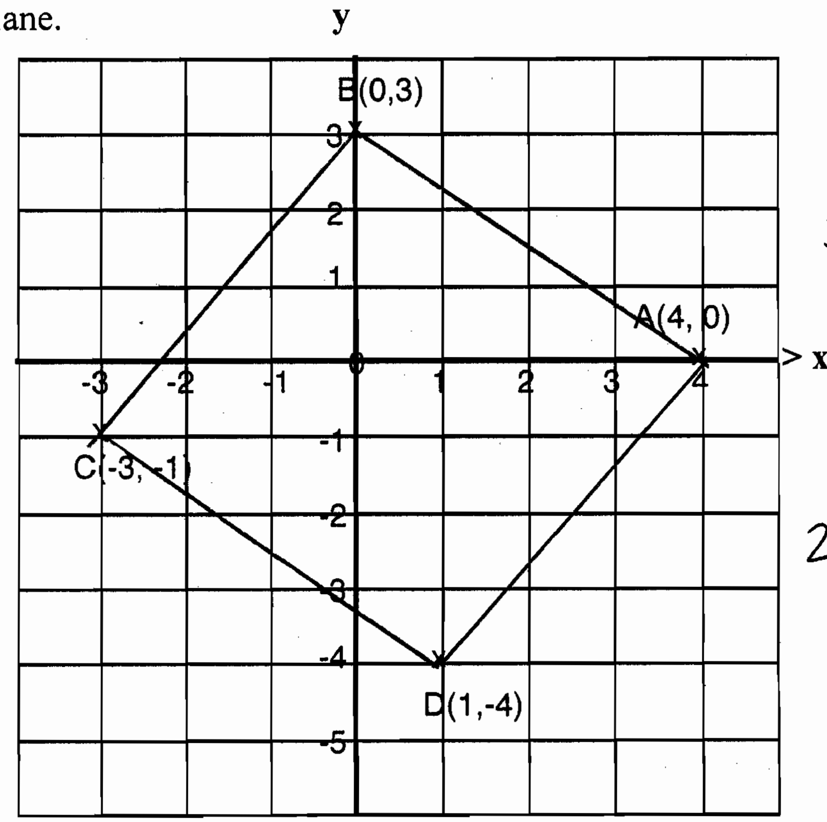
Square

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

3

2. Find the slope of the line AB.

$-\frac{3}{4}$ ✓

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

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

2

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

5

ABCD is a square.

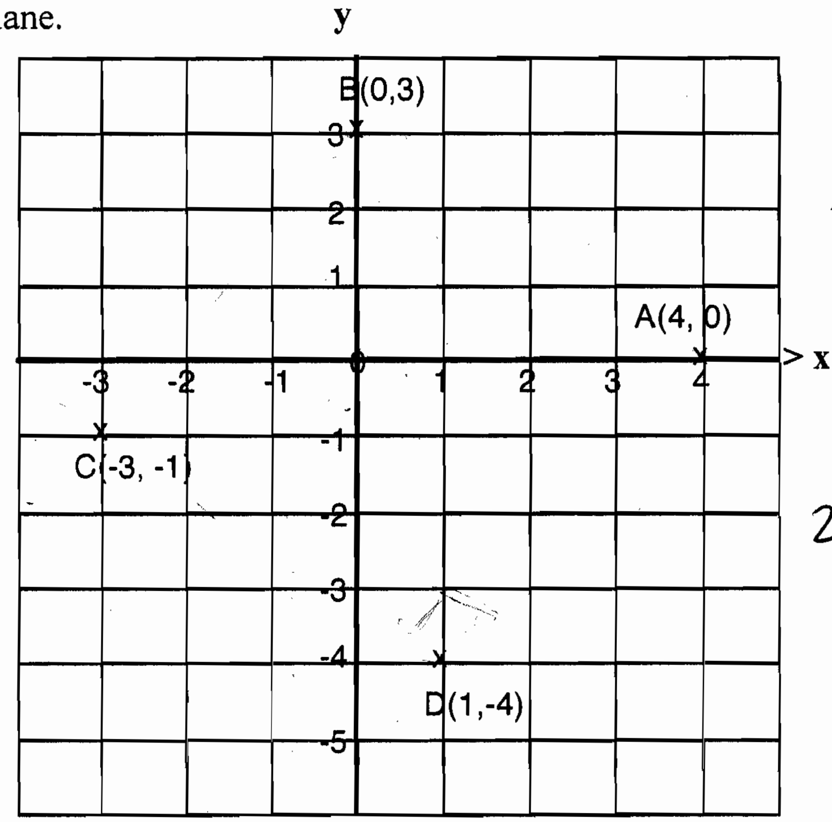
(by def. of a square – A square is a parallelogram that is both a rectangle and a rhombus.)

