

2) tan 60° (1 – $\tan^2$30°) = 2 tan 30°

3) $\tan^2$60° - $\tan^2$45° = 4 sin 30°

4) tan 60° = $\frac{2\tan 30°}{1-\tan^2 30°}$

5) $\frac{\tan^2 30° \tan 45° \tan^2 60° + \tan 30° \tan 60°}{\sin^2 60° - \tan 45° \sin 30°}$

(7) Find the value of x in each of the following:-

1) x cos 30° = tan 60°

2) x $\sin^2$ 45° = $\tan^2$ 60°

3) 4x = $\cos^2$30° $\tan^2$30° $\tan^2$45°

4) x sin 30° $\cos^2$45° = $\cos^2$30°

5) x sin 45° cos 45° tan 60° = $\tan^2$45° - $\cos^2$60°

6) tan x = $\frac{\sin 30° \cos 45° + \sin 45° \cos 30°}{\sin 45° \cos 60° + \sin 45° \sin 60°}$

(8) Find m ($\angle$ θ) where θ is an acute angle :

1) $\sin^2 45° = \cos\theta \tan 30°$

2) $2\sin\theta = \tan^2 60° - 2\tan 45°$

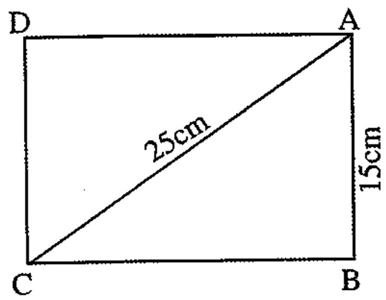
3) $\sin\theta = \sin 45° \cos 30° + \cos 45° \sin 45°$

4) $\sin\theta \sin^2 60° = 3\sin^2 45° \cos^2 45° \cos 60°$

5) $\tan\theta = 3(\sin 30° + \cos 30°) - 4(\sin^3 60° + \cos^3 60°)$

6) $3\tan^2\theta = 4\sin^2 30° + 8\cos^2 60°$

(9) In the opposite Figure:-



ABCD is a rectangle where AB = 15cm.

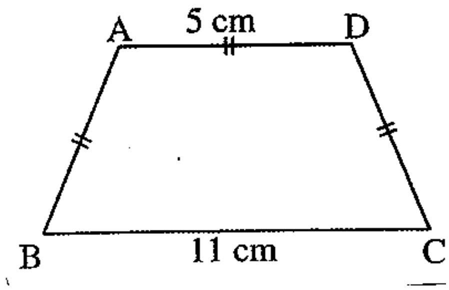
AC = 25cm.

Find:

First: m ($\angle$ ACB)

Second: The surface area of the rectangle ABCD

(10) In the opposite figure:-



ABCD is an isosceles trapezium

where AB = AD = DC = 5cm.

BC = = 11cm, find

First : m($\angle$ B), m ($\angle$A)

Second: the area of the trapezium ABCD.

Third geometry

1) Complete each of the following;-

1) The distance between the two points (9 , 0) , (4, 0) is ………
2) The distance between the two points (0 , -11), (0 , -5) is ………
3) The distance between the points (4 , -3) and the origin point is ……
4) The distance between the points (5 , 0) , (0, -12) is ………
5) The diameter length of the circle whose centre is (8 , 5) and passes through the point (4 , 2) equals………
6) If the distance between the two points (a , 0) and (0 , 1) is one length unit then a = …….
7) The distance between the points (3 , 4) and the X – axis = ………… length unit.
8) In the square ABCD: If A (2 , -5) , B (-1 , -1) then the perimeter of the square is …….. length unit and its area is …………….. square unit.

2) Answer the following questions:-

1) Find the length of $\overline{MN}$ in each of the following cases:

a) M (2 , -1) , N (5 , 3) b) M (-3 , -5), N (5 , 1)

c) M (7 , -8) , N (2 , 4) d) M (7 , -3) , N (0, 4).

2) Prove that the points A (3 , -1) , B (-4 , 6) , C (2, -2) which belong to an orthogonal Cartesian co-ordinates plane lie on the circle whose centre M (-1 , 2) then find the circumference of the circle.

