

D: Solving Two-Step $a(x+b)=c$ Equations Continued

Examples.

The side length of an equilateral triangle will be increased by 14 cm on each side. The perimeter of the new triangle is 642 cm.

a) Let "s" represent the side length of the old triangle. What equation models this situation.

$$\text{Perimeter} = 3(\text{side})$$


$$642 = 3(s+14)$$

$$\begin{aligned} \text{new side} &= \text{old length} + 14 \\ &= s+14 \end{aligned}$$

b) Determine the length of each side of the new triangle.

$$642 = 3(s+14)$$

Isolate $(s+14)$


$$\frac{642}{3} = \frac{3(s+14)}{3}$$

$$214 = s+14$$

"Get rid of 14."

$$\begin{array}{r} 214 = s+14 \\ -14 \quad -14 \\ \hline \end{array}$$

$$200 = s$$

This the old side.

$$\begin{aligned} \text{new side} &= s+14 \\ &= 200+14 \\ &= 200 \text{ cm} \end{aligned}$$

The length of the new side is 200 cm.



2. The amount of food energy per day required by hikers is modelled by $e = -125(t - 122)$, where e is the amount of food energy, in kilojoules (kJ), and t is the outside temperature, in degrees Celsius.

a) If the outside temperature is -18°C , how much food energy is required per day?

$$e = -125(t - 122)$$

$$= -125(-18 - 122)$$

BEDMAS (brackets!)

$$= -125(-140)$$

$$= 5000$$

The hiker needs 5000 kJ of food energy.

b) If a hiker consumes 20000 kJ of food energy, what is the outside temperature?

$$e = -125(t - 122)$$

$$20000 = -125(t - 122) \quad \text{isolate } (t - 122)$$

$$\frac{20000}{-125} = \frac{-125(t - 122)}{-125}$$

$$-160 = t - 122$$

solve for t "get rid" of -122

$$-160 = t - 122$$

$$+122 \quad +122$$

$$-38 = t$$

The outside temperature is -38°C

Assignment Pg. 398 # 10-14