Unit 7

Ex 7.1

Q1 i) $(-2, 1)$ and $(1, 5)$

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

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

$d = \sqrt{(1+2)^2 + (4)^2}$

$d = \sqrt{9 + 16}$

$d = \sqrt{25}$

$\boxed{d = 5}$

ii) $(-1, 1)\ (7, 9)$

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

$d = \sqrt{(7+1)^2 + (9-1)^2}$

$d = \sqrt{(6)^2 + (8)^2}$

$d = \sqrt{36 + 64}$

$d = \sqrt{100}$

$\boxed{d = 10}$

iii) $(0, -5)\ (-2, 1)$

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

$d = \sqrt{(-2-0)^2 + (1+5)^2}$

$d = \sqrt{(-2)^2 + (6)^2}$

$d = \sqrt{4 + 36}$

$d = \sqrt{40}$

$\boxed{d = 2\sqrt{10}}$

iv) $(0, -5)\ (10, 5)$

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

$d = \sqrt{(10-0)^2 + (5+5)^2}$

$d = \sqrt{(10)^2 + (10)^2}$

$d = \sqrt{100 + 100}$

$d = \sqrt{200}$

$\boxed{d = 10\sqrt{2}}$

v) $(4,-1)\ (2,0)$

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

$d=\sqrt{(2-4)^2+(0+1)^2}$

$d=\sqrt{(-2)^2+(1)^2}$

$d=\sqrt{4+1}$

$\boxed{d=\sqrt{5}}$

vi) $(-3,1)\ (-2,-3)$

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

$d=\sqrt{(-2+3)^2+(-3-1)^2}$

$d=\sqrt{(1)^2+(-4)^2}$

$d=\sqrt{1+16}$

$\boxed{d=\sqrt{17}}$

vii) $\left(\frac{1}{2},2\right)(-2,1)$

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

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

$d=\sqrt{\left(-\frac{5}{2}\right)^2+(-1)^2}$

$d=\sqrt{\frac{25}{4}+1}$

$\boxed{d=\sqrt{\frac{29}{4}}}$

viii) $\left(\frac{7}{2},11\right)\left(13,\frac{17}{2}\right)$

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

$d=\sqrt{\left(13-\frac{7}{2}\right)^2+\left(\frac{17}{2}-11\right)^2}$

$d=\sqrt{\left(\frac{19}{2}\right)^2+\left(-\frac{5}{2}\right)^2}$

$d=\sqrt{\frac{361}{4}+\frac{25}{4}}$

$\boxed{d=\sqrt{\frac{193}{2}}}$

xi) $\left(-\frac{9}{4},-\frac{7}{3}\right)\left(-\frac{3}{2},-\frac{5}{4}\right)$

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

$d=\sqrt{\left(-\frac{3}{2}+\frac{9}{4}\right)^2+\left(-\frac{5}{4}+\frac{7}{3}\right)^2}$

$d=\sqrt{\left(\frac{3}{4}\right)^2+\left(\frac{13}{12}\right)^2}$

$d=\sqrt{\frac{9}{16}+\frac{169}{144}}$

$d=\sqrt{\frac{250}{144}}$

$\boxed{d=\sqrt{\frac{125}{72}}}$

x) $\left(\frac{5}{2},\frac{21}{4}\right)(5,-1)$

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

$d=\sqrt{\left(5-\frac{5}{2}\right)^2+\left(-1-\frac{21}{4}\right)^2}$

$d=\sqrt{\left(\frac{5}{2}\right)^2+\left(-\frac{25}{4}\right)^2}$

$d=\sqrt{\frac{25}{4}+\frac{625}{16}}$

$d=\sqrt{\frac{100+625}{16}}$

$d=\sqrt{\frac{725}{16}}$

$d=\frac{5\sqrt{29}}{4}$ $\boxed{d=\frac{5\sqrt{29}}{4}}$

Q2 i) let $A(0,1)$, $B(2,3)$ $C(3,4)$

$AB = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$AB = \sqrt{(2-0)^2+(3-1)^2}$
$AB = \sqrt{(2)^2+(2)^2}$
$AB = \sqrt{4+4}$
$AB = \sqrt{8}$
$AB = 2\sqrt{2}$ —— (i)

