

## CONVERSION PROBLEMS

1.  $20 \text{ ft}^3 =$  \_\_\_\_\_ gallons
2. 100 gallons = \_\_\_\_\_  $\text{ft}^3$
3. 70 lbs = \_\_\_\_\_ gallons
4. 200 gallons = \_\_\_\_\_ lbs
5. 158,400 inches = \_\_\_\_\_ miles
6.  $1,500 \text{ ft}^3 =$  \_\_\_\_\_ lbs
7.  $25 \text{ ft}^3 =$  \_\_\_\_\_  $\text{yd}^3$
8. 3.5 acres = \_\_\_\_\_  $\text{ft}^2$
9.  $261,360 \text{ ft}^2 =$  \_\_\_\_\_ acres
10.  $130 \text{ ft}^3 =$  \_\_\_\_\_ lbs



5. A tank has a 10 foot radius. What is its circumference and area?
  
  
  
  
  
  
  
  
  
  
6. How many gallons of water would it take to completely fill a total of 3,000 feet of 12 inch water main?
  
  
  
  
  
  
  
  
  
  
7. If three stabilization ponds cover 5 acres, 7 acres, and 10.5 acres, how many square feet is this? If all three ponds are 8 feet deep and completely full, how many gallons of water will they hold?
  
  
  
  
  
  
  
  
  
  
8. A sewer line is 10 inches in diameter and 1,000 feet long. How many gallons does it hold?
  
  
  
  
  
  
  
  
  
  
9. A trench is to be excavated that is 7 feet wide, 30 feet long, and 36 inches deep. What is the volume in cubic yards of the trench?

10. A pipe has a diameter of 2 feet and is full of water. If the velocity through the pipe is 60 feet per minute, what is the flow rate through the pipe in cubic feet per second?

11. A water storage tank holds 500,000 gallons of water. How much chlorine (HTH) in pounds must be added to chlorinate the water to 50 mg/L? (Assume HTH is 65 % chlorine).

12. A water plant is treating 2,000,000 gallons per day. A test for free chlorine residual at the plant indicates a level of 0.2 mg/L. Based on experience, the operator knows they must bring the free chlorine level up to 1.7 mg/L at the plant in order to maintain a level of 1.0 mg/L free residual in the distribution system. If the rotameter on the chlorinator is set at 35, what must the new setting be?

13. Water is flowing into a sedimentation basin at a rate of 500 gpm. Find the detention time for the basin if it is the shape of a cylinder with a diameter of 100 feet and 20 feet deep.

14. A 12 inch sewer line is completely full and the velocity of the wastewater through it is 1.8 feet per second. What is the flow through the line in gpm?

15. A 6 inch water main has a discharge of 200 gallons per minute. Determine the velocity of the water in the main.

16. A stabilization pond is being loaded at the rate of 150 pounds of BOD<sub>5</sub> per day. A small industry contributes 35 pounds of BOD<sub>5</sub> per day to the total loading. If the average per capita of BOD<sub>5</sub> is 0.17 pounds per day, what is the approximate population of the city?
17. The reservoir for a water treatment plant has a capacity of 250,000 gallons. If the reservoir is only 10 % full and the capacity of the plant is 500 gpm while the usage from the customers is a constant 300 gpm, how long will it take to fill the reservoir?
18. The wastewater entering a stabilization pond has a BOD<sub>5</sub> of 250 mg/L. The discharge from the pond in the fall has a BOD<sub>5</sub> of 25 mg/L. What is the efficiency of the pond?