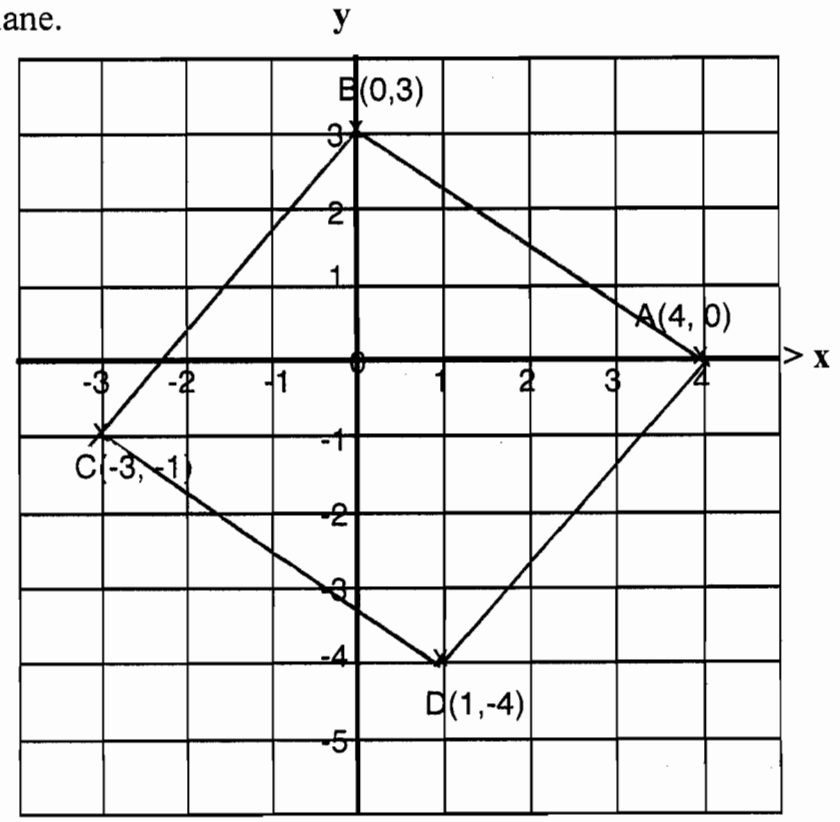
Square

T1

Four points, **A(4, 0), B(0, 3), C(-3, -1), and D(1, 4)** are drawn on the x/y co-ordinate plane.



1. Find the length of the line AB.

5 units

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

$= \sqrt{(4)^2+(-3)^2} = \sqrt{16+9}$

$= \sqrt{25}$

$= 5$ units

2. Find the slope of the line AB.

$-\frac{3}{4}$

$m = \frac{y_2-y_1}{x_2-x_1} = \frac{3-0}{0-4}$

$m = \frac{3}{-4} = -\frac{3}{4}$

3. Join the sides of the quadrilateral ABCD. Prove that ABCD is a square.

length of $\overline{AD} = \sqrt{(0+4)^2+(4-1)^2} = \sqrt{4^2+3^2} = \sqrt{16+9} = \sqrt{25} = 5$ units

length of $\overline{DC} = \sqrt{(1+3)^2+(-4+1)^2} = \sqrt{4^2+3^2} = \sqrt{16+9} = \sqrt{25} = 5$ units

length of $\overline{CB} = \sqrt{(-3-0)^2+(-1-3)^2} = \sqrt{3^2+4^2} = \sqrt{9+16} = \sqrt{25} = 5$ units

} ABCD is a rhombus

length of $\overline{AB} = 5$ units → ABCD is a ▱ (the opposite sides of a ▱ are ≅)