$BC = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$BC = \sqrt{(3-2)^2+(4-3)^2}$
$BC = \sqrt{(1)^2+(1)^2}$
$BC = \sqrt{1+1}$
$BC = \sqrt{2}$
$BC = \sqrt{2} \longrightarrow$ (ii)

$AC = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$AC = \sqrt{(3-0)^2+(4-1)^2}$
$AC = \sqrt{(3)^2+(3)^2}$
$AC = \sqrt{9+9}$
$AC = \sqrt{18}$
$AC = \cancel{9\sqrt{2}}\ 3\sqrt{2} \longrightarrow$ (iii)

From eq (i) (ii) and (iii)

$AC = AB + BC$
$3\sqrt{2} = 2\sqrt{2} + \sqrt{2}$
$\boxed{3\sqrt{2} = 3\sqrt{2}}$

ii) $(-5,-4), (1,0), (6,7)$

Let $A(-5,-4), B(1,0), C(6,7)$

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

$AB = \sqrt{(1+5)^2+(0+4)^2}$

$AB = \sqrt{(6)^2+(4)^2}$

$AB = \sqrt{36+16}$

$AB = \sqrt{52}$ —— (i)

$AB = 2\sqrt{13}$

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

$BC = \sqrt{(6-1)^2+(7-0)^2}$

$BC = \sqrt{(5)^2+(7)^2}$

$BC = \sqrt{25+49}$

$BC = \sqrt{74}$ —— (ii)

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

$AC = \sqrt{(6+5)^2+(7+4)^2}$

$AC = \sqrt{(11)^2+(11)^2}$

$AC = \sqrt{121+121}$

$AC = \sqrt{242}$

$AC = 11\sqrt{2}$ —— (iii)

from 1, 2, 3 eq

$AC = AB + BC$

$\sqrt{242} = \sqrt{52} + \sqrt{74}$

~~15.55 = 8.60 + 7.07~~

$15.55 = 7.07 + 8.60$

$15.55 \neq 15.67$

Hence given pionts are not collinear.

iii) $A(0,-5), B(3,7), C(5,15)$

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

$AB = \sqrt{(3-0)^2+(7+5)^2}$

$AB = \sqrt{(3)^2+(12)^2}$

$AB = \sqrt{9+144}$

$AB = \sqrt{153}$

$AB = 3\sqrt{17}$ —— (i)

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

$BC = \sqrt{(5-3)^2+(15-7)^2}$

$BC = \sqrt{(2)^2+(8)^2}$

$BC = \sqrt{4+64}$

$BC = \sqrt{68}$

$BC = 2\sqrt{17}$ —— (ii)

$A(0,-5)\ C(5,15)$

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

$AC = \sqrt{(5-0)^2+(15+5)^2}$

$AC = \sqrt{(5)^2+(20)^2}$

$AC = \sqrt{25+400}$

$AC = \sqrt{425}$

$AC = 5\sqrt{17}$ —— (iii)

from eq (i) (ii) and (iii)

$AC = AB + BC$

$5\sqrt{17} = 2\sqrt{17} + 3\sqrt{17}$

$5\sqrt{17} = 5\sqrt{17}$

Hence prove that given points are collinear.

$B(14,7)\ C(-6,-3)$

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

$BC = \sqrt{(-6-14)^2+(-3-7)^2}$

$BC = \sqrt{(-20)^2+(-10)^2}$

$BC = \sqrt{400+100}$

$BC = \sqrt{500}$

$BC = 10\sqrt{5}$ —— (ii)

$A(6,3)\ C(-6,-3)$

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

$AC = \sqrt{(-6-6)^2+(-3-3)^2}$

$AC = \sqrt{(-12)^2+(-6)^2}$

$AC = \sqrt{144+36}$

$AC = \sqrt{180}$

$AC = 6\sqrt{5}$ —— (iii)

iv) $A(6,3)\ B(14,7)\ C(-6,-3)$

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

$AB = \sqrt{(14-6)^2+(7-3)^2}$

$AB = \sqrt{(8)^2+(4)^2}$

$AB = \sqrt{64+16}$

$AB = \sqrt{80}$

$AB = 4\sqrt{5}$ —— (i)

from eq (i) (ii) and (iii)

$BC = AB + AC$

$10\sqrt{5} = 4\sqrt{5} + 6\sqrt{5}$

$10\sqrt{5} = 10\sqrt{5}$

Hence prove that given points are collinear.

