1. What is the volume of water in ft^3, of a sedimentation basin that is 22 feet long, and 15 feet wide, and filled to 10 feet?

2. What is the volume in ft^3 of an elevated clear well that is 17.5 feet in diameter, and filled to 14 feet?

3. What is the area of the top of a storage tank that is 75 feet in diameter?

4. What is the area of a wall 175ft. in length and 20ft. wide?

5. You are tasked with filling an area with rock near some of your equipment. 1 Bag of rock covers 250 square feet. The area that needs rock cover is 400 feet in length and 30 feet wide. How many bags do you need to purchase?

6. A circular clearwell is 150 feet in diameter and 40 feet tall. The Clearwell has an overflow at 35 feet. What is the maximum amount of water the clearwell can hold in Million gallons rounded to the nearest hundredth?

7. A sedimentation basin is 400 feet length, 50 feet in width, and 15 feet deep. What is the volume expressed in cubic feet?

8. A clearwell holds $314,000 ft^3$ of water. It is 100ft in diameter. What is the height of the clearwell?

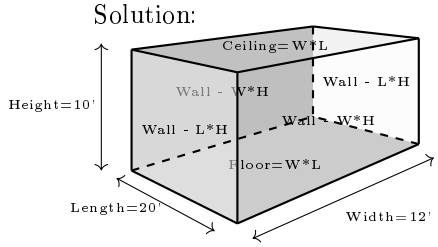
9. A treatment plant operator must fill a clearwell with $10,000 ft^3$ of water in 90 minutes. What is the rate of flow expressed in GPM?

10. A water tank has a capacity of 6MG. It is currently half full. It will take 6 hours to fill. What is the flow rate of the pump?

11. A clearwell with the capacity of 2.5MG is being filled after a maintenance period. The flow rate is 2,500 GPM. The operator begins filling at 7 AM. At what time will the clearwell be full?

12. The floor of a rectangular building is 20 feet long by 12 feet wide and the inside walls are 10 feet high. Find the total surface area of the inside walls of this building

    Solution:



    2 Walls W*H + 2 Walls L*H= $2 * 12 * 10ft^2 + 2 * 20 * 10ft^2$

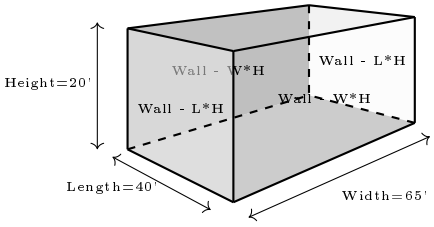
    $= 240 + 400 = \boxed{640ft^2}$

    2 Walls W*H + 2 Walls L*H + Floor + Ceiling= $2 * 12 * 10ft^2 + 2 * 20 * 10ft^2 + 2 * 12 * 20ft^2$

    $= 240 + 400 + 480 = \boxed{1,120ft^2}$

13. How many gallons of paint will be required to paint the inside walls of a 40 ft long x 65 ft wide x 20 ft high tank if the paint coverage is 150 sq. ft per gallon. Note: We are painting walls only. Disregard the floor and roof areas.

Solution:



2 Walls W*H + 2 Walls L*H $= 2 * 65 * 20ft^2 + 2 * 40 * 20ft^2 = 2,600 + 1,600 = 4,200ft^2$

$\implies @150\frac{ft^2}{gal}$ *paint coverage* $\rightarrow \frac{4,200\cancel{ft^2}}{150\frac{\cancel{ft^2}}{gal}} = \boxed{28\ gallons}$ **Example 3:** What is the circumference of a 100 ft diameter circular sedimentation tank?

Solution:

$Circumference = \pi * D = 3.14 * 100ft = \boxed{314ft}$

Example 4: If the surface area of a clarifier is $5{,}025ft^2$, what is its diameter?

Solution:

$Surface\ area = \frac{\pi}{4} * D^2 \implies 5025(ft^2) = 0.785 * D^2(ft^2)$

$\implies D^2 = \frac{5025}{0.785} \implies D = \sqrt{6401.3} = \boxed{80ft}$

14. What is the surface area of a cylinder 80 ft diameter and 25 ft height? Cylindrical part surface area only. Disregard the floor and roof areas.

