

# Your Bonus



## Steps for doing the Homework

1. Read the entire question.
2. Read it again: understand what it is asking.
3. Apply the appropriate formula (from page 5 of the *Handout Packet*).
4. Write the formula down.
5. Plug in the numbers from the question into the formula.
6. Do the arithmetic.
7. Write down the answer.

**Make sure you convert to the correct units of measure:**

Distance	--	Feet
Weight	--	Pounds
Liquid	--	Gallons



# CALCULATIONS HOMEWORK

2018-r1

1. A circular spa has a 12 foot diameter and a constant depth of 3.5 feet. What is the water volume of this spa?

A. What is the question asking? \_\_\_\_\_

B. What is the formula? \_\_\_\_\_

Show your work (plug in the numbers)

ANSWER: \_\_\_\_\_

2. A pool has a length of 135 feet and a width of 105 feet. What is the surface area of this pool?

A. What is the question asking? \_\_\_\_\_

B. What is the formula? \_\_\_\_\_

Show your work (plug in the numbers)

ANSWER: \_\_\_\_\_

3. A pool has a length of 46 feet, a width of 24 feet, a shallow depth of 4 feet and a deep depth of 8 feet. What is the water volume of this pool?

A. What is the question asking? \_\_\_\_\_

B. What is the formula? \_\_\_\_\_

Show your work (plug in the numbers)

ANSWER: \_\_\_\_\_

4. A pool has a length of 75 feet, a width of 50 feet, a shallow depth of 3.5 feet and a deep depth of 12 feet. What is the water volume of this rectangular pool?

A. What is the question asking? \_\_\_\_\_

B. What is the formula? \_\_\_\_\_

Show your work (plug in the numbers)

ANSWER: \_\_\_\_\_

5. Calculate the Saturation Index for water that has a carbonate alkalinity of 100 ppm, a pH of 7.3, a calcium hardness of 250 ppm, a temperature of 67°F, and a total dissolved solids of 1500 ppm. If it is not balanced, fix it.

\* Use the "Saturation Index Worksheet" in the Handout Packet. Please write the number of this question next to the worksheet that you use.

If it needs fixed, write in an "ideal" value for pH, Total Alkalinity, and Calcium Hardness in the "New Value" column. These values are on page 260 of your Pool & Spa Operator™ Handbook, 2017 Edition.

## CALCULATIONS HOMEWORK

2018-r1

6. Calculate the Saturation Index for water that has a carbonate alkalinity of 100 ppm, a pH of 8.2, a calcium hardness of 200 ppm, a temperature of 78°F, and a total dissolved solids of 500 ppm. If it is not balanced, fix it.

*\* Use the "Saturation Index Worksheet" in the Handout Packet. Please write the number of this question next to the worksheet that you use.*

*If it needs fixed, write in an "ideal" value for pH, Total Alkalinity, and Calcium Hardness in the "New Value" column. These values are on page 260 of your Pool & Spa Operator™ Handbook, 2017 Edition.*

7. Adjust the Alkalinity from 70 ppm to 100 ppm in a 250,000 gallon pool using sodium bicarbonate.

*\* Use the "Chemical Adjustment Worksheet" in the Handout Packet. Please write the number of this question next to the worksheet that you use.*

*You will need to refer to the "Water Chemistry Adjustment Guide" on page 262 of your Pool & Spa Operator™ Handbook, 2017 Edition. (A dosage chart for a 10,000 gallon pool).*

ANSWER: \_\_\_\_\_

8. Adjust the Calcium Hardness from 75 ppm to 150 ppm in a 150,000 gallon pool. Use Calcium Chloride 77%.

*\* Use the "Chemical Adjustment Worksheet" in the Handout Packet. Please write the number of this question next to the worksheet that you use.*

*You will need to refer to the "Water Chemistry Adjustment Guide" on page 262 of your Pool & Spa Operator™ Handbook, 2017 Edition. (A dosage chart for a 10,000 gallon pool).*

ANSWER: \_\_\_\_\_

9. How much Cyanuric Acid is needed to raise the stabilizer level in a 75,000 gallon pool from 0 to 30ppm?

*\* Use the "Chemical Adjustment Worksheet" in the Handout Packet. Please write the number of this question next to the worksheet that you use.*

*You will need to refer to the "Water Chemistry Adjustment Guide" on page 262 of your Pool & Spa Operator™ Handbook, 2017 Edition. (A dosage chart for a 10,000 gallon pool).*

ANSWER: \_\_\_\_\_

10. How much Calcium Hypochlorite is needed to breakpoint chlorinate a 125,000 gallon pool if Total chlorine is 1.4 ppm, and free chlorine is 1.0 ppm?