v) A(0, 15) B(2, 9) C(7, -6)

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

$AB = \sqrt{(2-0)^2+(9-15)^2}$

$AB = \sqrt{(2)^2+(-6)^2}$

$AB = \sqrt{4+36}$

$AB = \sqrt{40}$

$AB = 2\sqrt{10}$ —— (i)

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

$BC = \sqrt{(7-2)^2+(-6-9)^2}$

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

$BC = \sqrt{25+225}$

$BC = \sqrt{250}$

$BC = 5\sqrt{10}$ —— (ii)

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

$AC = \sqrt{(7-0)^2+(-6-15)^2}$

$AC = \sqrt{(7)^2+(-21)^2}$

$AC = \sqrt{49+441}$

$AC = \sqrt{490}$

$AC = 7\sqrt{10}$ —— (iii)

from eq (i)(ii) and (iii)

$AC = AB + BC$

$7\sqrt{10} = 2\sqrt{10} + 5\sqrt{10}$

$7\sqrt{10} = 7\sqrt{10}$

Hence prove that given point are collinear.

vi) A(1, -2) B(7, 8) C(-2, -7)

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

$AB = \sqrt{(7-1)^2+(8+2)^2}$

$AB = \sqrt{(6)^2+(10)^2}$

$AB = \sqrt{36+100}$

$AB = \sqrt{136}$

$AB = 2\sqrt{34}$ —— (i)

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

$BC = \sqrt{(-2-7)^2+(-7-8)^2}$

$BC = \sqrt{(-9)^2+(-15)^2}$

$BC = \sqrt{81+225}$

$BC = \sqrt{306}$

$BC = 3\sqrt{34}$ —— (ii)

~~C(-2~~ $A(1,-2)\ C(-2,-7)$

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

$AC=\sqrt{(-2-1)^2+(-7+2)^2}$

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

$AC=\sqrt{9+25}$

$AC=\sqrt{34}$ ---- (iii)

From eq(i)(ii) and(iii)

$BC=AB+AC$

$3\sqrt{34}=2\sqrt{34}+1\sqrt{34}$

$\boxed{3\sqrt{34}=3\sqrt{34}}$

Hence prove that given points are collinear.

Q3

a) If three sides of tirangle is equal ~~so~~ is called equilateral tirangle

b) If two sides of tirangle are equal and third is small and big so it is called Isosceles.

c) The ~~sum~~ small two sides sum of square is equal to one side sum of square is called right triangle. $\boxed{c^2=a^2+b^2}$

d) If all the sides of tirangle are oppsite to each other it is called scalene tirangle.

Q i) $A(2,3)\ B(5,3)$ and $C(2,1)$

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

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

$AB=\sqrt{(3)^2+(0)^2}$

$AB=\sqrt{9+0}$

$AB=\sqrt{9}$ ---- (i)

$AB=3$

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

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

$BC=\sqrt{(-3)^2+(-2)^2}$

$BC=\sqrt{9+4}$

$BC=\sqrt{13}$ ---- (ii)

$A(2,3)\,(2,1)$

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

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

$AC = \sqrt{(0)^2+(-2)^2}$

$AC = \sqrt{0+4}$

$AC = \sqrt{4}$ —— (iii)

From eq (i)(ii)(iii)

$c^2 = a^2+b^2$

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

$(\sqrt{13})^2 = (\sqrt{9})^2+(\sqrt{4})^2$

$13 = 9+4$

$\boxed{13 = 13}$

Give vertices are a rigth tirangle.

$P = \sqrt{9}+\sqrt{4}+\sqrt{13}$

$P = 3+2+\sqrt{13}$

$\boxed{P = 5+\sqrt{13} \text{ units}}$

ii) $A(0,0)\,B(1,\sqrt{3})\,C(2,0)$

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

$AB = \sqrt{(1-0)^2+(\sqrt{3}-0)^2}$

$AB = \sqrt{(1)^2+(\sqrt{3})^2}$

$AB = \sqrt{1+3}$

$AB = \sqrt{4}$ —— (i)

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

$BC = \sqrt{(2-1)^2+(0-\sqrt{3})^2}$

$BC = \sqrt{(1)^2+(-\sqrt{3})^2}$

$BC = \sqrt{1+3}$

$BC = \sqrt{4}$ —— (ii)

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

$AC = \sqrt{(2-0)^2+(0-0)^2}$

$AC = \sqrt{(2)^2+(0)^2}$

$AC = \sqrt{4+0}$

$AC = \sqrt{4}$

from eq (i) (ii) and (iii) given vertices are equilateral tirangle.