3) Find the value of a in each of the following

a) If the distance between the two points (a , 7) and (-2 , 3) equals 5.

b) If the distance between the two points (a , 7) and (3a -1 , -5) equals 13

4) If A (x , 3) , B (3 , 2) , C (5 , 1) and if AB = BC find the value of x.

5) If the distance between the point (x , 5) and the point (6 , 1) equals $2\sqrt{5}$ find the value of x.

6) Identify the type of the triangle whose vertices are A (-2 , 4) , B (3, -1) , C (4, 5) due to its sides lengths.

7) Prove that triangle whose vertices A (5, -5), B (-1 , 7), C (15 , 15) is right angled at B, then calculate its area.

8) Prove that the points (5 , 3) , (6, -2) , (1 , -1) , (0 , 4) are vertices of a rhombus. Then find its area.

Model Answers

Second :Trigonometry

(1) Complete the following table :

The angle / Ratio	$42° 12'$	$18° 44' 51''$	$57° 51' 9''$	$64° 8' 1''$
Sin	0.6717	0.3214	0.8467	0.8998
Cos	0.7408	0.9469	0.5321	0.4363
Tan	0.9067	0.3394	1.5912	2.0625

(2) Complete the following:

1) $46.6067°$

2) $44° 7' 30''$

3) $54° 50' 45''$

4) $39° 3'$

5) $30°$

6) $\frac{x}{2} = 30° \Rightarrow x = 30 \times 2 = 60°$

7) $\frac{\sqrt{3}}{2} + \frac{\sqrt{3}}{2} - \sqrt{3} = 0$

8) $\frac{1}{2} + \frac{1}{2} - 1 = 0$

9) $2 \times \frac{1}{2} \times \frac{1}{2} - 1 = -\frac{1}{2}$

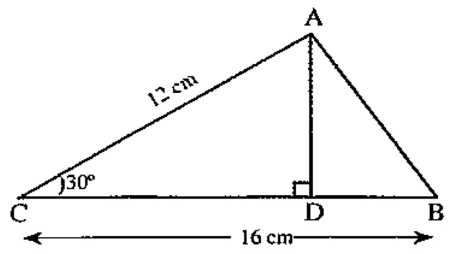
10) $(\frac{1}{2})^2 + (\frac{\sqrt{3}}{2})^2 = \frac{1}{4} + \frac{3}{4} = \frac{4}{4} = 1$

11) $x + 10 = 60 \Rightarrow x = 50°$

12) $3x = 60 \Rightarrow x = 20°$

(3) In the opposite figure:-

$\because \sin 30° = \frac{AD}{AC} = \frac{AD}{12}$

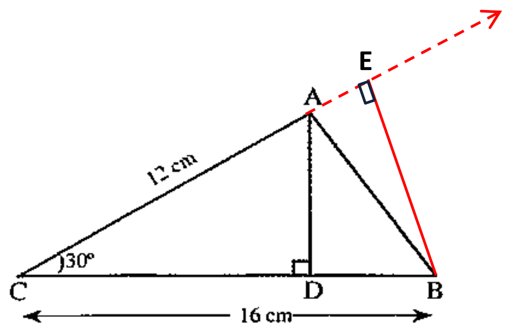


$\therefore AD = AC \times \sin 30° = 12 \times \frac{1}{2} = 6cm$

$\because$ The area of Δ ABC $= \frac{1}{2} \times AD \times BC$

$\therefore$ The area of Δ ABC $= \frac{1}{2} \times 6 \times 16 = 48\ cm^2$

In Δ ADC



$\because \overline{BE} \perp \overleftrightarrow{AC}$

$\therefore \Delta$ BEC is right angled at E

$\because m(\angle C) = 30°$, BC = 16 cm

$\therefore BE = \frac{1}{2} \times BC = 8$ cm

(4) Choose :-

1) C) 6   2) b (30)   3) $\frac{3x}{2} = 45° \Rightarrow x = 30°$

4) Zero   5) $\frac{x}{2} = 30 \longrightarrow x = 60°$ d) $\frac{\sqrt{3}}{2}$

6) $\because \sin B = \cos B$ $\therefore m(\angle B) = 45°$ $m(\angle C) = 50°$

(5) Find the value of the following:-

1) (cos 30° - cos 60°) (sin 30° + sin 60°)