10

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 ✓

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

$\sqrt{16+9}$

$\sqrt{25}=5$

3

2. Find the slope of the line AB.

$-3/4$ ✓

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

2

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

(3)

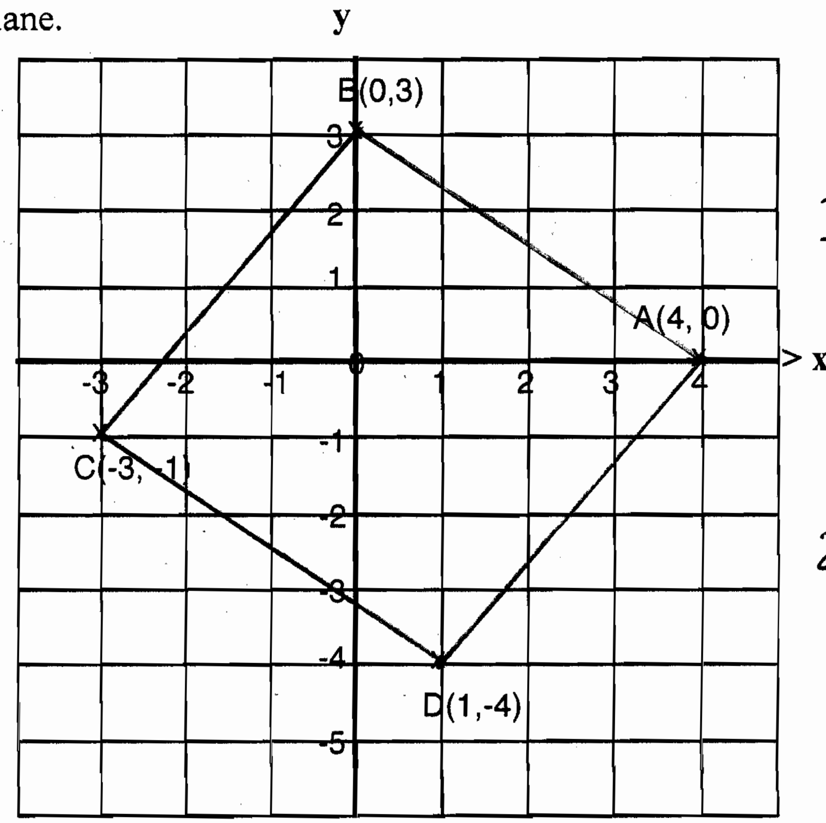
$\overline{CB} \parallel \overline{AD}$ because they have the same slope

