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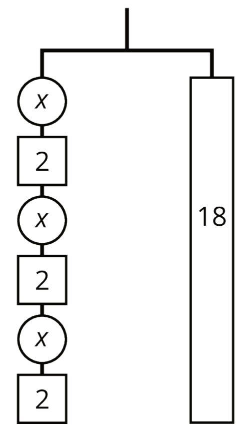
Lesson 8 Summary

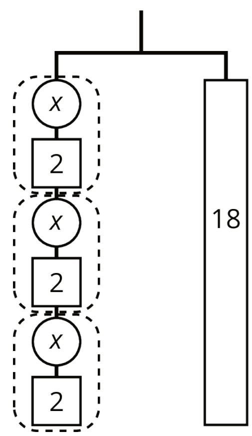
The balanced hanger shows 3 equal, unknown weights and 3 2-unit weights on the left and an 18-unit weight on the right.



There are 3 unknown weights plus 6 units of weight on the left. We could represent this balanced hanger with an equation and solve the equation the same way we did before.

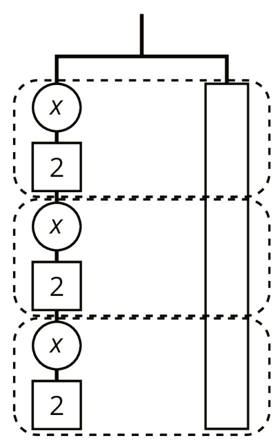
$$\begin{aligned} 3x+6&=18 \\ 3x&=12 \\ x&=4 \end{aligned}$$

Since there are 3 groups of $x+2$ on the left, we could represent this hanger with a different equation: $3(x+2)=18$.



$3(x + 2) = 18$

The two sides of the hanger balance with these weights: 3 groups of $x+2$ on one side, and 18, or 3 groups of 6, on the other side.



$3(x + 2) = 18$

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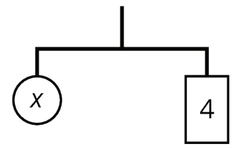
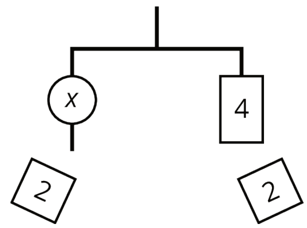
The two sides of the hanger will balance with $\frac{1}{3}$ of the weight on each side: $\frac{1}{3} \cdot 3(x+2) = \frac{1}{3} \cdot 18$.



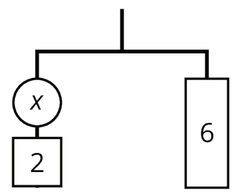
$x = 4$

We can remove 2 units of weight from each side, and the hanger will stay balanced. This is the same as subtracting 2 from each side of the equation.



$x + 2 = 4 + 2$

An equation for the new balanced hanger is $x = 4$. This gives the solution to the original equation.



$x + 2 = 6$

Here is a concise way to write the steps above:

$$
\begin{aligned}
3(x+2) &= 18 \\
x+2 &= 6 && \text{after multiplying each side by } \tfrac{1}{3} \\
x &= 4 && \text{after subtracting 2 from each side}
\end{aligned}
$$