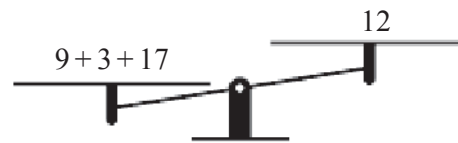


**Practice
3-2****Balancing Equations**

1. a) Find the number to add that makes the scale balance.



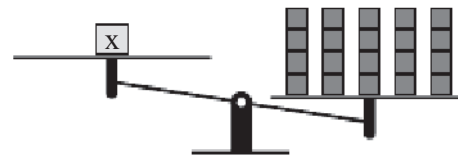
- b) Complete the equation $9 + 3 + 17 = 12 + \underline{\hspace{2cm}}$.

2. a) Find the number to add that makes the scale balance.



- b) Complete the equation $2 + 5 = 5 + \underline{\hspace{2cm}}$.

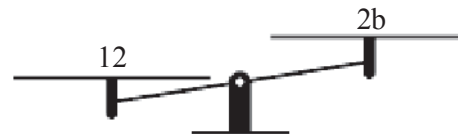
3. This scale balanced with x on one side and 4 blocks on the other side. Your friend changed the scale, but had to leave before restoring the balance.



- a) Find the number to multiply by on the left that makes the scale balance.

- b) Complete the equation $\underline{\hspace{2cm}} \cdot x = 20$.

4. This scale balanced with 12 on the left side and $6b$ on the right side. Your teacher changed the scale, but did not have time to restore the balance.



- a) Find the number to divide by on the left that makes the scale balance.

- b) Complete the equation $12 \div \underline{\hspace{2cm}} = 2b$.

5. This scale balanced when $n + 30 = 70$. Suppose the left side becomes $n + 13$.



- a) How can you change the right side so that $n + 13 = \underline{\hspace{2cm}}$ is equivalent to $n + 30 = 70$? Fill in the answer line to complete your choice.

- ☐ A. Multiply the right side by _____.
- ☐ B. Add _____ to the right side.
- ☐ C. Divide the right side by _____.
- ☐ D. Subtract _____ from the right side.

- b) Complete the equation $n + 13 = \underline{\hspace{2cm}}$.

6. This scale balanced when $13 + t = 25$.
Suppose the left side becomes $20 + t$.



- a) How can you change the right side so that $20 + t = \underline{\hspace{1cm}}$ is equivalent to $13 + t + 25$? Fill in the answer line to complete your choice.
- ☐ A. Multiply the right side by $\underline{\hspace{1cm}}$.
 - ☐ B. Add $\underline{\hspace{1cm}}$ to the right side.
 - ☐ C. Divide the right side by $\underline{\hspace{1cm}}$.
 - ☐ D. Subtract $\underline{\hspace{1cm}}$ from the right side.
- b) Complete the equation $20 + t = \underline{\hspace{1cm}}$.
7. **Error Analysis** In math class, you are checking your friend's work. This is how he balanced an equation.
- Unbalanced equation: $16 \div 8 = 16 \div 8 - 1$
- Balanced equation: $16 \div 8 + 1 = 16 \div 8 - 1$
- a) Find the correct balanced equation.
- ☐ A. $16 \div 8 + 1 = 16 \div 8 + 1$
 - ☐ B. $16 \div 8 - 1 = 16 \div 8 + 1$
 - ☐ C. $16 \div 8 - 1 = 16 \div 8 - 1$
- b) What error did your friend make?
- ☐ A. He added 1 to the left side.
 - ☐ B. He subtracted 1 from the left side.
 - ☐ C. He subtracted 1 from the right side.
 - ☐ D. He added 1 to the right side.
8. **Reasoning** A scale presenting the equation $x = 9$ balances with x on one side and 9 on the other side. A second scale representing the equation $y = 18$ balances with y on one side and 18 on the other side. What must be true about x and y ? Explain your reasoning.
- ☐ A. $x = y$
 - ☐ B. $2x = y$
 - ☐ C. $x = 2y$
 - ☐ D. $9x = y$
 - ☐ E. $x = 9y$
9. a) **Multiple Representation** Draw scales to show that if $4x = 8$, then $x = 2$.
- b) What operation must be used to show this?
- ☐ A. Division
 - ☐ B. Multiplication
 - ☐ C. Addition
 - ☐ D. Subtraction
10. **Writing** If you are given a true equation and you add the same number to each side, the resulting equation is also a true equation. If you are given a false equation and you add the same number to each side, will the resulting equation be a true equation or a false equation? Give an example to explain your answer.

- 11. Coloring Tools** Suppose that a crayon weighs the same as a marker. You have a box of crayons, 3 extra crayons, and 19 markers. Let b be the number of crayons in the box. A scale balances with all the crayons on one side and all the markers on the other. You remove markers from the scale so that you can color a picture.
- a) How many crayons must you remove to keep the scale balanced?
- b) Complete the equation $b + 3 - \underline{\hspace{2cm}} = 17$.
- 12.** Rodney and Maria are making beaded bracelets. They use the equation $6b + 9p = 51$ to keep track of the number of beads. Let $6b$ be the number of blue beads. Let $9p$ be the number of pink beads. They decide to make matching necklaces using 3 times the number of beads. Complete the equation $\underline{\hspace{2cm}}b + \underline{\hspace{2cm}}p = 153$ to make it equivalent to the starting equation.
- 13.** A math teacher writes the equation $25 \div 5 - 2 + 3 = 5$ for a test. Which equation suggests a correct way to complete the right side of the equation to make the equation true?
- ☐ A. $25 \div 5 - 2 + 3 = 5 \div 2 - 3$
- ☐ B. $25 \div 5 - 2 + 3 = 5 \cdot 2 - 3$
- ☐ C. $25 \div 5 - 2 + 3 = 5 - 2 + 3$
- 14. Challenge** Complete the right side of the equation $4(x + 2) + 3(4 + x) - 4 = 7x$ to make it true for all values of x .
- 15. Challenge** Which of the following equations are equivalent to $w - 3 = 6$? Check all that apply.
- ☐ A. $w + 102 = 111$
- ☐ B. $w + 1 = 10$
- ☐ C. $w + 1 = 11$
- ☐ D. $w = 9$
- ☐ E. none