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

 8

Square

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 ✓

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

3

2. Find the slope of the line AB.

$-\frac{3}{4}$ ✓

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

2

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

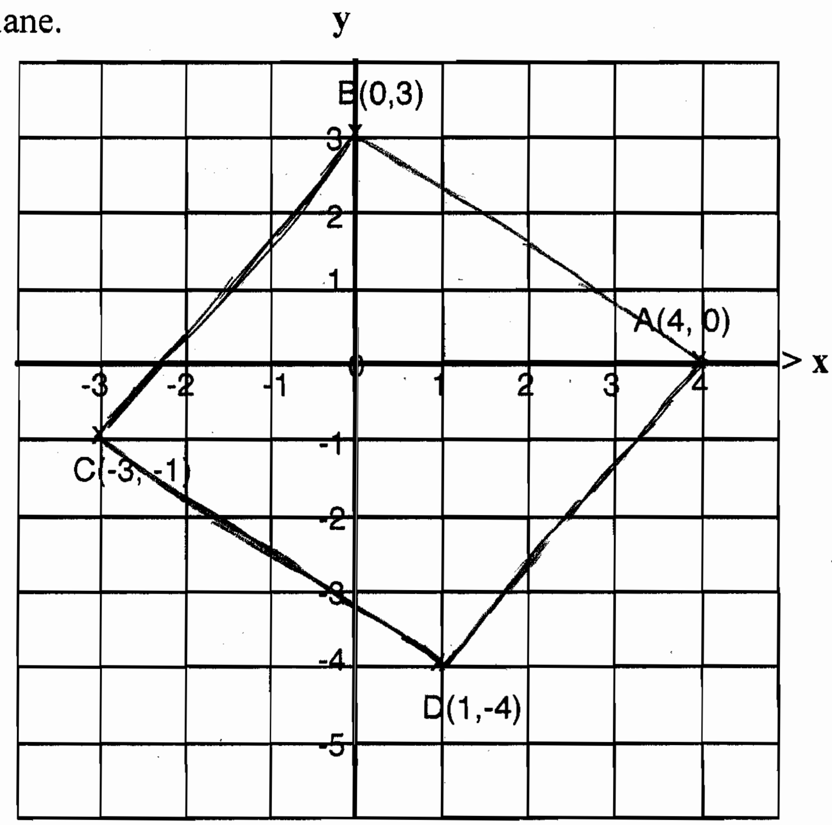
5

10

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 ✓   3

2. Find the slope of the line AB.

$\frac{-3}{4}$ ✓   2

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

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

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

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

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

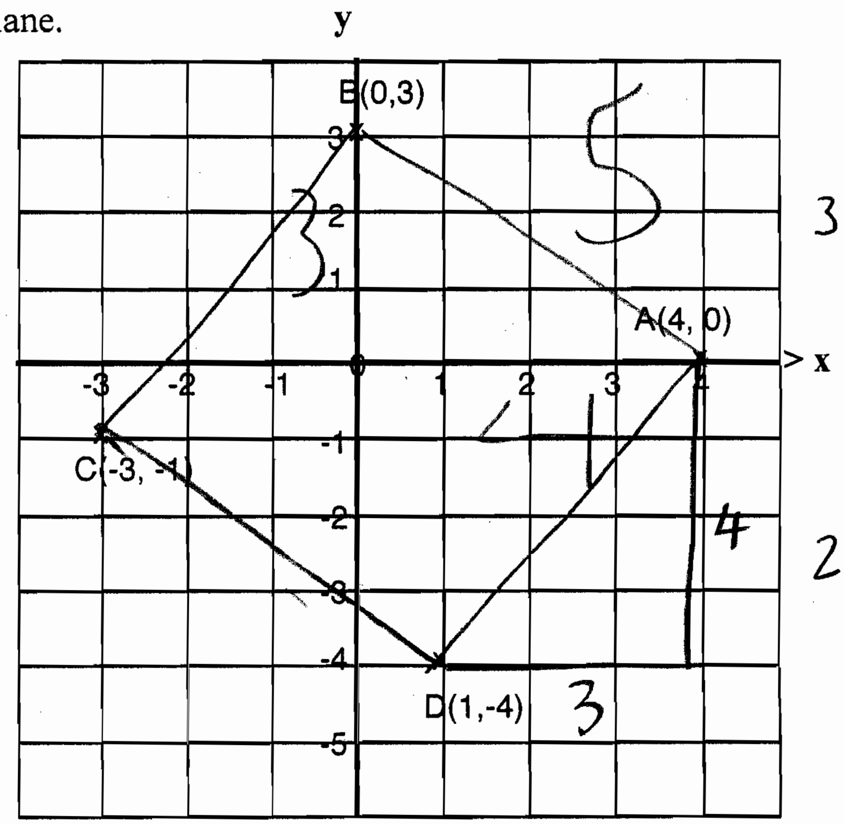
✓

(3)

8

Square

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 ✓

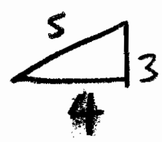
2. Find the slope of the line AB.

$-\frac{3}{4}$ ✓

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

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

Slopes	$\frac{\text{rise}}{\text{run}}$	Lenghts
AB = $-\frac{3}{4}$	They	AB = 5
BC = $\frac{4}{3}$ ✓	are	BC = 5
CD = $-\frac{3}{4}$ ✓	⊥ ✓	CD = 5 ✓
AD = $\frac{4}{3}$	They are rt. ∠s.	AD = 5



Pythagorean Theorem chizz

5

✓

It ish a square.

10