slope of $\overline{BC} = \frac{3+1}{0+3} = \frac{4}{3}$

$\frac{4}{3} \cdot -\frac{3}{4} = -1$ → $\overline{AB} \perp \overline{BC}$

negative reciprocals

∠ABC is a right ∠

ABCD is a rectangle

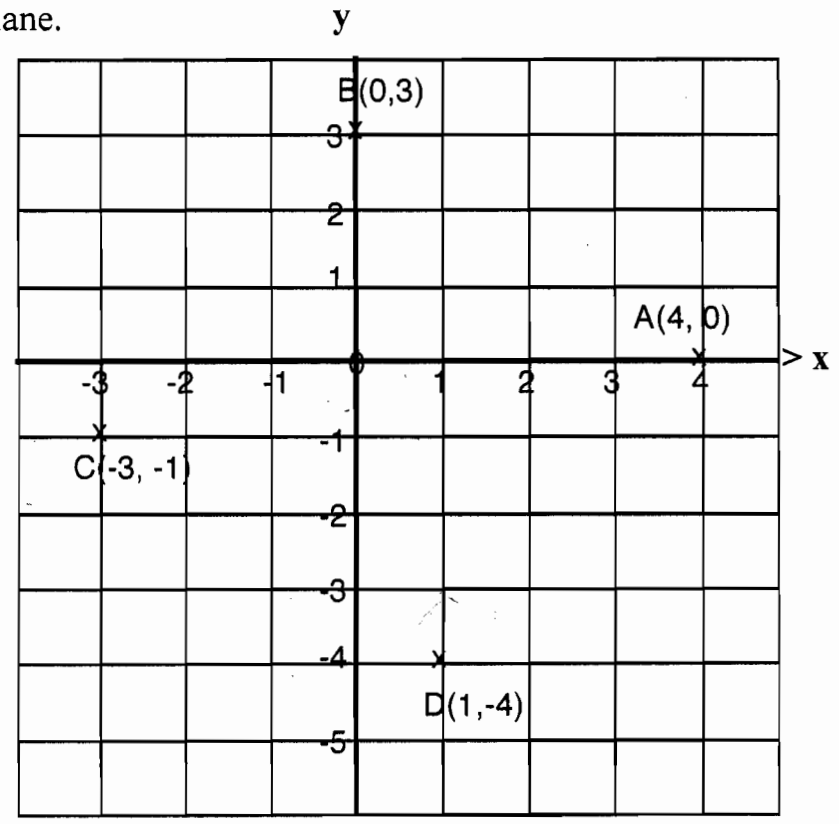
ABCD is a square.

(by def. of a square – A square is a parallelogram that is both a rectangle and a rhombus)

Square

T2

Four points, **A(4, 0), B(0, 3), C(-3, -1), and D(1, 4)** are drawn on the x/y co-ordinate plane.



1. Find the length of the line AB.

5

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

$\sqrt{16+9}$

$\sqrt{25} = 5$

2. Find the slope of the line AB.

$-3/4$

$\frac{3-0}{0-4} = \frac{3}{-4}$

3. Join the sides of the quadrilateral ABCD. Prove that ABCD is a square.

Dist slope

$\overline{AB} = 5, -3/4$

$\overline{AD} = 5, +1\frac{1}{3}$

$\overline{DC} = 5, -3/4$

$\overline{CB} = 5, +1\frac{1}{3}$

AD $\frac{-4-0}{1-4} = \frac{-4}{-3} = +1\frac{1}{3}$

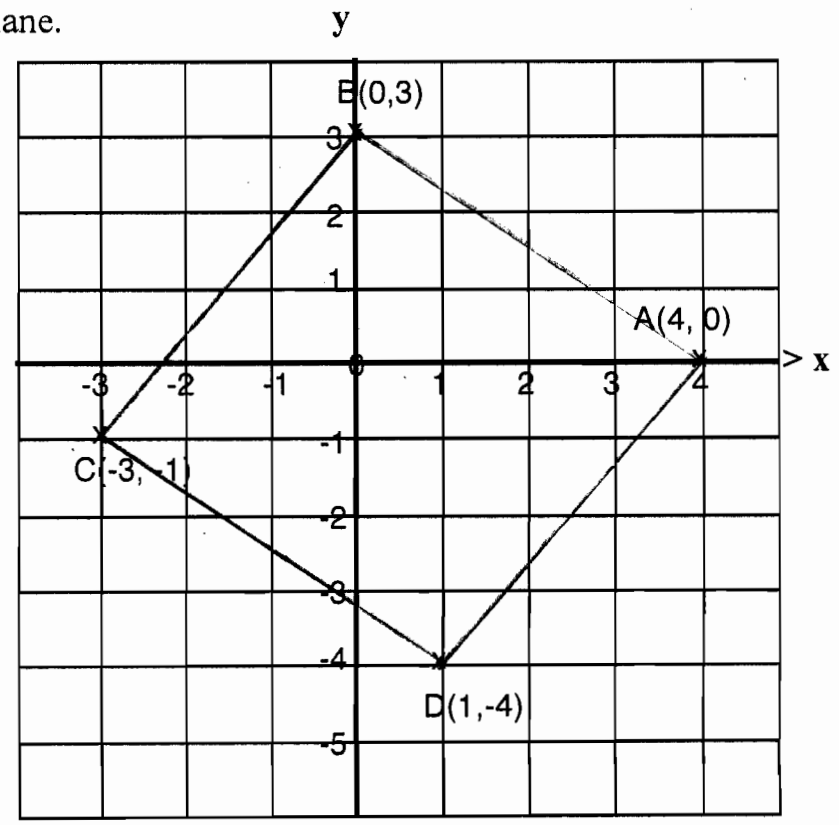
$\overline{CB} \parallel \overline{AD}$ because they have the same slope

