8.7 Classwork: Distance formula and Pythagorean theorem **CCSSM**

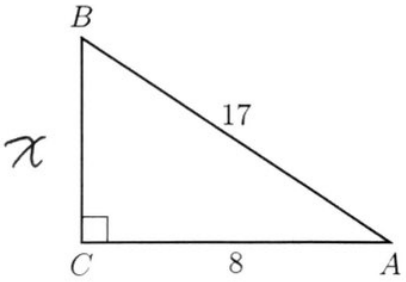
1. In the diagram below of right triangle ABC, $AC = 8$, and $AB = 17$. Find the length BC using the Pythagorean theorem.

$8^2 + x^2 = 17^2$

$64 + x^2 = 249$

$x^2 = 249 - 64 = 225$

$x = 15$



2. What is the distance between the points $(3, 4)$ and $(6, 8)$?

$d = \sqrt{(6-3)^2 + (8-4)^2}$

$= \sqrt{3^2 + 4^2}$

$= \sqrt{9+16} = \sqrt{25} = 5$

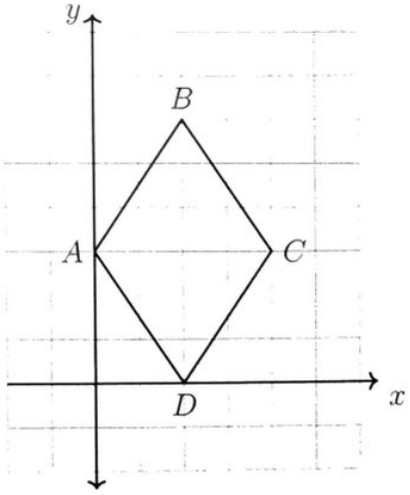
3. Show that quadrilateral $ABCD$ is a rhombus by calculating the lengths of its sides. $A(0, 3)$, $B(2, 6)$, $C(4, 3)$, $D(\cancel{4,3})$ $2, 0$

$AB = \sqrt{(2-0)^2 + (6-3)^2} = \sqrt{4+9} = \sqrt{13}$

$BC = \sqrt{(4-2)^2 + (6-3)^2} = \sqrt{13}$

$CD = \sqrt{(4-2)^2 + (3-0)^2} = \sqrt{13}$

$AD = \sqrt{(2-0)^2 + (3-0)^2} = \sqrt{13}$



$\sqrt{13} = \sqrt{13} = \sqrt{13} = \sqrt{13}$

$\Rightarrow$ ABCD is rhombus since all four sides are congruent

4. Rhombus $STAR$ has vertices $S(-1,2)4$, $T(2,3)$, $A(3,0)$, and $R(0,-1)$. What is the perimeter of rhombus $STAR$?

$ST = \sqrt{(2-(-1))^2+(3-2)^2} = \sqrt{3^2+1^2} = \sqrt{10}$

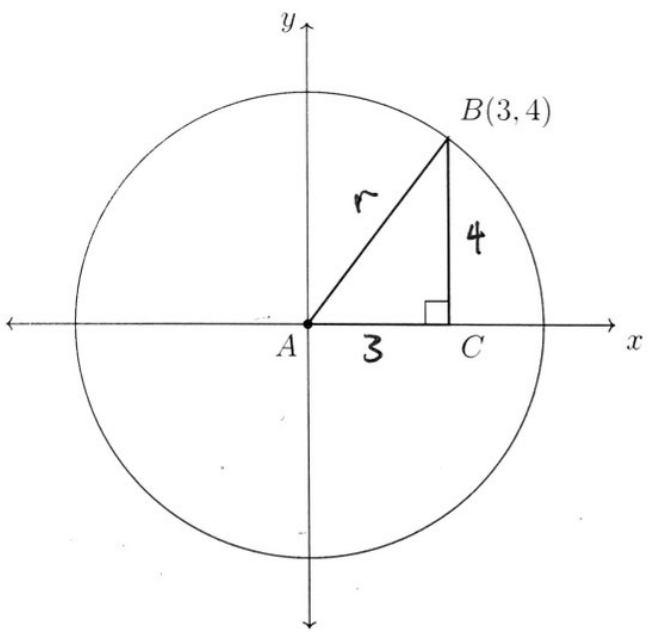
$TA = \sqrt{(3-2)^2+(3-0)^2} = \sqrt{10}$

$AR = \sqrt{(3-0)^2+(0-(-1))^2} = \sqrt{10}$

$SR = \sqrt{(0-(-1))^2+(2-(-1))^2} = \sqrt{10}$

$P = 4\sqrt{10}$

5. The hypotenuse of right triangle ABC is the radius of a circle centered at the origin, as shown. Use the lengths of the legs of the triangle and the Pythagorean formula to calculate the radius of the circle.



$3^2+4^2=r^2$

$9+16=r^2$

$25=r^2$

$r=\sqrt{25}=5$