

Mixing Liquid Formulations

The pesticide label says to use 3 pints of pesticide in 100 gallons of water. You want to fill a 300-gallon tank. How much pesticide must you add? Develop a ratio or proportion, with the same units on the top, and the same units on the bottom.

$$\frac{3 \text{ pints}}{100 \text{ gallons}} = \frac{N \text{ pints}}{300 \text{ gallons}}$$

Cross multiply

$$\frac{3 \text{ pints}}{100 \text{ gallons}} \times \frac{N \text{ pints}}{300 \text{ gallons}}$$

$$(100 \times N) = (3 \times 300)$$

$$100 N = 900$$

Divide each side by 100 to solve for N:

$$\frac{100 N}{100} = \frac{900}{100} \quad N = 9 \text{ pints}$$

How many pints of pesticide will you use if you just need 20 gallons of spray mixture?

$$\frac{3 \text{ pints}}{100 \text{ gallons}} = \frac{N \text{ pints}}{20 \text{ gallons}}$$

Cross multiply

$$\frac{3 \text{ pints}}{100 \text{ gallons}} \times \frac{N \text{ pints}}{20 \text{ gallons}}$$

$$(100 \times N) = (3 \times 20)$$

$$100 N = 60$$

Divide each side by 100 to solve for N:

$$\frac{100 N}{100} = \frac{60}{100}$$

N = 0.6 pints How many fluid ounces is that? 1 pint = 16 fluid ounces

$$0.6 \text{ pints} \times \frac{16 \text{ fluid ounces}}{1 \text{ pint}} = 9.6 \text{ fluid ounces}$$

Practice:

- The pesticide label says to use 2.5 pints of pesticide in 100 gallons of water. You want to fill a 400-gallon tank. How many pints of pesticide must you add?***
 - How many gallons? (8 pints = 1 gallon)***
- What if you need just 10 gallons of spray mixture?***
- The pesticide label says to use 3 pints of pesticide in 100 gallons of water. You want to fill a 600-gallon tank. How many pints of pesticide must you add?***
- How many pints must you add if you need just 200 gallons of spray mixture?***

Answers:

- The pesticide label says to use 2.5 pints of pesticide in 100 gallons of water. You want to fill a 400-gallon tank. How many pints of pesticide must you add?***

$$\frac{2.5 \text{ pints}}{100 \text{ gallons}} = \frac{N \text{ pints}}{400 \text{ gallons}}$$

Cross multiply

$$\frac{2.5 \text{ pints}}{100 \text{ gallons}} \times \frac{N \text{ pints}}{400 \text{ gallons}}$$

$$(100 \times N) = (2.5 \times 400)$$

$$100 N = 1,000$$

Divide each side by 100 to solve for N:

$$\frac{100 N}{100} = \frac{1,000}{100} \quad N = 10 \text{ pints}$$

- a. **How many gallons of pesticide? (8 pints = 1 gallon)**

$$10 \text{ pints} \times \frac{1 \text{ gallon}}{8 \text{ pints}} = 1.25 \text{ gal}$$

2. **What if you need just 10 gallons of spray mixture?**

$$\frac{2.5 \text{ pints}}{100 \text{ gallons}} = \frac{N \text{ pints}}{10 \text{ gallons}}$$

Cross multiply

$$\frac{2.5 \text{ pints}}{100 \text{ gallons}} \times \frac{N \text{ pints}}{10 \text{ gallons}}$$

$$(100 \times N) = (2.5 \times 10)$$

$$100 N = 25$$

Divide each side by 100 to solve for N:

$$\frac{100 N}{100} = \frac{25}{100} \quad N = 0.25 \text{ pints}$$

3. **The pesticide label says to use 3 pints of pesticide in 100 gallons of water. You want to fill a 600-gallon tank. How many pints of pesticide must you add?**

$$\frac{3 \text{ pints}}{100 \text{ gallons}} = \frac{N \text{ pints}}{600 \text{ gallons}}$$

Cross multiply

$$\frac{3 \text{ pints}}{100 \text{ gallons}} \times \frac{N \text{ pints}}{600 \text{ gallons}}$$

$$(100 \times N) = (3 \times 600)$$

$$100 N = 1,800$$

Divide each side by 100 to solve for N:

$$\frac{100 N}{100} = \frac{1,800}{100} \quad N = 18 \text{ pints}$$

4. **How many pints must you add if you need just 200 gallons of spray mixture?**

$$\frac{3 \text{ pints}}{100 \text{ gallons}} = \frac{N \text{ pints}}{200 \text{ gallons}}$$

$$(100 \times N) = (3 \times 200)$$

$$100 N = 600$$

Divide each side by 100 to solve for N:

$$\frac{100 N}{100} = \frac{600}{100} \quad N = 6 \text{ pints}$$

Another way of doing these problems is to see if you can find a relationships:

The pesticide label says to use 2 pints of pesticide in 100 gallons of water. You want to fill a 500-gallon tank. How much pesticide must you add?

$$\frac{500 \text{ gallons}}{100 \text{ gallons}} = 5$$

If you need 5 times the amount of water, you'll need 5 times the amount of product (2 pints X 5= 10 pints).