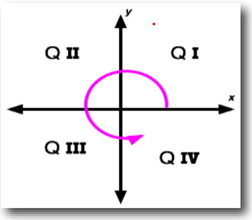
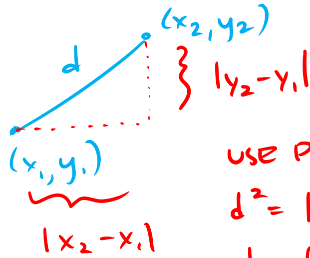
RECTANGULAR COORDINATES

OBJECTIVES: 1) Use the distance formula to determine if a set of coordinates form a right triangle.
2) Use the midpoint formula to find the center of a circle.





USE PYTHAG THRM:

$d^2 = |x_2 - x_1|^2 + |y_2 - y_1|^2$

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

DISTANCE: For $A(x_1,y_1)$ and $B(x_2, y_2)$, the distance between A and B is

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

1. Given B(1,4), I(6,–4), G(–16,–6). Is ΔBIG a right triangle?

$BI = \sqrt{5^2 + 8^2} = \sqrt{25 + 64} = \sqrt{89}$

$IG = \sqrt{22^2 + 2^2} = \sqrt{488}$

$BG = \sqrt{17^2 + 10^2} = \sqrt{389}$

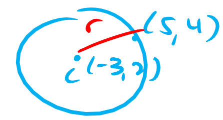
$(BI)^2 + (BG)^2 \overset{?}{=} (IG)^2$

$89 + 389 \neq 488$

No, ΔBIG is not a rt Δ.

(It's obtuse)

2. The center of a circle is at (–3, 2) and a point on the circle is (5,4). Find the radius of the circle.



$d = \sqrt{8^2 + 2^2}$

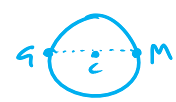
$d = \sqrt{68}$

$d = 2\sqrt{17}$

$\boxed{r = 2\sqrt{17}}$

3. Find the midpoint of $G\left(\frac{3\pi}{2}, \frac{3}{5}\right)$ and $M\left(\frac{3\pi}{4}, \frac{7}{10}\right)$. If G and M are endpoints of the diameter of a circle, find the center and radius.

For radius, find GC or CM.



$c\left(\frac{9}{8}\pi, \frac{13}{20}\right)$

Midpt: $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

$\left(\frac{\frac{3\pi}{2} + \frac{3\pi}{4}}{2}, \frac{\frac{3}{5} + \frac{7}{10}}{2}\right)$

$\frac{\frac{9\pi}{4}}{2}, \frac{\frac{13}{10}}{2}$

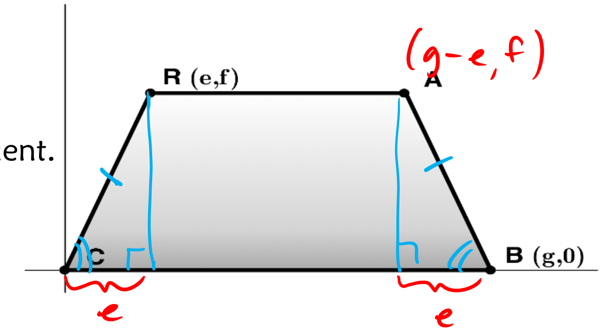
$\boxed{\begin{array}{l}\text{midpt:} \\ \text{center:}\end{array} \left(\frac{9\pi}{8}, \frac{13}{20}\right)}$ ← point "c"

$r = \sqrt{\left(\frac{9}{8}\pi - \frac{3}{4}\pi\right)^2 + \left(\frac{13}{20} - \frac{7}{10}\right)^2}$

$r = \sqrt{\left(\frac{3}{8}\pi\right)^2 + \left(\frac{-1}{20}\right)^2}$

$\boxed{r = \sqrt{\frac{9}{64}\pi^2 + \frac{1}{400}}}$

4. Find the coordinates of all points in the isosceles trapezoid.



5. Use the distance formula to prove that diagonals are congruent.

- legs $\cong$, base $\measuredangle$s $\cong$, bases $\parallel$ $\therefore$ Δ's $\cong$ AAS

4) $A(g-e, f)$ $C(0,0)$

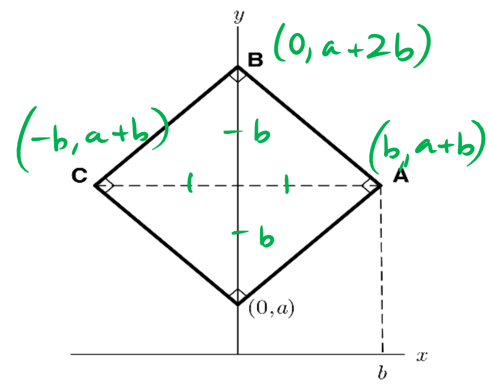
5) $RB = \sqrt{(g-e)^2 + (f-0)^2} = \sqrt{(g-e)^2 + f^2}$

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

$\overline{RB} \cong \overline{AC}$

6. Find the coordinates of all points in the square.

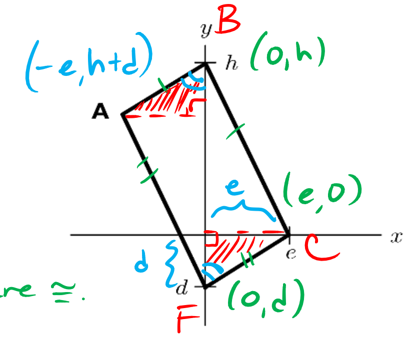
- Diag $\cong$ & bisect each other



7. Find the coordinates of all points in the rectangle.

- opp sides $\parallel$ & $\cong$
- shaded Δs are $\cong$ by AAS (see markings)

proves AAS
$\overline{AB} \parallel \overline{FC}$, $\measuredangle ABF \cong \measuredangle CFB$ (alt. int $\measuredangle$s)
$\overline{AB} \cong \overline{FC}$, (Def. rect.)
$\perp$ lines intersect to form rt $\measuredangle$s, $\therefore$ rt Δs



☆ You don't need all of this work, just the coordinates! Just wanted to give you an idea of why shaded Δs are $\cong$.