$P = AB+BC+AC$

$P = 2+2+2 = \boxed{6}$ units.

iii) let

A(0, 1) B(8, 4) C(0, 8)

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

$AB = \sqrt{(8-0)^2+(4-1)^2}$

$AB = \sqrt{(8)^2+(3)^2}$

$AB = \sqrt{64+9}$

$AB = \sqrt{73}$ —— (i)

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

$BC = \sqrt{(0-8)^2+(8-4)^2}$

$BC = \sqrt{(-8)^2+(4)^2}$

$BC = \sqrt{64+16}$

$BC = \sqrt{80}$

$BC = 4\sqrt{5}$ —— (ii)

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

$AC = \sqrt{(0-0)^2+(8-1)^2}$

$AC = \sqrt{(0)^2+(7)^2}$

$AC = \sqrt{0+49}$

$AC = \sqrt{49}$

$AB \neq BC \neq AC$

given vetices are scalene tirangle.

$P = \sqrt{73} + \sqrt{80} + \sqrt{49}$

$P = 24.49$ unit.

let

A(-3, -5), B(3, -3) C(0, 6)

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

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

$AB = \sqrt{(6)^2+(2)^2}$

$AB = \sqrt{36+4}$

$AB = \sqrt{40}$

$AB = 2\sqrt{10}$ —— (i)

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

$BC = \sqrt{(0-3)^2+(6+3)^2}$

$BC = \sqrt{(-3)^2+(9)^2}$

$BC = \sqrt{9+81}$

$BC = \sqrt{90}$

$BC = 3\sqrt{10}$ —— (ii)

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

$AC = \sqrt{(0+3)^2+(6+5)^2}$

$AC = \sqrt{(3)^2+(11)^2}$

$AC = \sqrt{9+121}$

$AC = \sqrt{130}$ —— (iii)

From eq(i) (ii) and (iii)

$c^2 = a^2 + b^2$

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

$(\sqrt{130})^2 = (\sqrt{90})^2 + (\sqrt{40})^2$

$130 = 90 + 40$

$\boxed{130 = 130}$

$P = \sqrt{90} + \sqrt{40} + \sqrt{130}$

$P = 27.21$ units.

v) $A(-1,-1)$ $B(-1,5)$ $C(4,2)$

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

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

$AB = \sqrt{(0)^2 + (6)^2}$

$AB = \sqrt{0 + 36}$

$AB = \sqrt{36}$ —— (i)

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

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

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

$BC = \sqrt{25 + 9}$

$BC = \sqrt{34}$ —— (ii)

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

$AC = \sqrt{(4+1)^2 + (2+1)^2}$

$AC = \sqrt{(5)^2 + (3)^2}$

$AC = \sqrt{25 + 9}$

$AC = \sqrt{34}$ —— (iii)

From eq(i)(ii) and (iii)

$BC = AC \neq AB$

$\sqrt{34} = \sqrt{34} \neq \sqrt{36}$ so vertices are Isosceles triangle.

$P = \sqrt{34} + \sqrt{34} + \sqrt{36}$

~~P = 17.661 units~~

$P = 6 + 2\sqrt{34}$ units.

Let

vi) $A(1,2)$ $B(7,2)$ $C(7,8)$

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

$AB = \sqrt{(7-1)^2 + (2-2)^2}$

$AB = \sqrt{(6)^2 + (0)^2}$

$AB = \sqrt{36 + 0}$

$AB = \sqrt{36}$ —— (i)

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

$BC = \sqrt{(7-7)^2+(8-2)^2}$

$BC = \sqrt{(0)^2+(6)^2}$

$BC = \sqrt{0+36}$

$BC = \sqrt{36}$ —— (ii)

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

$AC = \sqrt{(7-1)^2+(8-2)^2}$

$AC = \sqrt{(6)^2+(6)^2}$

$AC = \sqrt{36+36}$

$AC = \sqrt{72}$ —— (iii)

