**EXAMPLE 6** **TAKS REASONING: Multi-Step Problem**
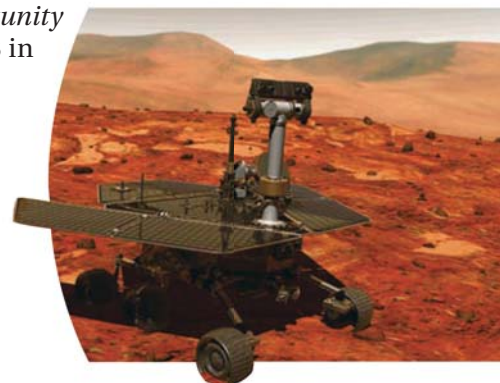
**ASTRONOMY** The Mars Exploration Rovers *Opportunity* and *Spirit* are robots that were sent to Mars in 2003 in order to gather geological data about the planet. The temperature at the landing sites of the robots can range from −100°C to 0°C.

- Write a compound inequality that describes the possible temperatures (in degrees Fahrenheit) at a landing site.

- Solve the inequality. Then graph your solution.

- Identify three possible temperatures (in degrees Fahrenheit) at a landing site.

**Solution**

Let $F$ represent the temperature in degrees Fahrenheit, and let $C$ represent the temperature in degrees Celsius. Use the formula $C = \frac{5}{9}(F - 32)$.

*STEP 1* **Write** a compound inequality. Because the temperature at a landing site ranges from −100°C to 0°C, the lowest possible temperature is −100°C, and the highest possible temperature is 0°C.

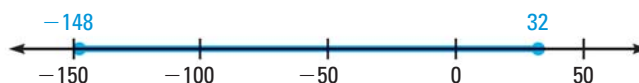$$-100 \le C \le 0 \qquad \text{Write inequality using } C.$$

$$-100 \le \frac{5}{9}(F - 32) \le 0 \qquad \text{Substitute } \frac{5}{9}(F - 32) \text{ for } C.$$

*STEP 2* **Solve** the inequality. Then graph your solution.

**ANOTHER WAY**
You can solve the compound inequality by multiplying through by 9:

$-100 \le \frac{5}{9}(F - 32) \le 0$

$-900 \le 5(F - 32) \le 0$

$-900 \le 5F - 160 \le 0$

$-740 \le 5F \le 160$

$-148 \le F \le 32$

$$-100 \le \frac{5}{9}(F - 32) \le 0 \qquad \text{Write inequality from Step 1.}$$

$$-180 \le F - 32 \le 0 \qquad \text{Multiply each expression by } \frac{9}{5}.$$

$$-148 \le F \le 32 \qquad \text{Add 32 to each expression.}$$



*STEP 3* **Identify** three possible temperatures.

The temperature at a landing site is greater than or equal to −148°F *and* less than or equal to 32°F. Three possible temperatures are −115°F, 15°F, and 32°F.

✓ **GUIDED PRACTICE** for Example 6

11. **MARS** Mars has a maximum temperature of −7°C at the equator and a minimum temperature of −133°C at the winter pole.

- Write and solve a compound inequality that describes the possible temperatures (in degrees Fahrenheit) on Mars.

- Graph your solution. Then identify three possible temperatures (in degrees Fahrenheit) on Mars.