

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.
- Be extra careful with double negations; for example

$$7 - (-1) = 7 + 1 = 8.$$

- 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

$$\text{dist}((7, 9), (-1, 2)) = \sqrt{85} \quad (\text{problem 1})$$

$$\text{dist}((-1, 2), (0, 10)) = \sqrt{1^2 + 8^2} = \sqrt{65}$$

$$\text{dist}((0, 10), (7, 9)) = \sqrt{49 + 1^2} = \sqrt{50}.$$

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.