

## 10.4 Modelling and Solving Two-Step Equations

## Communicate the Ideas

$a(x + b) = c$

1. Julia and Chris are solving the equation  $-6(x + 2) = -18$ .

- a) Julia:  
Is she correct? Circle YES or NO.  
Give 1 reason for your answer.

First, I subtract 2 from both sides.  
Then, I divide both sides by  $-6$ .

---



---

- b) Chris:  
Is he correct? Circle YES or NO.  
Give 1 reason for your answer.

I start by dividing  $-6(x + 2)$  by  $-6$ .  
Then, I subtract 2 from both sides.

---



---

## Check Your Understanding

## Practise

2. Model each equation with algebra tiles.

a)  $3(t - 2) = 12$

b)  $6(j - 1) = -6$

c)  $2(3 + p) = 8$


d)  $14 = 7(n - 2)$

3. Solve the equation modelled by each diagram. Check your answers.

a) 

Check:

Left Side	Right Side

b) 

Check:

Left Side	Right Side

4. Solve each equation by dividing first. Check your answers.

a)  $6(r + 6) = -18$

b)  $4(m - 3) = 12$

$$\frac{6(r + 6)}{\boxed{\phantom{000}}} = \frac{-18}{\boxed{\phantom{000}}}$$

$r + 6 = \underline{\hspace{2cm}}$

$r + 6 - \underline{\hspace{2cm}} = 3 - \underline{\hspace{2cm}}$

$r = \underline{\hspace{2cm}}$

$m = \underline{\hspace{2cm}}$

Check:

Left Side	Right Side

Check:

Left Side	Right Side

5. Solve each equation using the distributive property.

**a)**  $21 = 3(k + 3)$   
 $21 = 3(k + 3)$  Multiply  $k + 3$  by 3.  
 $21 = \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$   
 $21 - \underline{\hspace{2cm}} = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} - \underline{\hspace{2cm}}$  Subtract 9 from both sides.  
 $\underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

		$k$	Divide both sides by 3.

$k = \underline{\hspace{2cm}}$

**b)**  $40 = -4(n - 3)$   
 $40 = -4(n - 3)$  Multiply  $n$  and  $-3$  by  $-4$ .  
 $40 = (\underline{\hspace{2cm}}) + 12$   
 $40 - \underline{\hspace{2cm}} = (-\underline{\hspace{2cm}}) + 12 - \underline{\hspace{2cm}}$  Subtract 12 from both sides.  
 $\underline{\hspace{2cm}} = (\underline{\hspace{2cm}})$

		$-4n$	Divide both sides by $-4$ .

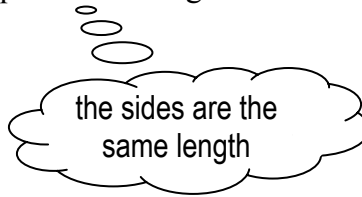
$n = \underline{\hspace{2cm}}$

**c)**  $8(x - 3) = 32$

**d)**  $3(1 + g) = 27$

**Apply**

6. An old fence around Gisel’s tree is shaped like an equilateral triangle. Gisel wants to build a new fence. She wants to make each side 7 cm longer. She wants the perimeter to be 183 cm.



- a) Write an equation for this problem.  
 $f$  = length of fence before adding 7 cm

The length,  $f$ , with 7 cm added = \_\_\_\_\_

Since all 3 sides are equal, the equation is  $3(f + 7) =$  \_\_\_\_\_

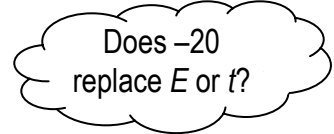
- b) Solve the equation to find the length of each side of the old fence.

The old fence measures \_\_\_\_\_ along each of its sides.

7. The formula  $E = -125(t - 122)$  shows the amount of energy a hiker needs each day on a hike.  $E$  is the amount of food energy, in kilojoules (kJ), and  $t$  is the outside temperature, in degrees Celsius.

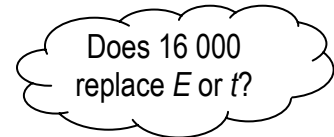


- a) If the outside temperature is  $-20\text{ }^\circ\text{C}$ , how much food energy will the hiker need each day?



Sentence: \_\_\_\_\_

- b) If a hiker uses 16 000 kJ of food energy, what is the outside temperature?



Sentence: \_\_\_\_\_