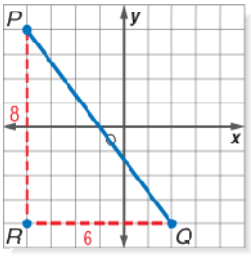
Lesson 7-7

Example 1

Use the Pythagorean Theorem to find the distance from point *P*(–4, 4) to point *Q*(2, –4).

Solution

First draw right triangle *PQR* with $\overline{PQ}$ as the hypotenuse. Draw a horizontal line through point *Q* and a vertical line through point *P*. The lines intersect at point *R*(–4, 4).



Since $\triangle PQR$ is a right triangle, use the Pythagorean Theorem to find the length of $\overline{PQ}$.

$(PQ)^2 = (RQ)^2 + (RP)^2$ $\quad c^2 = a^2 + b^2$
$(PQ)^2 = 6^2 + 8^2$ $\quad RQ = 6,\ RP = 8$
$(PQ)^2 = 36 + 64$
$(PQ)^2 = 100$
$PQ = \sqrt{100}$ $\quad$ Use only the positive solution since distance cannot be a negative value.
$PQ = 10$

The distance from *P* to *Q* is 10 units.

Example 2

Given points *F*(4, –12) and *G*(–2, –3), use the distance formula to find the length of $\overline{FG}$.

Solution

Let *F*(4, –12) be the ordered pair (x_1, y_1) Let *G*(–2, –3) be the ordered pair (x_2, y_2).

$FG = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
$FG = \sqrt{(-2 - 4)^2 + [-3 - (-12)]^2}$
$FG = \sqrt{(-6)^2 + 9^2}$
$FG = \sqrt{36 + 81}$
$FG = \sqrt{117} \approx 11$

The length of $\overline{FG}$ is about 11 units.