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

2) $\frac{1}{4} \sin^2 45° \tan^2 60° - \frac{1}{3} \sin^2 60° \tan^2 30°$

$$= \frac{1}{4} \times \left(\frac{1}{\sqrt{2}}\right)^2 \times (\sqrt{3})^2 - \frac{1}{3} \times \left(\frac{\sqrt{3}}{2}\right)^2 \left(\frac{1}{\sqrt{3}}\right)^2$$

$$= \frac{1}{4} \times \frac{1}{2} \times 3 - \frac{1}{3} \times \frac{3}{4} \times \frac{1}{3} =$$

$$= \frac{3}{8} - \frac{1}{12} = \frac{7}{24}$$

3) Sin 45° cos 45° + sin 30° cos 60° - cos² 30°

$$\frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} + \frac{1}{2} \times \frac{1}{2} - (\frac{\sqrt{3}}{2})^2 = \frac{1}{2} + \frac{1}{4} - \frac{3}{4} = 0$$

4) $\frac{\sin 30\,° \cos 45° + \cos 30° \sin 45°}{\sin 45° \cos 60° + \cos 45° \sin 60°} = 1$

(6) Prove that:

1) $\cos 60° = 2 \cos^2 30° - 1$

$\cos 60° = \frac{1}{2}$

$2\cos^2 30° - 1 \quad = 2 \times (\frac{\sqrt{5}}{2})^2 - 1$

$= 2x\,\frac{3}{4} - 1 = \frac{3}{4} - 1 = \frac{1}{2}$

2) $\tan 60° (1 - \tan^2 30°) = 2 \tan 30°$

$\tan 60° (1 - \tan^2 30°) = \sqrt{3}\,(1 - \left(\frac{1}{\sqrt{3}}\right)^2)$

$2 \tan 30° = 2x\,\frac{1}{\sqrt{3}} = \frac{2}{3}\sqrt{3}$

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

3) $\tan^2 60° - \tan^2 45° = 4 \sin 30°$

$\tan^2 60° - \tan^2 45° = (\sqrt{3})^2 - (1)^2$

$= 3 - 1 = 2$

$4 \sin 30° = 4 \times \frac{1}{2} = 2$

4) $\tan 60° = \frac{2 \tan 30°}{1 - \tan^2 30°}$

$\tan 60° = \sqrt{3}$

$$\frac{2 \tan 30°}{1 - \tan^2 30°} = \frac{2x\,\frac{1}{\sqrt{3}}}{1 - \left(\frac{1}{\sqrt{3}}\right)^2} = \frac{\frac{2}{\sqrt{3}}}{1 - \frac{1}{3}}$$

$= \frac{2}{\sqrt{3}} \times \frac{3}{2} = \sqrt{3}$

5) $\dfrac{\tan^2 30° \tan 45° \tan^2 60° + \tan 30° \tan 60°}{\sin^2 60° - \tan 45° \sin 30°}$

$$\frac{\left[(\frac{1}{\sqrt{3}})^2 \text{ x } (1) \text{ x } (\sqrt{3})^2\right] + \left[\frac{1}{\sqrt{3}} \text{ x } \sqrt{x}\right]}{\left[\left(\frac{\sqrt{3}}{2}\right)^2 - (1 \text{ x } \frac{1}{2})\right]}$$

$$= \frac{1+1}{\left[\frac{3}{4} - \frac{1}{2}\right]} = \frac{2}{\frac{1}{4}} = 8$$

(7) Find the value of x in each of the following:-

1) x cos 30° = tan 60°

$$x = \frac{\tan 60°}{\cos 30°} = \frac{\sqrt{3}}{\sqrt{3/2}} = \sqrt{3} \text{ x } \frac{2}{\sqrt{3}} = 2$$

2) x $\sin^2$ 45° = $\tan^2$ 60°

$$x = \frac{\tan^2 60°}{\sin^2 45°} = \frac{(\sqrt{3})^2}{(\frac{\sqrt{2}}{2})^2} = 3 \div \frac{1}{2} = 3 \text{ x } 2 = 6$$