$\overline{DC} \parallel \overline{AB}$ because they have the same slope

Square

T3

Four points, **A(4, 0), B(0, 3), C(-3, -1), and D(1, 4)** are drawn on the x/y co-ordinate plane.



1. Find the length of the line AB.

5

$3^2+4^2=c^2$
$9+16=c^2$
$25=c^2$
$c=5$

2. Find the slope of the line AB.

$\frac{-3}{4}$

$\frac{3-0}{0-4}=\frac{3}{-4}$

3. Join the sides of the quadrilateral ABCD. Prove that ABCD is a square.

slope of $\overline{AB}$: $\frac{-3}{4}$
slope of $\overline{AD}$: $\frac{4}{3}$
slope of $\overline{CD}$: $\frac{-3}{4}$
slope of $\overline{BC}$: $\frac{4}{3}$

$\overline{AB} \perp \overline{AD}$ $\overline{AB} \perp \overline{BC}$ $\overline{AB} \parallel \overline{CD}$
$\overline{CD} \perp \overline{BC}$ $\overline{CD} \perp \overline{AD}$ $\overline{BC} \parallel \overline{AD}$

length of $\overline{AB}$: 5
length of $\overline{AD}$: $3^2+4^2=c^2$
$c^2=25$
$c=5$

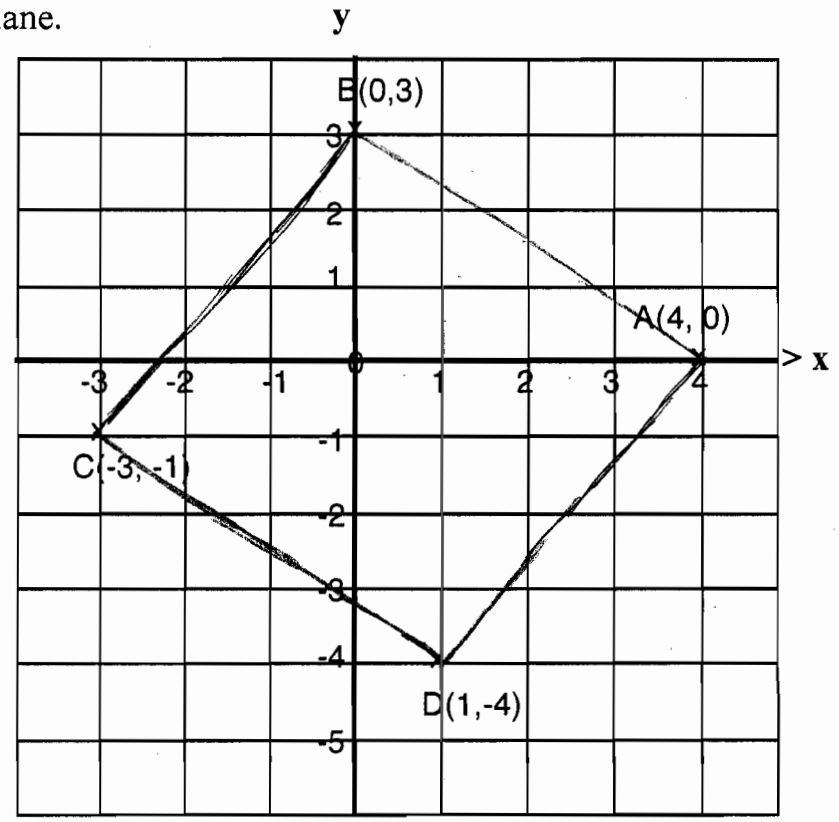
length of $\overline{CD}$: $4^2+3^2=c^2$
$c=5$

length of $\overline{BC}$: $3^2+4^2=c^2$
$c=5$

Square

T4

Four points, **A(4, 0), B(0, 3), C(-3, -1), and D(1, 4)** are drawn on the x/y co-ordinate plane.



