MATH 102, 2023 **Name:** _____

In class work Week 1 **Row and Seat:** _____

In class work Week 1 has questions 1 through 3 with a total of 15 points. This assignment is due at the end of the class period (*9:55* AM).

5 1. Find the *distance* between the points $(7,9)$ and $(-1,-2)$.

Solution: We have

$$\begin{aligned} \text{dist}((7,9),(-1,-2)) &= \sqrt{(7+1)^2+(9+2)^2}, && \text{(distance formula)} \\ &= \sqrt{64+121}, && \text{(arithmetic)} \\ &= \sqrt{185}. && \text{(arithmetic)} \end{aligned}$$

The factors of 185 are 5 and 37. Neither of these factors are perfect squares, so $\sqrt{185}$ is properly simplified. Unless asked for a decimal approximation, you should leave your answers in an exact form. This problem *doesn't* ask for an exact solution, so 13.60147 is *not* a correct solution.

5 2. The *midpoint* of points P and $(5,6)$ is $(-2,3)$. Find the *coordinates* of the point P.

Solution: Let $P=(x,y)$. We have

$$\left(\frac{x+5}{2},\frac{y+6}{2}\right)=(-2,3).$$

So

$$\begin{aligned} \frac{x+5}{2} &= -2, \\ \frac{y+6}{2} &= 3. \end{aligned}$$

Solving these equations for x and y gives $x=-9$ and $y=0$.

5 3. Are the three points $(7,9),(-1,-2)$, and $(0,10)$ the vertices of a right triangle? Explain.

Solution: We have

$$\begin{aligned} \text{dist}((7,9),(-1,2)) &= \sqrt{85} && \text{(problem 1)} \\ \text{dist}((-1,2),(0,10)) &= \sqrt{1^2+8^2} = \sqrt{65} \\ \text{dist}((0,10),(7,9)) &= \sqrt{49+1^2} = \sqrt{50}. \end{aligned}$$

The largest of these numbers is $\sqrt{85}$. But $\sqrt{85}^2 \neq \sqrt{65}^2 + \sqrt{50}^2$, so the three points $(7,9), (-1,-2)$, and $(0,10)$ are *not* the vertices of a right triangle.