3) 4x = $\cos^2$30° $\tan^2$30° $\tan^2$45°

$$4x = (\frac{\sqrt{3}}{2})^2 (\frac{\sqrt{3}}{3})^2 (1)^2 = \frac{3}{4} \text{ x } \frac{3}{9} \text{ x } 1$$

$$4x = \frac{1}{4} \Rightarrow x = \frac{1}{8}$$

4) x sin 30° $\cos^2$45° = $\cos^2$30°

$$x = \frac{\cos^2 30°}{\sin 30° \cos^2 45°} = \frac{3}{4} \div \frac{1}{4} = \frac{3}{4} \text{ x } 4 = 3$$

5) x sin 45° cos 45° tan 60° = $\tan^2$45° - $\cos^2$60°

$$x = \frac{\tan^2 45 - \cos^2 60}{\sin 45° \cos 45° \tan 60°}$$

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

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

6) tan x = $\frac{\sin 30° \cos 45° + \sin 45° \cos 30°}{\sin 45° \cos 60° + \sin 45° \sin 60°}$

Tan x = $\frac{\frac{1}{2} \times \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} \times \frac{\sqrt{3}}{2}}{\frac{\sqrt{2}}{2} \times \frac{1}{2} + \frac{\sqrt{2}}{2} \times \frac{\sqrt{3}}{2}} = 1$

∴ x = 45°

(8) Find m (∠ θ) where θ is an acute angle:

1) $\sin^2 45° = \cos \theta \tan 30°$

Cos θ = $\frac{\sin^2 45}{\tan 30} = \frac{1}{2} \times \frac{3}{\sqrt{3}} = \frac{\sqrt{3}}{2}$

∴ θ = 30°

2) 2 sin θ = $\tan^2 60°$ - 2 tan 45°

2 sin θ = 3 – 2 = 1

Sin θ = $\frac{1}{2}$ $\Rightarrow \theta = 30°$

3) Sin θ = sin45° cos30° + cos45° sin30°

Sin θ = $\left(\frac{\sqrt{2}}{2} \times \frac{\sqrt{3}}{2}\right) + \left(\frac{\sqrt{2}}{2} \times \frac{1}{2}\right) = \frac{\sqrt{6} + \sqrt{2}}{4}$

θ = 75°

4) Sin θ $\sin^2 60°$ = $3\sin^2 45° \cos^2 45° \cos 60°$

Sin θ = $\frac{3\sin^2 45 \cos 45 \cos 60}{\sin^2} = \frac{3 \times \frac{1}{2} \times \frac{\sqrt{2}}{2} \times \frac{1}{2}}{\frac{3}{4}}$

Sin θ = $\frac{3\sqrt{2}}{8} \times \frac{4}{3} = \frac{\sqrt{2}}{2}$

θ = 45°

5) tan θ = 3 (sin 30° + cos 30°) – 4 ($\sin^3 60°$ + $\cos^3 60°$)

$\tan\theta = 3\left(\frac{1}{2} + \frac{\sqrt{3}}{2}\right) - 4\left(\left(\frac{\sqrt{3}}{2}\right)^3 + \left(\frac{1}{2}\right)^3\right)$

$\tan\theta = \frac{3+3\sqrt{3}}{2} - 4\left(\frac{3\sqrt{3}}{8} + \frac{1}{8}\right)$

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

tan θ = 1

θ = 45°

6) 3 $\tan^2\theta$ = 4 $\sin^2 30°$ + 8 $\cos^2 60°$

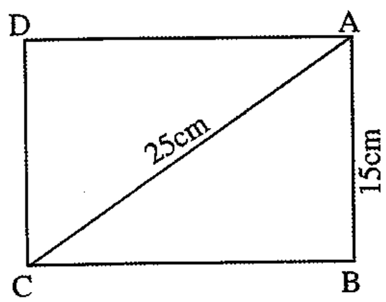
$3\tan^2\theta = 4 \times \frac{1}{4} + 8 \times \frac{1}{4} = 1 + 2 = 3$