1. Find the length of the line AB.

5

2. Find the slope of the line AB.

$\frac{-3}{4}$

3. Join the sides of the quadrilateral ABCD. Prove that ABCD is a square.

Slopes

$DA = \frac{0-(-4)}{4-1} = \frac{4}{3}$

$BA = \frac{3-0}{0-4} = \frac{-3}{4}$

$CB = \frac{3-(-1)}{0-(-3)} = \frac{4}{3}$

$CD = \frac{4-(-1)}{1-(-3)} = \frac{-3}{4}$

Lengths

$\sqrt{(-4-(-1))^2+(1-(-3))^2} = \sqrt{(-3)^2+4^2} = \sqrt{9+16} = \sqrt{25} = 5$

$\sqrt{(3-0)+(0-4)^2} = \sqrt{3^2+(-4)^2} = \sqrt{9+16} = \sqrt{25} = 5$

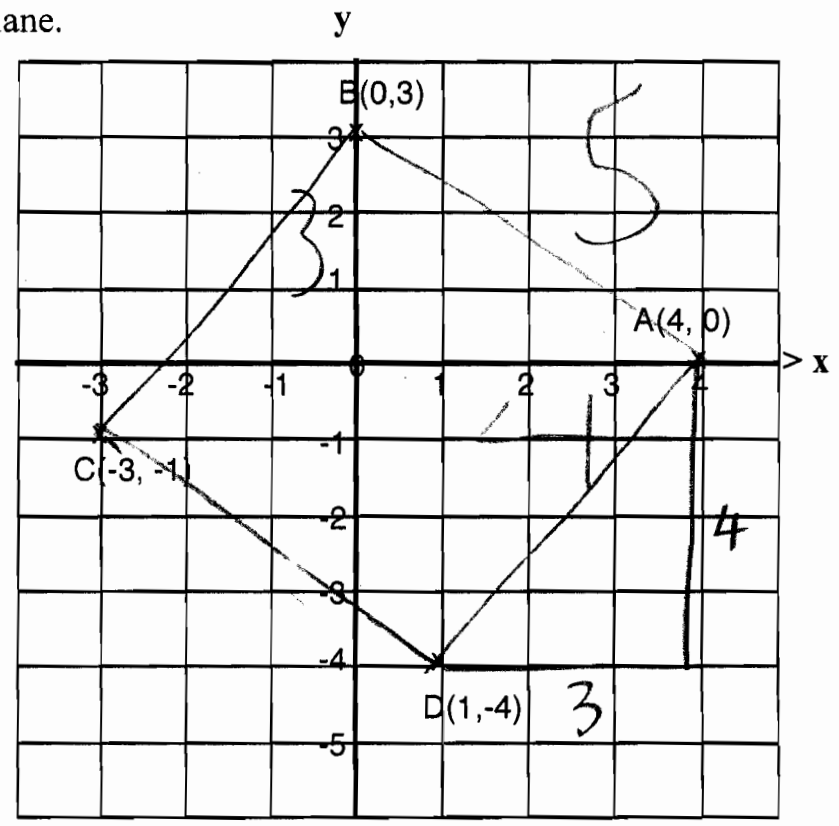
$\sqrt{(3-(-1))^2+(0-(-3))^2} = \sqrt{4^2+(3)^2} = \sqrt{16+9} = \sqrt{25} = 5$

$\sqrt{(4-(-1))^2+(1-(-3))^2} = \sqrt{(-3)^2+(4)^2} = \sqrt{9+16} = \sqrt{25} = 5$

Square

T5

Four points, **A(4, 0), B(0, 3), C(-3, -1), and D(1, 4)** are drawn on the x/y co-ordinate plane.



1. Find the length of the line AB.

5

2. Find the slope of the line AB.

$-\frac{3}{4}$

$m = \frac{y_1 - y_2}{x_1 - x_2} = \frac{3-0}{0-4} = \frac{3}{-4} = -\frac{3}{4}$

3. Join the sides of the quadrilateral ABCD. Prove that ABCD is a square.

Slopes

AB = $-\frac{3}{4}$

BC = $\frac{4}{3}$

CD = $-\frac{3}{4}$

AD = $\frac{4}{3}$

rise / run

They are $\perp$.

They are rt. Ls.

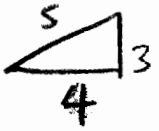
Lenghts

AB = 5

BC = 5

CD = 5

AD = 5



Pythagorean Theorem

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

It ish a square