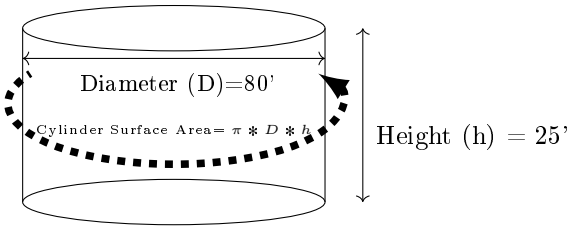
*a. 6,280ft^2

b. 460ft^2

c. 25,425ft^2

d. 1,785ft^2

Solution:



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1. Find the diameter of a settling basin that has a circumference of 126 feet.
2. Find the diameter of a pipe that has a circumference of 12 9/16".

Find the diameter of a storage tank that has a surface area of 314 ft2.

5. The detention time in a chlorine contact chamber is 42 minutes. If the chamber holds 3200 gallons, what is the flow rate in gpm?

6. A clearwell has a detention time of 2 hours. What is the flow rate in gpm if the clearwell holds 8000 gallons?

7. A rectangular settling basin has a weir length of 10 feet. What is the weir overflow rate when the flow is 80,000 gpd?

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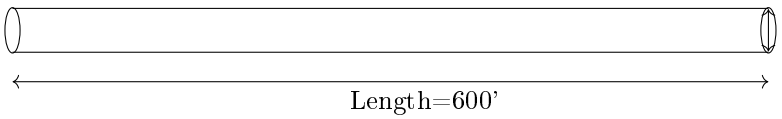
$Surface\ area\ of\ cylinder = \pi * D * h = 3.14 * 80 * 25 = \boxed{6,280 ft^2}$

15. How many gallons of water would 600 feet of 6-inch diameter pipe hold, approximately?

Solution:

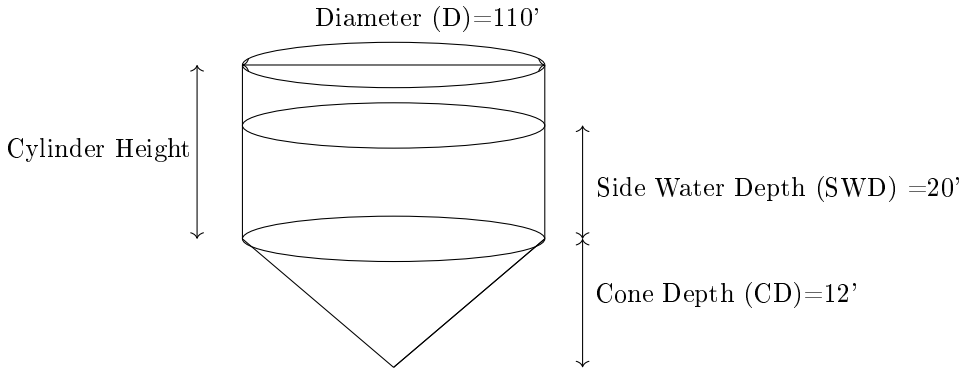


$Volume = \frac{\pi}{4} D^2 *$

$L = 0.785 * \left(\frac{6}{12}\right)^2 * 600 \cancel{ft^3} * 7.48 \frac{gallons}{\cancel{ft^3}} = \boxed{881\ gallons}$

16. A 110 ft diameter cylindrical tank with a 12 ft deep cone is operated at a side water depth of 20 ft. Calculate the volume of water in the tank in ft^3.

Solution:



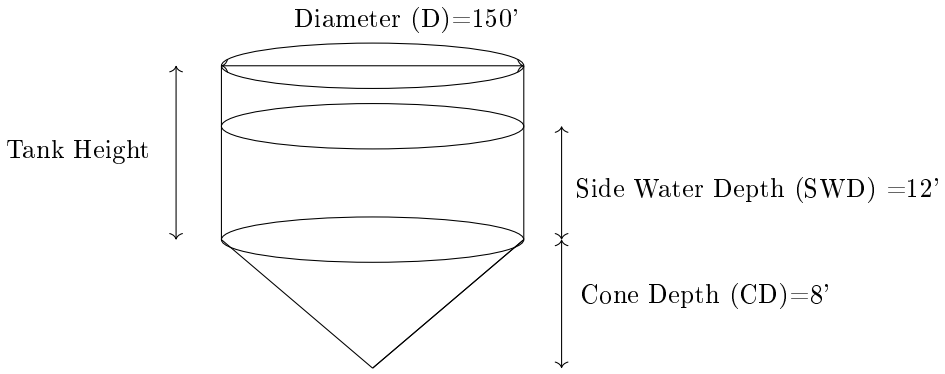
$Digester\ volume = Volume_{cylinder} + Volume_{cone}$

$\implies Digester\ volume = \frac{\pi}{4} D^2 * SWD + \frac{1}{3} * (\frac{\pi}{4} * D^2 * CD)$

$= 0.785 * 110^2 * 20 + 1.05 * 110^2 * 12 = \boxed{227,988 ft^3}$

17. A 150 ft diameter cylindrical tank with a 8 ft deep cone is operated at a side water depth of 12 ft. Calculate the volume of water in the tank in MG.