From eq (i) (ii) and (iii)

$c^2 = a^2+b^2$

$(AC)^2 = (Ab)^2+(BC)^2$

$(\sqrt{72})^2 = (\sqrt{36})^2+(\sqrt{36})^2$

$72 = 36+36$

$\boxed{72 = 72}$

Given vertices are right triangle

$P = \sqrt{36}+\sqrt{36}+\sqrt{72}$

$\boxed{P = 12+6\sqrt{2}}$

Q4

$A(-4,2)\ B(1,4)\ C(3,-1)\ D(-2,-3)$

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

$AB = \sqrt{(1+4)^2+(4-2)^2}$

$AB = \sqrt{(5)^2+(2)^2}$

$AB = \sqrt{25+4}$

$AB = \sqrt{29}$ —— (i)

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

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

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

$BC = \sqrt{4+25}$

$BC = \sqrt{29}$ —— (ii)

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

$CD = \sqrt{(-2-3)^2+(-3+1)^2}$

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

$CD = \sqrt{25+4}$

$CD = \sqrt{29}$ —— (iii)

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

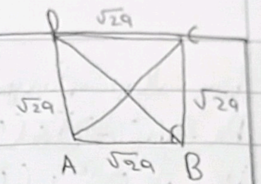
$AD = \sqrt{(-2+4)^2+(-3-2)^2}$

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

$AD = \sqrt{4+25}$

$AD = \sqrt{29}$ —— (vi)

from eq (i) (ii) (iii) and (iv) Show that
$AB = BC = CD = AD = \sqrt{29}$



$AC = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
$AC = \sqrt{(3+4)^2 + (-1-2)^2}$
$AC = \sqrt{(7)^2 + (-3)^2}$
$AC = \sqrt{49 + 9}$
$AC = \sqrt{58}$

$c^2 = a^2 + b^2$
$(AC)^2 = (AB)^2 + (BC)^2$
$(\sqrt{58})^2 = (\sqrt{29})^2 + (\sqrt{29})^2$
$(58) = 29 + 29$
$\boxed{58 = 58}$

Hence prove that the angle is 90° and give vertices are a square.

Q5 $A(-4,-1)$ $B(0,-2)$ $C(6,1)$ and $D(2,2)$

$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
$AB = \sqrt{(0+4)^2 + (-2+1)^2}$
$AB = \sqrt{(4)^2 + (-1)^2}$
$AB = \sqrt{16 + 1}$
$AB = \sqrt{17}$ —— (i)

$CD = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
$CD = \sqrt{(2-6)^2 + (2-1)^2}$
$CD = \sqrt{(-4)^2 + (1)^2}$
$CD = \sqrt{16 + 1}$
$CD = \sqrt{17}$ —— (iii)

$BC = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
$BC = \sqrt{(6-0)^2 + (1+2)^2}$
$BC = \sqrt{(6)^2 + (3)^2}$
$BC = \sqrt{36 + 9}$
$BC = \sqrt{45}$ —— (ii)

$DA = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
$DA = \sqrt{(-4-2)^2 + (-1-2)^2}$
$DA = \sqrt{(-6)^2 + (-3)^2}$
$DA = \sqrt{36 + 9}$
$DA = \sqrt{45}$ —— (iv)

From eq (i)(ii)(iii) and (iv) it shown that ~~the given~~ ~~vert~~ $AB = CD = \sqrt{17}$ and $BC = DA = \sqrt{45}$ the given vertices are of ~~pallelogram~~ parallelogram

Q6 $A(1,2)$ $B(7,2)$, $C(7,8)$ and $D(1,8)$

$AB = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$AB = \sqrt{(7-1)^2+(2-2)^2}$
$AB = \sqrt{(6)^2+(0)^2}$
$AB = \sqrt{36+0}$
$AB = \sqrt{36}$ —— (i)

$BC = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$BC = \sqrt{(7-7)^2+(8-2)^2}$
$BC = \sqrt{(0)^2+(6)^2}$
$BC = \sqrt{0+36}$
$BC = \sqrt{36}$ —— (ii)

$CD = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$CD = \sqrt{(1-7)^2+(8-8)^2}$
$CD = \sqrt{(6)^2+(0)^2}$
$CD = \sqrt{36+0}$
$CD = \sqrt{36}$

