DOMAINS IN REAL LIFE In Example 5, the domain of each function is all real numbers because there is an output for every real number x. In real life, you may need to restrict the domain so that it is reasonable in the given situation.

### EXAMPLE 6   Use a function in real life

DIVING A diver using a Diver Propulsion Vehicle (DPV) descends to a depth of 130 feet. The pressure P (in atmospheres) on the diver is given by $P(d) = 1 + 0.03d$ where d is the depth (in feet). Graph the function, and determine a reasonable domain and range. What is the pressure on the diver at a depth of 33 feet?

Solution

The graph of $P(d)$ is shown. Because the depth varies from 0 feet to 130 feet, a reasonable domain is $0 \le d \le 130$.

The minimum value of $P(d)$ is $P(0) = 1$, and the maximum value of $P(d)$ is $P(130) = 4.9$. So, a reasonable range is $1 \le P(d) \le 4.9$.

▶ At a depth of 33 feet, the pressure on the diver is $P(33) = 1 + 0.03(33) \approx 2$ atmospheres, which you can verify from the graph.

Pressure on a Diver

(33, 2)

Depth (ft)
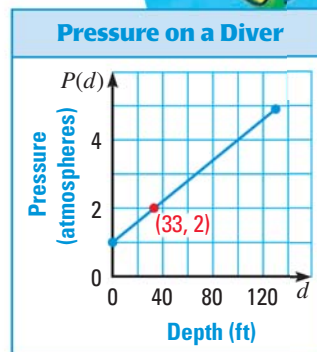
✓   **GUIDED PRACTICE**   for Example 6

7. **OCEAN EXPLORATION** In 1960, the deep-sea vessel *Trieste* descended to an estimated depth of 35,800 feet. Determine a reasonable domain and range of the function $P(d)$ in Example 6 for this trip.

2.1 EXERCISES

SKILL PRACTICE

1. **VOCABULARY** Copy and complete: In the equation $y = x + 5$, x is the __?__ variable and y is the __?__ variable.

2. **WRITING** *Describe* how to find the domain and range of a relation given by a set of ordered pairs.

EXAMPLE 1
on p. 72
for Exs. 3–9

REPRESENTING RELATIONS Identify the domain and range of the given relation. Then represent the relation using a graph and a mapping diagram.

3. $(-2, 3)$, $(1, 2)$, $(3, -1)$, $(-4, -3)$

4. $(5, -2)$, $(-3, -2)$, $(3, 3)$, $(-1, -1)$

5. $(6, -1)$, $(-2, -3)$, $(1, 8)$, $(-2, 5)$

6. $(-7, 4)$, $(2, -5)$, $(1, -2)$, $(-3, 6)$

7. $(5, 20)$, $(10, 20)$, $(15, 30)$, $(20, 30)$

8. $(4, -2)$, $(4, 2)$, $(16, -4)$, $(16, 4)$