



PRACTICE PROBLEMS

for

Dilution and Calibration

(March 1992)

ANSWERS TO PRACTICE PROBLEMS, pp. 14 - 16
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Dilution problems—LIQUID pesticides, pp. 2 - 9

Dilution by Parts, p. 10

Calibration Problems, p. 12

Estimating Amount of Pesticide for a Job, p. 12

ANSWERS, pp. 14 - 16

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For problem 1, refer to the directions in this box:

For control of LANTANA: Apply a 1% mixture
(1 gallon of this herbicide to make 100 gallons of spray mixture).

DIRECTIONS: Fill in the blanks. Follow the example.

1. How much of this herbicide would you need to make ...

(example)...120 gallons of spray mixture? 1 gal. + 3.2 cups

1a. ...125 gallons of spray mixture? gal. + cups

1b. ...145 gallons of spray mixture? gal. + cups

1c. ...170 gallons of spray mixture? gal. + cups

1d. ...185 gallons of spray mixture? gal. + cups

1e. ...190 gallons of spray mixture? gal. + cups

SHOW YOUR WORK ON THE SPACE BELOW AND ON THE NEXT PAGE.

For problem 2, refer to the directions in this box:

For control of Botrytis flower rot: Apply a full coverage spray mixture of 2 pints per 100 gallons of water.

DIRECTIONS: Fill in the blanks. Follow the example.

2. How much of this fungicide would you need to make ...

(example)...90 gallons of spray mixture? 3 cups + 4.8 fl. oz.

2a. ...85 gallons of spray mixture? cups + fl. oz.

2b. ...70 gallons of spray mixture? cups + fl. oz.

2c. ...65 gallons of spray mixture? cups + fl. oz.

2d. ...55 gallons of spray mixture? cups + fl. oz.

2e. ...30 gallons of spray mixture? cups + fl. oz.

SHOW YOUR WORK ON THE SPACE BELOW AND ON THE NEXT PAGE.

For problem 3, refer to the directions in this box:

CHRYSANTHEMUMS: Mix 3 pints PGR 4E in 100 gallons of water and spray foliage thoroughly.

DIRECTIONS: Fill in the blanks. Follow the example.

3. How much of this pesticide would you need to make ...

(example)...24 gallons of spray mixture? 11.5 fl. oz.

3a. ...20 gallons of spray mixture? _____ fl. oz.

3b. ...18 gallons of spray mixture? _____ fl. oz.

3c. ...15 gallons of spray mixture? _____ fl. oz.

3d. ...12 gallons of spray mixture? _____ fl. oz.

SHOW YOUR WORK ON THE SPACE BELOW AND ON THE NEXT PAGE.

For problem 4, refer to the directions in this box:

Apply a mixture of 4 fl. oz. ($\frac{1}{2}$ cup) in 3 gallons of water.

DIRECTIONS: Fill in the blanks. Follow the example.

4. How much of this pesticide would you need to make ...

(example)...10 gallons of spray mixture? 13.33 fl. oz.

4a. ...8 gallons of spray mixture? _____ fl. oz.

4b. ...7 gallons of spray mixture? _____ fl. oz.

4c. ...2 gallons of spray mixture? _____ fl. oz.

4d. ...1 gallon of spray mixture? _____ fl. oz.

SHOW YOUR WORK ON THE SPACE BELOW AND ON THE NEXT PAGE.

DILUTION BY PARTS

(For help in doing these problems, see the handout, "Calibration of Pesticide Application Equipment", page 2, column 2.)

1. Suppose you have a container of liquid insecticide. Its label states that it contains 32% active ingredient. You are told to make 1 gallon (128 fluid ounces) of spray mixture containing 1% active ingredient. How many fluid ounces of liquid insecticide should you measure out? *See page 16 for solution.*
2. Suppose you have a container of liquid fungicide. Its label states that it contains 24% active ingredient. You are told to make 1 gallon (128 fluid ounces) of finished spray mixture containing 1.5% active ingredient. How many fluid ounces of liquid fungicide should you measure out? *See page 16 for solution.*
3. If you have a container of liquid pesticide containing 77% active ingredient, approximately how much liquid pesticide should you use to make 1 gallon of finished spray mixture containing 1% active ingredient? (Choose one answer.)
 - a) $1\frac{2}{3}$ fluid ounces
 - b) 2 fluid ounces
 - c) $2\frac{1}{2}$ fluid ounces
 - d) 3 fluid ounces
4. If you gave a 2-gallon container of liquid pesticide containing 36% active ingredient, approximately how much liquid pesticide should you use to make 1 gallon of finished spray mixture containing 1.5% active ingredient? (Choose one answer.)
 - a) $4\frac{2}{3}$ fluid ounces
 - b) 5 fluid ounces
 - c) $5\frac{1}{3}$ fluid ounces
 - d) $5\frac{2}{3}$ fluid ounces

CALIBRATION PROBLEMS

1. When you use your 50-gallon capacity power sprayer, each 1 gallon of spray mixture in the tank is enough to cover 800 square feet. How many gallons of spray mixture will you need to cover 20,000 square feet?
2. With a full load of spray mixture (3 gallons) in your knapsack sprayer, you are able to spray 2,400 square feet of short lawn grass. How much spray mixture would you need to spray only 400 square feet of short lawn grass? (Choose one answer.)
a) $\frac{1}{4}$ gallon b) $\frac{1}{2}$ gallon c) $\frac{3}{4}$ gallon d) 1 gallon
3. With a full load of spray mixture (3 gallons) in your knapsack sprayer, you are able to spray 4,500 square feet of bare soil. How much spray mixture would you need to spray only 750 square feet of bare soil? (Choose one answer.)
a) $\frac{1}{4}$ gallon b) $\frac{1}{2}$ gallon c) $\frac{3}{4}$ gallon d) 1 gallon

