

FOILED PLANS

When Bridge Bungees scouts new locations for their jump sites, they also have to plan for an office location. This is for people to park, check in, and get briefed before their jump.

These always start as **square plots** of land. Then, the CEO gives instructions on how to change the plot to better fit each site.

Unfortunately, the construction manager spilled coffee on the plans and now **nobody knows the size of the original square plots!** Can you still build drawings for the new sites and draw conclusions about how big they will be?



SITE A Extend the square 8 units in the north direction

SITE B Extend the square 5 units in the east direction

SITE C Extend the square 3 units east and 7 units south

SITE D Extend 10 units east and subtract 2 units south

SITE E Subtract 4 units east and subtract 1 unit south

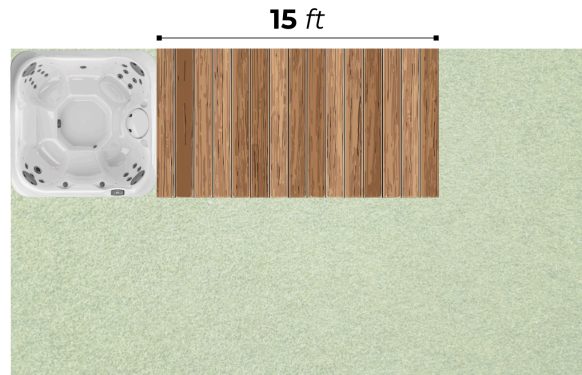
1. Draw a diagram **for each site** that shows what the new, modified site will look like. Include the original square site in your diagram.
2. Find the area of each new site if the original square site was . . .
 - a. . . 6 units by 6 units.
 - b. . . 10 units by 10 units.
 - c. . . x units by x units.
3. Write expressions for the dimensions (length and width) of each new site, using x to represent the side length of the original square site.

ON YOUR OWN

Foiled Plans

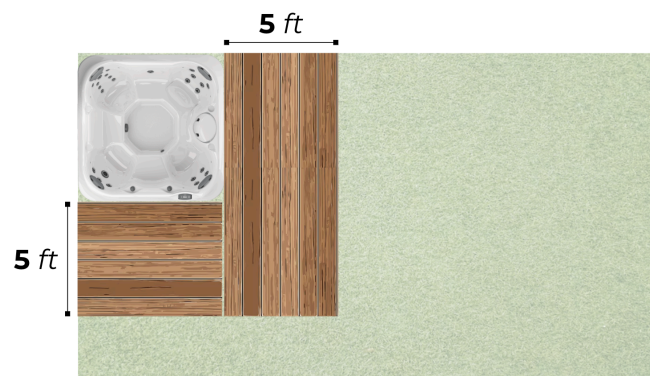
Can I interpret and create expressions?
What does it mean for expressions to be equivalent?

1. Richie wants to put a hot tub in his back yard. He knows he wants a square hot tub, but can't decide what size to get.



How much space will the hot tub and deck take up . . .

- a. . . if Richie buys a hot tub that is 10 feet by 10 feet?
 - b. . . if Richie buys a hot tub that is 8 feet by 8 feet?
 - c. . . if Richie buys a hot tub that is x feet by x feet?
2. Richie's grassy area is **1,000 square feet**. He is also considering the deck option shown below, but is concerned that there may not be enough grassy space remaining if he chooses this option.



- a. How much **grassy space will be left** if Richie buys a hot tub that is 10 feet by 10 feet?
- b. How much *grassy space will be left* if Richie buys a hot tub that is 8 feet by 8 feet?
- c. How much *grassy space will be left* if Richie buys a hot tub that is x feet by x feet?

3. Remember that variables actually represent numbers! So, working with expressions follows the same properties as when working with numbers. Determine if each pair of expressions is equivalent. Use what you know about numbers to help you reason about the expressions involving variables.

SET 1

| Expression 1 | Expression 2 | Equivalent? (Y or N) |
|-----------------|--------------------|----------------------|
| $15 - (4 + 1)$ | $15 - 4 + 1$ | |
| $15 + (4 - 1)$ | $15 + 4 - 1$ | |
| $15 - 2(3 + 2)$ | $15 - 2(5)$ | |
| $15 - 2(3 + 2)$ | $15 - 2(3) - 2(2)$ | |
| $10 - (8 - x)$ | $10 - 8 - x$ | |
| $3 - 4(n - 1)$ | $3 - (4n - 4)$ | |
| $3 - 4(n - 1)$ | $3 - 4n - 4$ | |

SET 2

| Expression 1 | Expression 2 | Equivalent? (Y or N) |
|-------------------------------|--------------|----------------------|
| $4 + 4 + 4$ | $3(4)$ | |
| $2 \cdot 2 \cdot 2$ | $3(2)$ | |
| $3 + 3 + 3 + 3 \cdot 3$ | $5(3)$ | |
| $3^2 + 3^2 + 3^2 + 3^2 + 3^2$ | $5(3)^2$ | |
| $x + x + x + x$ | x^4 | |
| $y + y + y \cdot y$ | $3y^2$ | |

4. For each set of expressions below:

- Decide if the expression on the right is equivalent to the expression on the left.
- If it is equivalent, explain how you know.
- If it is not equivalent, cross it out and write an expression that is equivalent.

a. $2(n + 3)$ and $2n + 3$

b. $(5n)^2$ and $5n^2$

c. $\frac{10n - 5}{5}$ and $2n - 1$

d. $(n + 3)^2$ and $n^2 + 9$