*\* Use the "Breakpoint Super-Chlorination Worksheet" in the Handout Packet. Please write the number of this question next to the worksheet that you use.*

*You will need to refer to the "Water Chemistry Adjustment Guide" on page 262 of your Pool & Spa Operator™ Handbook, 2017 Edition. (A dosage chart for a 10,000 gallon pool).*

ANSWER: \_\_\_\_\_

## CALCULATIONS HOMEWORK

2018-r1

11. How much Sodium Hypochlorite would it take to put in 1ppm of chlorine in a 120,000 gallon pool?

*\* Use the "Chemical Adjustment Worksheet" in the Handout Packet. Please write the number of this question next to the worksheet that you use.*

*You will need to refer to the "Water Chemistry Adjustment Guide" on page 262 of your Pool & Spa Operator™ Handbook, 2017 Edition. (A dosage chart for a 10,000 gallon pool).*

ANSWER: \_\_\_\_\_

12. A 3,500 gallon commercial spa has a flow rate of 150 gpm. What is the turnover rate?

A. *What is the question asking?* \_\_\_\_\_

B. *What is the formula?* \_\_\_\_\_

*Show*

ANSWER: \_\_\_\_\_

13. What is the flow rate of a 3500 gallon spa based on a 30 minute turnover rate?

A. *What is the question asking?* \_\_\_\_\_

B. *What is the formula?* \_\_\_\_\_

*Show your work (plug in the numbers)*

ANSWER: \_\_\_\_\_

14. A 275,000 gallon pool needs to turn over the water every 6 hours. What flow rate is required for this turnover rate?

A. *What is the question asking?* \_\_\_\_\_

B. *What is the formula?* \_\_\_\_\_

*Show your work (plug in the numbers)*

ANSWER: \_\_\_\_\_

15. A pool with a sand filter system has a flow rate of 220 gpm and an optimal media flow rate of 12 gpm per square foot of filter medium. What is the required filter area to meet this need?

A. *What is the question asking?* \_\_\_\_\_

B. *What is the formula?* \_\_\_\_\_

*Show your work (plug in the numbers)*

ANSWER: \_\_\_\_\_

## CALCULATIONS HOMEWORK

2018-r1

### Answers and Formulas

- |     |                     |   |
|-----|---------------------|---|
| 1)  | 2966 gallons        | Surface Area X Avg. Depth X 7.5               |
| 2)  | 14,175 sq. ft.      | Length X Width                                |
| 3)  | 49,680 gallons      | Surface Area X Avg. Depth X 7.5               |
| 4)  | 217,969 gallons     | Surface Area X Avg. Depth X 7.5               |
| 5)  | -0.3                | Langelier Index                               |
| 6)  | 0.7                 | Langelier Index                               |
| 7)  | 105 pounds          | Dosage Chart p. 262, Chemical Adj. Worksheet  |
| 8)  | 135 pounds          | Dosage Chart p. 262, Chemical Adj. Worksheet  |
| 9)  | 18.28 pounds        | Dosage Chart p. 262, Chemical Adj. Worksheet  |
| 10) | 4.69 pounds         | Dosage Chart p. 262, BrkPt SprChlor Worksheet |
| 11) | 1 gallon            | Dosage Chart p. 262, Chemical Adj. Worksheet  |
| 12) | .39 hrs (23.3 min.) | Water Volume ÷ Flow Rate ÷ 60                 |
| 13) | 117 gpm             | Water Volume ÷ Turnover Rate ÷ 60             |
| 14) | 764 gpm             | Water Volume ÷ Turnover Rate ÷ 60             |
| 15) | 18.33 sq. ft.       | Flow Rate ÷ Filter Media Rate                 |