

## **Convert square feet (sq. ft.) to acres (Cross Multiplication)**

When making pesticide applications, the label may give application rates in sq. ft. while you know the acres that need treatment, or vice versa. You may have to convert from sq. ft. to acres, or acres to sq. ft. to figure out the correct amount of pesticide to apply. Putting the information you know into ratios and using cross multiplication is one way to find the answer.

***A field that is 1,742,400 sq. ft. is equal to how many acres?      43,560 sq. ft. = 1 acre***

We'll show two different ways of looking at this problem. The first is just deciding whether to multiply or divide. The second way uses cross multiplication. In both cases, it is important to know that 43,560 sq. ft. equals 1 acre.

If you are converting from a smaller unit of measure to a larger unit of measure, say from square feet to acres, you will divide. Take our example above: how many acres are in 1,742,400 square feet? An acres is much larger than a square foot, so you will end up having fewer acres. That means you divide:

$$1,742,400 \div 43,560 = 40 \text{ acres}$$

This can also be written as

$$\frac{1,742,400}{43,560} = 40 \text{ acres}$$

If you are converting from a larger unit of measure to a smaller unit of measure, say from acres to square feet, you will multiply. For example, you want to know how many square feet are in 2 acres. A square foot is a lot smaller than an acre, so you will end up having more square feet than acres in a given plot. That means you will multiply 2 by 43,560 (because there are 43,560 square feet in one acre)

$$43,560 \text{ square feet} \times 2 = 87,120 \text{ square feet}$$

**Practice:**

**1. A field that is 45,000 sq. ft. is how many acres?**

**2. 15 acres is how many sq. ft.?**

**3. A field that is 15,000 sq. ft. is how many acres?**

**Answers**

1.  $\frac{45,000 \text{ sq. ft.}}{43,560 \text{ sq. ft.}} = 1.03$  or about 1 acre

2.  $15 \text{ acres} \times 43,560 = 653,400 \text{ sq. ft.}$

3.  $\frac{15,000 \text{ sq. ft.}}{43,560 \text{ sq. ft.}} = 0.34$  acre

## Cross Multiplication

***A field that is 1,742,400 sq. ft. is equal to how many acres?      43,560 sq. ft. = 1 acre***

Write the information you know as proportions or ratios, using N for the number of acres you want to find. Have the same units of measurement on the top (numerator) and the same units on the bottom (denominator). In this case, acres are on top, and sq. ft. on the bottom. You could have sq. ft. on the top and acres on the bottom, and would get the same answer.

$$\frac{1 \text{ acre}}{43,560 \text{ sq. ft.}} = \frac{N \text{ acres}}{1,742,400 \text{ sq. ft.}}$$

Then, cross multiply the two terms that are diagonal to each other:

$$\frac{1 \text{ acre}}{43,560 \text{ sq. ft.}} \times \frac{N \text{ acres}}{1,742,400 \text{ sq. ft.}}$$

$$(N \times 43,560) = (1 \times 1,742,400)$$

You can write this as:

$$43,560N = 1,742,400$$

Now, you have 43,560 N, but you want to solve for just N. Divide both sides by 43,560 to get N:

$$\frac{43,560N}{43,560} = \frac{1,742,400}{43,560} = 40$$

$$N = 40 \text{ acres}$$

When you use proportions or ratios, the units (feet, inches, pounds, ounces, etc.) on the top and bottom of one ratio have to be the same as the units on top and bottom of the other ratio.

**Practice:**

**4. A field that is 45,000 sq. ft. is how many acres?**

**5. 15 acres is how many sq. ft.?**

**6. A field that is 15,000 sq. ft. is how many acres?**

**Answers:**

**4. A field that is 45,000 sq. ft. is how many acres?**

$$\frac{43,560 \text{ sq. ft.}}{1 \text{ acre}} = \frac{45,000 \text{ sq. ft.}}{N \text{ acres}} \quad N = 1.03 \text{ or about 1 acre}$$

Notice that in the answer above, sq. ft. is on top for both ratios, instead of on the bottom as given in the examples. You will get the same answer if sq. ft. was on the bottom of both ratios. Just make sure you have the same units on the top and the same units on the bottom for both ratios when doing cross multiplication.

**5. 15 acres is how many sq. ft.?**

$$\frac{1 \text{ acre}}{43,560 \text{ sq. ft.}} = \frac{15 \text{ acres}}{N \text{ sq. ft.}} \quad N = 653,400 \text{ sq. ft.}$$

**6. A field that is 15,000 sq. ft. is how many acres?**

$$\frac{1 \text{ acre}}{43,560 \text{ sq. ft.}} = \frac{N \text{ acres}}{15,000 \text{ sq. ft.}} \quad N = 0.34 \text{ acre}$$