Solution:



$Tank\ \ volume = Volume_{cylinder} + Volume_{cone}$

$$\Longrightarrow Tank\ \ volume = \frac{\pi}{4}D^2 * SWD + \frac{1}{3} * (\frac{\pi}{4} * D^2 * CD)$$

$$= \left[0.785 * 150^2 * 12 + \frac{1}{3} * \frac{3.14}{4} * 150^2 * 8\right] ft^3 * 7.48\frac{gal}{ft^3} * \frac{MG}{1,000,000\ \ gal} = \boxed{1.94MG}$$

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

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

19. If a trench is 526ft long, 4.0ft wide, and 5.5ft deep, how many cubic yards of soil were excavated?

$$526 \times 4 \times 5.5 = \frac{11,572\mathrm{f}^3}{27} = 428$$

20. Bow many gallons would be contained in a circular tank that is 100ft. in diameter and 10ft deep?
    a. $587,0.00$ gallons
    b. 657,000 gallons
    c. 1,340,000 gallons
    d. $2,349,000$ gallons

21. In order to rebuild a manhole, it will be necessary to remove the asphalt from a 35-foot diameter circle in a street. The pavement area involved is:
    a. 208sq.ft
    b. $241,$ sq.ft
    c. 962sq.ft
    d. 1125sq.ft

22. Calculate the area in square feet of: a space 100ft long and 75ft svide. 100×75 Ans. TTur Sq. Fr.

23. Calculate the volume of a rectangular tank 20 feet high, 100ft long, and 75 feet wike.
Ans. $\frac{10\ \mathrm{wo}}{1}$ Cu.Ft.

24. Calculate the gallons the tank in the preceding problem will hold. Ans. $1,122,000$ Gallons

25. Calculate the area in square feet of a space 40ft long and 50 feet vvide.
Ans, 2000 Sq. Ft

26. Calculate the volume of a rectangular tank 40 ft long, 50 ft wide and 25 feet tall.

Ans. $50,000$ Cu.Ft

27. Calculate the gallons the tank in the preceding problem will contain.
Ans. 374,000 Gallons

28. Calculate the area of a circle with a 10ft radius.
Ans. 314 Sq Ft

29. Calculate the aren of a circle with a 10 ft diameter.
Ans. $78-5$

30. Calculate the yolmue of a tank with a 50 ft diameter that is 20 feet high.

Ans. $39,260$

Cu. Ft

31. How many gallons will the tank in the preceding problem hold?

32. Calculate the area of a circle with a 100 ft dibmeter.

Ans. $293,590$

Ans. $7,800$SqFt

33. Calculate the volume of a tank with a 100ft diameter that is 50 feet high.

$392,500$

Ans.

34. How many gallons ryill the tank in the preceding problen hold? Auls.
$2,935,960$

$$18 \times 18 \times 0'0408 \times 1200$$

35. How many gallons will an $18''$ diameter pipeline, 1200 ' long contain?
imi $= 5280$ Ans. 15,863 Gallons

36. How many gallons will a 24 " pipeline, 2 miles long contain?
$24 \times 24 \times 0.0408 \times \quad 248,168$

37. How many gallons will an $8''$ pipeline 550 ' long contain?

$$8 \times 8 \times 0.0408 \times 550$$

Ans. $1436 \cdot \dfrac{16}{\text{gallons}}$

38. Water is filling a tank at the rate of 50 gpm for a 10 min. period, How many gallons of water are contained in the tank at the end of the 10 minute time period?

39. A well pump is discharging water at the rate of 400 gpm into a tank for 15 minutes. Haw many gallons will be in the tank at the end of this time period?

$$6,000\ldots \text{ Gal.}$$

Dose = Dewand T Resrdual $\frac{300}{20} \times 16$

40. A tank is filling at the rate of 300gpm for a 20 minute period. How many of water will be contained in the tank at the end of 16 minutes?
4880 Gal.

