Math

For Pesticide Handlers

IANR

University of Nebraska Lincoln | Extension

What's Up?

Working with pesticides often involves math, something many people don't really enjoy and try to avoid. This presentation is made up of 15 questions with multiple choice answers. The idea is for you to find out your strengths, and what you could brush up on so that you can handle pesticides safely and effectively.

If you solve a problem correctly (without guessing!), we're going to assume you know what's going on. If you miss a problem, you'll have the opportunity to try again and print a worksheet for more information and practice.

What's Up?

Besides solving problems you'll have when working with pesticides, we'll review some skills, like cross multiplication and unit cancellation. These can help you figure out:

- how much pesticide to apply,
- how to convert acres to 1,000 sq. ft. or sq. ft. to acres, and
- how to determine the size of an area that needs treatment,

often without memorizing formulas.

Grab a pencil and paper and let's see what you already know.

Percentages

1. 0.5% is equal to what decimal? Click on the correct answer.
    a. 0.5
    b. 0.05
    c. 0.005

***More* like this**

Why do I need to know this?

Often, the amount of an adjuvant to use in a pesticide mixture is given in terms of percentage of the final solution. For example, the adjuvant directions may say to use it at a 0.5% concentration. To determine the amount needed, *first convert the percentage of concentrate in the final solution to a decimal.* Then you'll calculate the amount of the adjuvant concentrate to mix with water.

Convert square feet (sq. ft.) to acres

2. A field that is 1,742,400 sq. ft. is equal to how many acres?

   43,560 sq. ft. = 1 acre

   a. 4
   b. 10
   c. 40

***More* like this**

Why do I need to know this?

The label may give application rates in sq. ft. while you know the acres that need treatment, or vise 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.

Find the area of a rectangular field

3. You measure a rectangular field and find it to be 100 feet long and 800 feet wide. How many acres is it? 1 acre = 43,560 sq. ft.

a. 1.8
b. 9.8
c. 15.1

More like this

Why do I need to know this?

You need to know the size of the area to be treated so that you purchase the right amount of pesticides and know how much to mix.

Find the area of a circular field

4. You have a circular field (center pivot and do not farm the corners). The diameter of the field is 1,000 feet. How many acres is it?

   a. 10
   b. 18
   c. 78

***More* like this**

Why do I need to know this?

You need to know the size of the area to be treated so that you purchase the right amount of pesticides and know how much to mix.

Area of an irregularly shaped field

5. The area to be treated is 120 feet long. You measure the width in 6 places: 30 ft., 45 ft., 60 ft., 70 ft., 45 ft., and 35 ft. What is the area, in acres?

a. 0.13 acres
b. 0.36 acres
c. 0.54 acres

***More* like this**

Why do I have to know this?

You must know the area of the field or site to be treated. Often it will not be a circle, square, or rectangular.

Determine total amount of product needed

6. The pesticide label says to apply a granule at the rate 2 pounds per acre. How much product do you need to treat 5 acres?
    a. 7.5 pounds
    b. 10 pounds
    c. 15 pounds

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Why do I need to know this?

This is a common problem when purchasing pesticides. If you know the required rate and the size of the area to treat, you can figure out how much pesticide product you'll need.

Find amount of active ingredient in a product

7. How many pounds of active ingredient (a.i.) is in a 50-pound bag of a 75WP pesticide?

a. 37.5 pounds

b. 45 pounds

c. 50 pounds

Why do I need to know this?

***More* like this**

Some pesticide labels give the application rate in amount of active ingredient (a.i.) per acre or per 1,000 sq. ft. You must convert the a.i. to the amount of formulated product needed. For dry formulations such as wettable powders, granules, and dusts, the amount of a.i. is expressed as a percentage of the weight. A 75WP tells that the a.i. is 75% of the product.

Convert miles per hour to feet per second

8. Convert 2 miles per hour to feet per second.

a. 0.4 ft per second

b. 1.3 ft per second

c. 2.9 ft per second

***More* like this**

Why do I have to know this?