$DA = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$DA = \sqrt{(1-1)^2+(2-8)^2}$
$DA = \sqrt{(0)^2+(-6)^2}$
$DA = \sqrt{0+36}$
$DA = \sqrt{36}$ —— (iv)

For Diagnal AC

$AC = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$AC = \sqrt{(7-1)^2+(8-2)^2}$
$AC = \sqrt{(6)^2+(6)^2}$
$AC = \sqrt{36+36}$
$AC = \sqrt{72}$ —— (v)

Now For Diagnal BD

$BD = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$BD = \sqrt{(1-7)^2+(8-2)^2}$
$BD = \sqrt{(-6)^2+(6)^2}$
$BD = \sqrt{36+36}$
$BD = \sqrt{72}$ —— (vi)

From eq (v) and (vi) it shown that diagnals $AC = BD = \sqrt{72}$ and From eq (i)(ii)(iii) and (iv) it show that given vertices are not rectangle but ~~it is a~~ this is square.

Q7 A(4, 2) B(7, 2) C(7, 5) D(4, 5)

$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
$AB = \sqrt{(7-4)^2 + (2-2)^2}$
$AB = \sqrt{(3)^2 + (0)^2}$
$AB = \sqrt{9 + 0}$
$AB = \sqrt{9}$ —— (i)

$BC = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
$BC = \sqrt{(7-7)^2 + (5-2)^2}$
$BC = \sqrt{(0)^2 + (3)^2}$
$BC = \sqrt{0 + 9}$
$BC = \sqrt{9}$ —— (ii)

$CD = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
$CD = \sqrt{(4-7)^2 + (5-5)^2}$
$CD = \sqrt{(-3)^2 + (0)^2}$
$CD = \sqrt{9 + 0}$
$CD = \sqrt{9}$ —— (iii)

$DA = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
$DA = \sqrt{(4-4)^2 + (2-5)^2}$
$DA = \sqrt{(0)^2 + (-3)^2}$
$DA = \sqrt{0 + 9}$
$DA = \sqrt{9}$ —— (iv)

Now find diagnals AC and BD

$AC = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
$AC = \sqrt{(7-4)^2 + (5-2)^2}$
$AC = \sqrt{(3)^2 + (3)^2}$
$AC = \sqrt{9 + 9}$
$AC = \sqrt{18}$ —— (v)

$BD = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
$BD = \sqrt{(4-7)^2 + (5-2)^2}$
$BD = \sqrt{(-3)^2 + (3)^2}$
$BD = \sqrt{9 + 9}$
$BD = \sqrt{18}$ —— (vi)

From eq (i) (ii) (iii) and (iv) $AB = BC = CD = DA = \sqrt{9}$
and From eq (v) and (vi) $AC = BD = \sqrt{18}$ it shown that both diagnals are equal. so given vertice are of square.

Q 8 $A(-6,2)$ $B(1,2)$ $C(1,5)$ $D(-6,5)$

$AB = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$AB = \sqrt{(1+6)^2+(2-2)^2}$
$AB = \sqrt{(7)^2+(0)^2}$
$AB = \sqrt{49+0}$
$AB = \sqrt{49}$ —— (i)
$AB = 7$

$BC = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$BC = \sqrt{(1-1)^2+(5-2)^2}$
$BC = \sqrt{(0)^2+(3)^2}$
$BC = \sqrt{0+9}$
$BC = \sqrt{9}$
$BC = 3$ —— (ii)

$CD = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$CD = \sqrt{(-6-1)^2+(5-5)^2}$
$CD = \sqrt{(-7)^2+(0)^2}$
$CD = \sqrt{49+0}$
$CD = \sqrt{49}$
$CD = 7$ —— (iii)

$DA = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$DA = \sqrt{(-6+6)^2+(5-2)^2}$
$DA = \sqrt{(0)^2+(3)^2}$
$DA = \sqrt{0+9}$
$DA = \sqrt{9}$
$DA = 3$ —— (iv)

From eq (i) (ii) (iii) and (iv) it shown that $AB = CD = 7$
$BC = DA = 3$ oppsite sides are equal

Diognals = AC
$AC = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$AC = \sqrt{(1+6)^2+(5-2)^2}$
$AC = \sqrt{(7)^2+(3)^2}$
$AC = \sqrt{49+9}$
$AC = \sqrt{58}$