$\text{Tan}^2\,\theta = \frac{3}{3} = 1$

Tan θ = 1

θ = 45 °

(9) In the opposite Figure:-



In Δ ABC

∵ m (∠B) = 90°

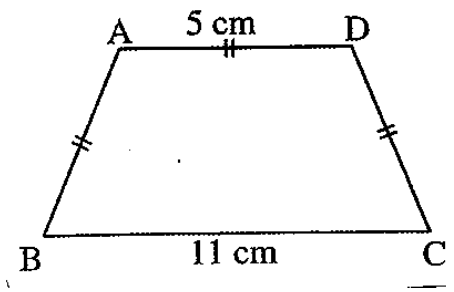
∴ sin (∠ACB) = $\frac{AB}{AC} = \frac{15}{25} = \frac{3}{5}$

M(∠ (ACB) = 38° 52' 12''

BC= $\sqrt{AC^2 - AB^2}$ = 20

Area of rectangle = L x W = 20 x 15 = 300cm^2

(10) In the opposite figure:-



Construction: Draw

$\overrightarrow{AE} \perp \overline{BC} . \overrightarrow{DF} \perp \overline{BC}$

∵ AD = AB = DC = 5cm

∴ EF = 5cm , BE + CF = 11 – 5 = 6 cm.

∴ BE = FC = 3cm.

In Δ AEB

∵ m (∠ AEB) = 90 ° , AB = 5cm , BE = 3cm.

∴ Cos ∠ (B) = $\frac{BE}{AB} = \frac{3}{5}$

∴ m ∠ (B) = 53° 7\ 48\\

$m(\angle BAE) =$ 180° - (90 + 53° 7\ 48\\) = 36° 52\ 12\\

AE = 4cm "Pythagoras"

Area of trapezium = $\frac{B_1 + B_2}{2}$ x 17

= $\frac{5+11}{2}$ x 4 = 8 x 4 = 32 cm^2

Third geometry

1) Complete each of the following;-

1) $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} =$

$= \sqrt{(9-4)^2 + (0-0)^2} = \sqrt{25} = 5$ length unit.

2) D = $\sqrt{(0-0)^2 + (-11+5)^2} = \sqrt{36} = 6$ length unit.

3) D = $\sqrt{(4-0)^2 + (-3-0)^2} = \sqrt{16+9} = 5$ length unit.

4) D = $\sqrt{(5-0)^2 + (0+12)^2} = \sqrt{25+144} = 13$ length unit.

5) r = $\sqrt{(8-4)^2+(5-2)^2} = \sqrt{16+9} = \sqrt{25}$ = 5 length unit.

∴ Diameter = 2r = 10 length unit.

6) D = $\sqrt{(a-0)^2+(0-1)^2} = 1$

$\sqrt{a^2+1} = 1$

$a^2 + 1 = 1^2 = 1$

$a^2 = 1 - 1 = 0 \Rightarrow a = 0$

7) |– 4| = 4 length unit.

8) AB = $\sqrt{(2+1)^2+(-5+1)^2} = \sqrt{9+16}$

AB = $\sqrt{25} = 5$ length unit.

P.of square = side length x 4 = 4 x 5 = 20 length unit.

area = $S^2 = 5^2$ = 25 squared length unit.

<u>2) Answer the following questions:-</u>

1) a) MN = $\sqrt{(5-2)^2+(3+1)^2} = \sqrt{9+16} = 5$ length unit.

b) MN = $\sqrt{(5+3)^2+(1+5)^2} = \sqrt{64+36} = 10$ length unit.

c) MN = $\sqrt{(2-7)^2+(4+8)^2} = \sqrt{25+144} = 13$ length unit.

d) MN = $\sqrt{(7+0)^2+(-3-4)^2} = \sqrt{49+49} = \sqrt{98} = 7\sqrt{2}$

2) D= $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

MA = $\sqrt{(-1-3)^2+(2+1)^2} = \sqrt{16+9} = 5$ length unit.

MB = $\sqrt{(-1+4)^2+(2+2)^2} = \sqrt{9+16} = 5$ length unit.

MC = $\sqrt{(-1-2)^2+(2+2)^2} = \sqrt{9+16}$ = 5 length unit.

∵ MA = MB = MC = r

∴ A , B, and C lie on the circle M

….. = 2π r = 2 x 3.14 x 5 = 31.4 length unit.