When calibrating equipment, you may have to know how to do this. In addition, understanding how to do conversions like this will help you do many calculations without having to memorize formulas.

Determine amount of granular product needed

9. The label says to apply a fungicide at a rate of 2 pounds per acre. How much do you need to treat 40 acres?

a. 20 pounds

b. 50 pounds

c. 80 pounds

***More* like this**

Why do I need to know this?

When applying pesticides, one of the most common problems you will have is to figure out how much pesticide needed to treat an area.

Determine amount of liquid product needed

10. The label says to apply a fungicide at a rate of 10 fluid ounces per acre. How many gallons do you need to treat 45 acres?

a. 3.5 gallons

b. 25 gallons

c. 45 gallons

***More* like this**

Why do I need to know this?

When applying pesticides, one of the most common problems you will have is to figure out how much pesticide needed to treat an area. The rate may be given in fluid ounces, and your purchase will be in gallons.

Determine amounts of water & pesticide to mix

11. You are going to apply an herbicide to a 20-acre field, using a ground sprayer that has been calibrated to apply 20 gallons per acre. How many gallons of water and how many gallons of pesticide product should you mix if the herbicide rate is 44 fluid ounces per acre, and the spray volume must be at least 15 gallons per acre?

a. 2.125 gallons of herbicide and 400.125 gallons of water

b. 4.875 gallons of herbicide and 395.125 gallons of water

c. 6.875 gallons of herbicide and 393.125 gallons of water

Why do I have to know this?

This is a common problem when mixing pesticides.

***More* like this**

Determine amount of pesticide to use

12. Your 300-gallon sprayer has been calibrated to apply 15 GPA. The pesticide label says to apply 32 fluid ounces of product per acre for broadcast application. How many gallons of pesticide will you add to the tank to spray 20 acres? 1 gallon = 128 fluid ounces

a. 5 gallons

b. 10 gallons

c. 15 gallons

Why do I have to know this?

This is a common problem when mixing pesticides.

***More* like this**

Mix a wettable powder pesticide

13. The pesticide label says to use 2 pounds of pesticide in 100 gallons of water. You want to fill a 300-gallon tank. How much pesticide must you add?

a. 3 pounds

b. 6 pounds

c. 9 pounds

***More* like this**

Why should I know how to do this?

In mixing a finished spray, you must add the correct amount of pesticide to the carrier (usually water). Too little may result in a poor job and possible resistance. Too much may injure the treated surface, result in illegal residues, or be a waste of money and pesticides.

Mix a liquid pesticide

14. The pesticide label says to use 3 pints of emulsifiable concentrate (EC) pesticide in 100 gallons of water. You want to fill a 300-gallon tank. How much pesticide must you add?

a. 3 pints
b. 6 pints
c. 9 pints

***More* like this**

Why should I know how to do this?

In mixing a finished spray, you must add the correct amount of pesticide to the carrier (usually water). Too little may result in a poor job and possible resistance. Too much may injure the treated surface, result in illegal residues, or be a waste of money and pesticides.

Using formulas

15. What is the output in gallons per minute (gpm) if you spray 25 gallons per acre (gpa) at a speed of 8 miles per hour (mph)? Your sprayer has 15 inches between nozzles.

Use the formula $GPM = \frac{GPA \times MPH \times Width\ (inches)}{5{,}940}$

a. 0.32 gpm
b. 0.5 gpm
c. 1.32 gpm

***More* like this**

Why should I know how to do this?

Some people prefer to use formulas, such as this one, especially when calibrating equipment.

Correct!

Unless you just took a lucky guess, you know how to do this!

Return to problems

Sorry!

Try again to see if you can figure out the correct answer.

If you want more practice with this type of problem, click on ***Return to problems*** (below). On the problem page, click on ***More like this*** in the right hand corner.

Return to problems

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Developed by the
Pesticide Safety Education Program

Questions? Contact pested@unl.edu

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