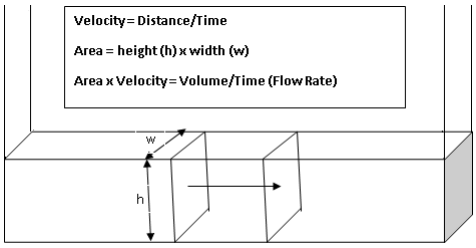
1. A sedimentation basin is 60 feet in diameter. What is the surface area of the tank?

   Solution:

   $$\text{Surface Area}=\frac{\pi}{4} * \text{D}^2 = 0.785 * 60^2 \text{ft}^2 = \boxed{2,826\text{ft}^2}$$

2. A rectangular cross section irrigation channel is 3.25 feet wide and is conveying a water flow of 3.5 MGD. The water flow is 8 inches deep. Calculate the velocity of this flow in ft/s.

   Solution:

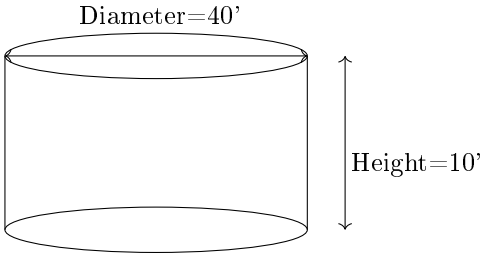


   $$Q = V * A \implies V = \frac{Q}{A}$$

   $$\implies \text{V}\frac{\text{ft}}{\text{s}} = \frac{3.5\frac{\cancel{\text{MG}}}{\cancel{\text{day}}} * \frac{1000000\cancel{gal}}{\cancel{\text{MG}}} * \frac{ft^3}{7.48\cancel{\text{gal}}} * \frac{\cancel{\text{day}}}{(1440 * 60)\text{s}}}{(3.25 * 0.75)\cancel{ft^2}} = \boxed{2.2\frac{\text{ft}}{\text{s}}}$$

3. A circular tank has a diameter of 40 feet and is 10 feet deep. How many gallons will it hold?

   Solution



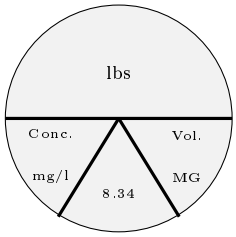
   $$\text{Volume=Surface Area*Height} \implies (\frac{\pi}{4} * D^2 = 0.785 * 40^2 \text{ ft}^2 * 10 \text{ ft}) * 7.48 \text{ gallons} = \boxed{93,949\text{gallons}}$$

4. A 50,000 gallon tank receives 250,000 gpd flow. What is the detention time in hours?

   Solution

   $$\text{DT}=\frac{50,000 \text{ gallons}}{250,000 \frac{\text{gallons}}{\text{day}} * \frac{\text{day}}{24 \text{ hrs}}} = \boxed{4.8 \text{ hours}}$$

5. A tank is 44' in diameter and 22' high and is dosed with 50 ppm of chlorine. How many pounds of 70% HTH is needed?



$$\text{lbs} = \text{Volume(MG)} * \text{Concentration}\frac{\text{mg}}{\text{l}} * 8.34 \implies$$

$$\left(\left((0.785 * 44^2 * 22)\cancel{ft^3} * \frac{7.48\cancel{\text{gallon}}}{\cancel{ft^3}} * \frac{\text{MG}}{1,000,000\cancel{\text{gallon}}}\right) * 50 * 8.34\right)\cancel{\text{lbs HTH}} * \frac{1 \text{ lb of } 70\% \text{ HTH}}{0.7 \cancel{\text{lb HTH}}} = \boxed{149\text{lbs of } 70\%\text{HTH}}$$

6. A flow of 2,200 gpm is pumped against a total head of 14.0 feet. · The pump is 80% efficient and the motor' is 85% efficient. Calculate the brake Hp.

$$\text{pump efficiency} = \frac{\text{waterHp}}{\text{brake Hp}}$$

$$\implies \text{brake Hp} = \frac{\text{waterHp}}{\text{pump efficiency}} = \frac{2,200\text{GPM} * 14\text{ft} * \frac{\text{Hp}}{3,960\text{GPM} - \text{ft}}}{0.8} = \boxed{10Hp}$$