Now we use

$H^2 = AB^2 + P^2$

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

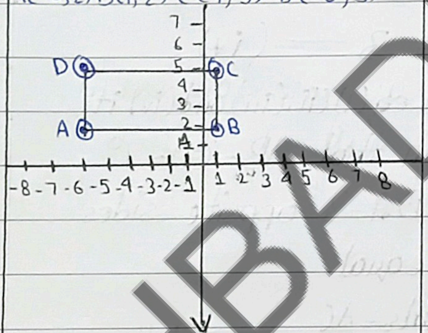
$(\sqrt{58})^2 = (\sqrt{7})^2 + (3)^2$

$58 = 49 + 9$

$58 = 58$

So given points are ~~given~~ the vertices of a Rectangle and angle are right angle.

A(-6,2) B(1,2) C(1,5) D(-6,5)



Q9 A(-3,0) B(3,0) C(6,4) D(0,4)

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

$AB = \sqrt{(3+3)^2 + (0-0)^2}$

$AB = \sqrt{(6)^2 + (0)^2}$

$AB = \sqrt{36+0}$

$AB = \sqrt{36}$

$AB = 6$ —— (i)

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

$BC = \sqrt{(6-3)^2 + (4-0)^2}$

$BC = \sqrt{(3)^2 + (4)^2}$

$BC = \sqrt{9+16}$

$BC = \sqrt{25}$

$BC = 5$ —— (ii)

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

$CD = \sqrt{(0-6)^2 + (4-4)^2}$

$CD = \sqrt{(-6)^2 + (0)^2}$

$CD = \sqrt{36+0}$

$CD = \sqrt{36}$

$CD = 6$ —— (iii)

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

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

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

$DA = \sqrt{9+16}$

$DA = \sqrt{25}$

$DA = 5$ —— (iv)

From eq(i)(ii)(iii) and (iv) $AB = CD = 6$, $BC = DA = 5$
Hence given vertices are oppsite ~~are~~ so this is parallelogram

Q10 $A(2,-1)$ $B(8,-1)$ $C(8,3)$ $D(2,3)$

$AB = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$AB = \sqrt{(8-2)^2+(-1+1)^2}$
$AB = \sqrt{(6)^2+(0)^2}$
$AB = \sqrt{36+0}$
$AB = \sqrt{36}$
$AB = 6$ —— (i)

$BC = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$BC = \sqrt{(8-8)^2+(3+1)^2}$
$BC = \sqrt{(0)^2+(4)^2}$
$BC = \sqrt{0+16}$
$BC = \sqrt{16}$
$BC = 4$ —— (ii)

$CD = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$CD = \sqrt{(2-8)^2+(3-3)^2}$
$CD = \sqrt{(6)^2+(0)^2}$
$CD = \sqrt{36+0}$
$CD = \sqrt{36}$
$CD = 6$ —— (iii)

$DA = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$DA = \sqrt{(2-2)^2+(-1-3)^2}$
$DA = \sqrt{(0)^2+(-4)^2}$
$DA = \sqrt{0+16}$
$DA = \sqrt{16}$
$DA = 4$ —— (iv)

From eq(i)(ii)(iii) and (iv) it shown that $AB = CD = 6$
$BC = DA = 4$

Now check angles

$AC = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$AC = \sqrt{(8-2)^2+(3+1)^2}$
$AC = \sqrt{(6)^2+(4)^2}$
$AC = \sqrt{36+16}$
$AC = \sqrt{52}$

Now we use

$H^2 = B^2 + P^2$

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

$(\sqrt{52})^2 = (6)^2 + (4)$

$52 = 36 + 16$

$52 = 52$

it is the right tirangle

In ΔABD $B(8,1)$ $D(2,3)$

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

$BD = \sqrt{(2-8)^2 + (3-(-1))^2}$

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

$BD = \sqrt{36 + 16}$

$BD = \sqrt{52}$

Now we use

$H^2 = B^2 + P^2$

$(BD)^2 = (AB)^2 + (DA)^2$

$(\sqrt{52})^2 = (6)^2 + (4)^2$

$52 = 36 + 16$

$52 = 52$

So Hence proved that

Δ ABD is a right tirangle.