3) D = $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

$(5)^2 = (\sqrt{(a+2)^2+(7-3)^2})^2$

$25 = (a+2)^2 + 16$

$(a+2)^2 = 25 - 16 = 9$

$\sqrt{(a+2)^2} = \pm\sqrt{9}$

$a + 2 = \pm 3$

a + 2 = 3 or a + 2 = -3

a = 1 or a = -5

(b) 13 = $\sqrt{(3a-1-a)^2+(-5-7)^2}$

$(13)^2 = (\sqrt{(2a-1)^2+144})^2$

$169 = (2a-1)^2 + 144$

$(2a-1)^2 = 169 - 144 = 25$

$\sqrt{(2a-1)^2}\ \pm\sqrt{25}$

$2a - 1 = \pm 5$

∴ 2a – 1 = 5 or 2a – 1 = -5

2a = 6 → a = 3 or 2a = -4 → a = -2

4) ∵ AB = BC

$\therefore \sqrt{(x-\ 3)^2\ +\ (3-2)^2}\ =\ \sqrt{(3-5)^2+\ (2-1\,)^2}$

$(\sqrt{(x-\ 3)^2+1}\ )^2\ = \sqrt{4+1} = (\sqrt{5})^2$

$(x - 3)^2 + 1 = 5$

$(x - 3)^2 = 4$

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

X – 3 = $\pm$ 2

X – 3 = 2 or x3 = -2

X = 5 or x = 1

5) D= $\sqrt{(x_2-\ x_1)^2+\ (y_2-\ y_1)^2}$

$2\sqrt{5} = \sqrt{(x-6)^2+\ (5-1)^2}$

$(2\sqrt{5}\ )^2 = \sqrt{(x-6)^2+\ 16}\ )^2$

$20 = (\ x - 6)^2 + 16$

$(x - 6)^2 = 20 - 16 = 4$

$\sqrt{(x-6)^2}\ =\ \pm\sqrt{4}$

x – 6 = $\pm$ 2

x – 6 = 2 or x – 6 = -2

x = 8 or x = 4

6) AB = $\sqrt{(3+2)^2 + (-1-4)^2} = \sqrt{25+25} = \sqrt{50}$

BC = $\sqrt{(4-3)^2 + (5+1)^2} = \sqrt{1+36} = \sqrt{37}$

AC = $\sqrt{(4+2)^2 + (5-4)^2} = \sqrt{36+1} = \sqrt{37}$

$\because$ AC = BC = $\sqrt{37}$

$\therefore$ Δ ABC is an isosceles Δ

7) AB = $\sqrt{(5+1)^2 + (-5-7)^2} = \sqrt{36+144} = 6\sqrt{5}$

BC = $\sqrt{(15+1)^2 + (15-7)^2} = \sqrt{256+64} = \sqrt{37}$

BC = $8\sqrt{5}$

CA = $\sqrt{(15-5)^2 + (15+5)^2} =$

$= \sqrt{100 + 400} = 10\sqrt{5}$

$AC^2 = (10\sqrt{5})^2 = 500$

$AB^2 + BC^2 = 180 + 320 = 500$

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

$\therefore$ ABC is right-angled Δ at B

8) A (5 , 3) , B (6 , -2) , C (1 , -1) , D (0 , 4)

AB = $\sqrt{(6-5)^2+(-2-3)^2}=\sqrt{1+25}=\sqrt{26}$

BC = $\sqrt{(6-1)^2+(-2+1)^2}=\sqrt{25+1}=\sqrt{26}$

CD = $\sqrt{(1-0)^2+(-1-4)^2}=\sqrt{1+25}=\sqrt{26}$

DA = $\sqrt{(5-0)^2+(3-4)^2}=\sqrt{25+1}=\sqrt{26}$

$\because$ AB = BC = CD = DA.

$\therefore$ A, B, C, and D are vertices of numbers.

AC = $\sqrt{(5-1)^2+(3+1)^2}=\sqrt{16+16}=\sqrt{32}$

BD = $\sqrt{(6-0)^2+(-2-4)^2}=\sqrt{36+36}=\sqrt{72}$

Area of the rhombus = $\frac{1}{2}$ x d_1 x d_2

= $\frac{1}{2}$ x $\sqrt{32}$ x $\sqrt{72}$ = 24 (u.l. $)^2$