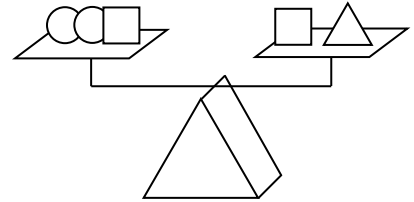


# VARIABLES AND BALANCE (EE1)

## Essentials Pre-Assessment **Answer Key**

1. The total weight of the scale to the right (both sides together) is 44 units. The triangle weighs 16 units. Find the weight of the circle.

**8 units**



Use the menu below for problem 2.

| PIZZA SHOP MENU                                |        |                            |        |
|------------------------------------------------|--------|----------------------------|--------|
| (The variable represents the cost of an item.) |        |                            |        |
| Pizza                                          |        | Drinks                     |        |
| Cheese slice ( $c$ ) .....                     | \$1.25 | Small drink ( $s$ ) .....  | \$1.00 |
| Pepperoni slice ( $p$ ) .....                  | \$1.75 | Medium drink ( $m$ ) ..... | \$1.50 |
|                                                |        | Large drink ( $L$ ) .....  | \$2.00 |

2. Find a menu item with a cost that makes the following equations true. In different problems, the  $\square$  need not represent the same menu item.

|                                  |                                                                    |
|----------------------------------|--------------------------------------------------------------------|
| a. $3\square = c + p$            | Menu item: <b>small drink</b><br>Cost of menu item: <b>\$1.00</b>  |
| b. $2(s + L) = 2m + p + \square$ | Menu item: <b>cheese slice</b><br>Cost of menu item: <b>\$1.25</b> |

3. Solve each equation. Write MM if you used mental math. Otherwise show all work.

|                            |                                   |
|----------------------------|-----------------------------------|
| a. $7 - x = 3$<br><b>4</b> | b. $24 = n + 9$<br><b>15</b>      |
| c. $5m = 60$<br><b>12</b>  | d. $\frac{y}{6} = 8$<br><b>48</b> |

4. Describe in your own words the difference between an expression and an equation. Include examples.

One way to distinguish between these two concepts is to make parallels to grammar. An expression is a mathematical "phrase." It contains numbers and variables, sometimes combined by operations.

For example, 12,  $5x$ , and  $3(2 + x)$  are expressions.

An equation is a mathematical "sentence." It contains two expressions that we assert are equal using a mathematical "verb" (is equal to).

For example,  $3(2 + x) = 12$  is an equation.

## EXPRESSIONS AND BALANCE (EE2)

### Essentials Pre-Assessment **Answer Key**

1. Choose ALL expressions below that are equivalent to  $2(5 + w)$ .

A.  $10 + w$

**B.**  $2w + 10$

C.  $2w - 10$

**D.**  $w + 5 + w + 5$

2. Choose ALL expressions below that are equivalent to  $12y + 8x$ .

**A.**  $4(3y + 2x)$

B.  $3(4y + 3x)$

C.  $4(3y + 8x)$

D.  $4(3y + x)$

3. Choose ALL expressions below that are equivalent to  $5g - 9 + 2 + 7g$

A.  $12g + 11$

B.  $-2g + 11$

**C.**  $12g + (-7)$

**D.**  $12g - 7$

4. Write and solve equations for each problem below.

a. The perimeter of a triangle is 103 cm. The second side is 2 cm shorter than the first side. The third side is 5 cm longer than twice the length of the first side. How long is each side?

$$103 = x + x - 2 + 2x + 5$$

$$103 = 4x + 3$$

$$25 = x$$

The side lengths are 25 cm, 23 cm, and 55 cm.

b. Deni says, "I'm thinking of a number. When you add 8 to my number, multiply the sum by 4, and then subtract 11, the result is 77." What is Deni's number?

$$(n + 8)4 - 11 = 77$$

$$4n + 21 = 77$$

$$n = 14$$

Deni's number is 14.

**EXPRESSION, EQUATIONS, AND APPLICATIONS (EE3)**  
**Essentials Pre-Assessment Answer Key**

1. Choose all of the expressions that are equivalent to  $3x + 2(x + 1) - 2 - x$ .

- A. 5      **B.**  $4x$       **C.**  $3x + x$       D.  $5x$       E.  $5x + 2$

2. Solve each equation for  $x$  and check.

a.  $4 - 6x = 2(x - 8) + 2x$

$x = 2$

Check:

b.  $\frac{1}{3}x + 2 = \frac{1}{6}(x - 6)$

$x = -18$

Check:

3. The length of a patio is four times its width. The perimeter is 80 feet. Find the length and the width. Draw a diagram and show your work using algebra.

Let  $L$  = Length and  $W$  = Width.

$P = 2(L + W)$

$2(4W + W) = 80$

$10W = 80$

$W = 8$

$W = 8$

$L = 4(8) = 32$

Width = 8 feet , Length = 32 feet

