EXAMPLE 4 TAKS REASONING: Multi-Step Problem

SCUBA DIVING As a scuba diver descends into deeper water, the pressure of the water on the diver's body steadily increases.

The pressure at the surface of the water is 2117 pounds per square foot (lb/ft^2). The pressure increases at a rate of 64 pounds per square foot for each foot the diver descends. Find the depth at which a diver experiences a pressure of 8517 pounds per square foot.

ANOTHER WAY
For an alternative method for solving Example 4, turn to page 147 for the **Problem Solving Workshop**.

Solution

STEP 1 **Write** a verbal model. Then write an equation.

Pressure at given depth (lb/ft^2)	=	Pressure at surface (lb/ft^2)	+	Rate of change of pressure (lb/ft^2 per foot of depth)	·	Diver's depth (ft)
P	=	2117	+	64	·	d

STEP 2 **Find** the depth at which the pressure is 8517 pounds per square foot.

$P = 2117 + 64d$ — Write equation.

$8517 = 2117 + 64d$ — Substitute 8517 for P.

$8517 - 2117 = 2117 - 2117 + 64d$ — Subtract 2117 from each side.

$6400 = 64d$ — Simplify.

$\frac{6400}{64} = \frac{64d}{64}$ — Divide each side by 64.

$100 = d$ — Simplify.

▶ A diver experiences a pressure of 8517 pounds per square foot at a depth of 100 feet.

CHECK

$P = 2117 + 64d$ — Write original equation.

$8517 \stackrel{?}{=} 2117 + 64(100)$ — Substitute 8517 for P and 100 for d.

$8517 \stackrel{?}{=} 2117 + 6400$ — Multiply 64 and 100.

$8517 = 8517$ ✓ — Simplify. Solution checks.

GUIDED PRACTICE for Example 4

9. **WHAT IF?** In Example 4, suppose the diver experiences a pressure of 5317 pounds per square foot. Find the diver's depth.

10. **JOBS** Kim has a job where she makes $8 per hour plus tips. Yesterday, Kim made $53 dollars, $13 of which was from tips. How many hours did she work?