

## Problem Solving

### Homework

Solve the following word problems by finding the value of the indicated variable.

- a) The formula for finding the volume of a rectangle is  $V = lwh$ , where  $V$  is volume,  $l$  is length,  $w$  is width, and  $h$  is the height. If the volume of a rectangle is  $108 \text{ cm}^3$ , the length 4 cm, and the width is 3 cm, what is the height of the rectangle?
- b) The formula  $P = 2l + 2w$  is used to calculate the perimeter,  $P$ , of a rectangle. Length is represented by  $l$  and  $w$  represents the width. If the perimeter of a rectangle is 210 cm, and the length is 20 cm, calculate the width of the rectangle.
- c) Volcanoes and geysers illustrate that Earth's interior is very hot. The formula  $T = 10d + 20$  is used to estimate the temperature,  $T$  degrees Celsius, at a depth of  $d$  kilometers.
- Determine the temperature in a mine shaft that is 0.5 km below the surface of the earth.
  - At what depth ( $d$ ) is the temperature  $100^\circ\text{C}$ ?

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Solve the following word problems by finding the value of the indicated variable.

- a) The formula for finding the volume of a rectangle is  $V = lwh$ , where  $V$  is volume,  $l$  is length,  $w$  is width, and  $h$  is the height. If the <sup>volume</sup> area of a rectangle is  $108 \text{ cm}^3$ , the length  $4 \text{ cm}$ , and the width is  $3 \text{ cm}$ , what is the height of the rectangle?

① Isolate  $h$   $\frac{V = lwh}{lw \quad lw} \quad \frac{V}{lw} = h$

② Sub in values  $\frac{V = h}{lw} \quad \frac{108}{(4)(3)} = h$

$$\frac{108}{12} = h$$

$$\boxed{9 = h} \quad \therefore \text{height is } 9 \text{ cm.}$$

- b) The formula  $P = 2l + 2w$  is used to calculate the perimeter,  $P$ , of a rectangle. Length is represented by  $l$  and  $w$  represents the width. If the perimeter of a rectangle is  $210 \text{ cm}$ , and the length is  $20 \text{ cm}$ , calculate the width of the rectangle.

① Isolate  $w$   $P = 2l + 2w$

$$\frac{P - 2l}{2} = \frac{2w}{2}$$

$$\frac{P - 2l}{2} = w$$

② Sub in values  $\frac{P - 2l}{2} = w$

$$\frac{210 - 2(20)}{2} = w$$

$$\frac{210 - 40}{2} = w$$

$$\frac{170}{2} = w$$

$$\boxed{85 = w}$$

$\therefore$  width is  $85 \text{ cm}$ .

- c) Volcanoes and geysers illustrate that Earth's interior is very hot. The formula  $T = 10d + 20$  is used to estimate the temperature,  $T$  degrees Celsius, at a depth of  $d$  kilometers.

- Determine the temperature in a mine shaft that is  $0.5 \text{ km}$  below the surface of the earth.
- At what depth ( $d$ ) is the temperature  $100^\circ\text{C}$ ?

i)  $T = 10d + 20$

$$T = 10(0.5) + 20$$

$$T = 5 + 20$$

$$\boxed{T = 25}$$

$\therefore$  temperature is  $25^\circ\text{C}$ .

ii) Isolate  $d$  first  $T = 10d + 20$

$$\frac{T - 20}{10} = \frac{10d}{10}$$

$$\frac{T - 20}{10} = d$$

Sub  $T = 100$   $\frac{T - 20}{10} = d$

$$\frac{100 - 20}{10} = d$$

$$\frac{80}{10} = d$$

$$\boxed{8 = d}$$

$\therefore$  depth is  $8 \text{ km}$ .

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