ESTIMATING AMOUNT OF PESTICIDE FOR A JOB

1. The label directions for Weedicate 50W call for an application rate of 2 pounds per acre. How many pounds of Weedicate 50W would you need to treat 5 acres at that rate?
2. The label directions for Weedicate 4E call for an application rate of 2 pints per acre. How many pints of Weedicate 4E would you need to treat $\frac{1}{4}$ acre at that rate?
3. If you calibrated your 100-gallon capacity sprayer to apply 20 gallons of spray mixture per acre AND the label directions for Weedicate 50W call for an application rate of 2 pounds per acre, how many pounds of Weedicate 50W should you put in your sprayer tank to treat 4 acres at that rate? (Choose one answer.)
a) 20 pounds b) 16 pounds c) 10 pounds d) 8 pounds
4. If you calibrated your 50-gallon capacity sprayer to apply 200 gallons of spray mixture per acre AND the label directions for Weedicate 4E call for an application rate of 2 pints per acre, how many pints of Weedicate 4E should you put in the tank to treat $\frac{1}{8}$ acre at that rate? (Choose one answer.)
a) 1 pint b) $\frac{1}{2}$ pint c) $\frac{1}{4}$ pint d) $\frac{1}{8}$ pint

ANSWERS TO PRACTICE PROBLEMS

DILUTION PROBLEMS—LIQUID FORMULATIONS

- 1a. 1 gal. + 4 cups
- 1b. 1 gal. + 7.2 cups
- 1c. 1 gal. + 11.2 cups
- 1d. 1 gal. + 13.6 cups
- 1e. 1 gal. + 14.4 cups
- 2a. 3 cups + 3.2 fl. oz.
- 2b. 2 cups + 6.4 fl. oz.
- 2c. 2 cups + 4.8 fl. oz.
- 2d. 2 cups + 1.6 fl. oz.
- 2e. 1 cup + 1.6 fl. oz.
- 3a. 9.6 fl. oz.
- 3b. 8.6 fl. oz.
- 3c. 7.2 fl. oz.
- 3d. 5.8 fl. oz.
- 4a. 10.67 fl. oz.
- 4b. 9.33 fl. oz.
- 4c. 2.67 fl. oz.
- 4d. 1.33 fl. oz.

DILUTION BY PARTS

- 1. 4 fl. oz. (see last page for steps in solving this problem)
- 2. 8 fl. oz. (see last page for steps in solving this problem)
- 3. a) $1\frac{2}{3}$ fl. oz.
- 4. c) $5\frac{1}{3}$ fl. oz.

ANSWERS TO PRACTICE PROBLEMS

CALIBRATION PROBLEMS

1. 25 gallons to cover 20,000 square feet

$$\frac{20,000 \text{ sq. ft.} \times 1 \text{ gal.}}{800 \text{ sq. ft.}} = 25 \text{ gallons}$$

2. $\frac{1}{2}$ gallon to cover 400 square feet.

$$\frac{400 \text{ sq. ft.} \times 3 \text{ gal.}}{2,400 \text{ sq. ft.}} = \frac{1}{2} \text{ gallon}$$

3. $\frac{1}{2}$ gallon to cover 750 square feet.

$$\frac{750 \text{ sq. ft.} \times 3 \text{ gal.}}{4,500 \text{ sq. ft.}} = \frac{1}{2} \text{ gallon}$$

ESTIMATING AMOUNT OF PESTICIDE FOR A JOB

1. 10 pounds needed to treat 5 acres

$$\frac{2 \text{ pounds}}{\text{acre}} \times 5 \text{ acres} = 10 \text{ pounds}$$

2. $\frac{1}{2}$ pint needed to treat $\frac{1}{4}$ acre

$$\frac{2 \text{ pints}}{\text{acre}} \times \frac{1}{4} \text{ acre} = \frac{1}{2} \text{ pint}$$

3. 8 pounds needed to treat 4 acres

$$\frac{2 \text{ pounds}}{\text{acre}} \times 4 \text{ acres} = 8 \text{ pounds}$$

4. $\frac{1}{4}$ pint needed to treat $\frac{1}{8}$ acre

$$\frac{2 \text{ pints}}{\text{acre}} \times \frac{1}{8} \text{ acre} = \frac{1}{4} \text{ pint}$$

SOLVING "DILUTION BY PARTS" PROBLEMS

1. — Step 1 —

$$\frac{32\%}{1\%} = 32 \text{ means: } \textit{The dilution should be '1 part liquid insecticide + 31 parts water'}$$

In other words, $\frac{1}{32}$ of the finished spray mixture should be liquid insecticide.

— Step 2 —

You want 1 gallon of finished spray mixture.
1 gallon = 128 fluid ounces.

— Step 3 —

How much is $\frac{1}{32}$ of one gallon?

$$\frac{128 \text{ fl. oz.}}{32} = 4 \text{ fluid ounces. } \textit{This means: 4 fl. oz. of liquid insecticide to make 1 gallon of 1\% finished insecticide spray mixture.}$$

2. — Step 1 —

$$\frac{24\%}{1.5\%} = 16 \text{ means: } \textit{The dilution should be '1 part liquid fungicide + 15 parts water'}$$

In other words, $\frac{1}{16}$ of the finished spray mixture should be liquid fungicide.

— Step 2 —

You want 1 gallon of finished spray mixture.
1 gallon = 128 fluid ounces.

— Step 3 —

How much is $\frac{1}{16}$ of one gallon?

$$\frac{128 \text{ fl. oz.}}{16} = 8 \text{ fluid ounces. } \textit{This means: 8 fl. oz. of liquid fungicide to make 1 gallon of 1.5\% finished fungicide spray mixture.}$$