41. How many galtons will the above cylinder hold?
$100 \times 7.48 = 748$

42. Calculate the area in square feet of a space 100ft. long and 75ft widie.
Ans. 7500 Sq. Fit

43. Calculate the volume of a rectangular tank 20 feet high, 100ft long, and 75 feet wide.
Ans. $150,00$ Cu.F.

44. Calculate the gallons the tauk in the preceding problem will hold.

45. Calculate the area in square feet of a space 40ft long and 50 feet wide.
Ans, $\frac{2,000}{1}$ Sq. Ft

46. Calculate the volume of a rectangular tank 40ft long, 50ft wide and 25 feet tall.
Ans. 50000 Cu.Ft

47. Calculate the gallons the tank in the preceding problem will contain.

$$50,000 \times 7.48 \text{ Ans. } 374,000 \text{ Gallons}$$

48. Caiculate the area of a circle with a 10ft radius.

$$D = 20.$$

Ans. 314 SqFt

49. Calculate the area of a circle with a 10 ft diameter.
Ans. 78.5 SqFt

50. Calculate the volume of a tank with a 50ft diameter that is 20 feet high.

Ans. 250 Cu. Ft

51. How many gallons will the tank in the preceding problem hold?

52. Calculate the area of a circle with a 100ft ciameter.
Ans. $\frac{293590}{7850}$ Gallons

53. Caiculate the volume of a tank with a 100ft diameter that is 50 feet higl,

$$392,50$$

$\frac{300 \text{ gallons}}{1 \text{ mute}} \times 6$ mm

54. A tank is filling at the rate of 300gpm for a 20 minute period. How many of water will be contained in the tank at the end of 16 minutes?

55. What is the area of a circular tank pad in ft2, if it has a diameter of 102 ft?
    a. 6,160 ft2
    b. 6,167 ft2
    c. 8,170 ft2
    d. 8,200 ft2

56. A 60-foot diameter tank contains 422,000 gallons of water. Calculate the height of water in the storage tank.

    Volume = Area * Height $\implies Height(ft) = \dfrac{Volume - \cancel{ft^3}^{\,ft}}{Area\cancel{ft^2}}$

    $Volume\ (ft^3) = \dfrac{\pi}{4} * D^2 * fillheight = 0.785 * 17.5^2\ \ ft^2 * 14ft = \boxed{240\ \ ft^3}$

57. What is the volume of water in ft^3, of a sedimentation basin that is 22 feet long, and 15 feet wide, and filled to 10 feet?
    Volume = Length * Width * Height = 22 ft * 15 ft * 10 ft = $\boxed{3300\ \ ft^3}$

    $Volume\ (ft^3) = \dfrac{\pi}{4} * D^2 * fill\ \ height = 0.785 * 17.5^2\ \ ft^2 * 14ft = \boxed{240\ \ ft^3}$

58. What is the volume in ft^3 of an elevated clear well that is 17.5 feet in diameter, and filled to 14 feet?

    Volume = Area * Height

    $Volume\ (ft^3) = \dfrac{\pi}{4} * D^2 * fillheight = 0.785 * 17.5^2\ \ ft^2 * 14ft = \boxed{240\ \ ft^3}$

59. What is the area of the top of a storage tank that is 75 feet in diameter?
    $Area\ (ft^2) = \dfrac{\pi}{4} * D^2 = 0.785 * 75^2\ \ ft^2 = 0.785 = \boxed{4416\ \ ft^2}$

60. What is the area of a wall 175ft. in length and 20ft. wide?

    Solution:

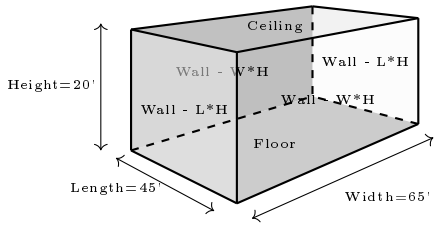
    Area = $175 * 20\ \ = \ \boxed{3,500ft^2}$

61. You are tasked with filling an area with rock near some of your equipment. 1 Bag of rock covers 250 square feet. The area that needs rock cover is 400 feet in length and 30 feet wide. How many bags do you need to purchase?

    Solution:

    Area to be covered = 400' * 30' = 12,000 $ft^2 \implies 12,000\ \cancel{ft^2} * \dfrac{Bag}{250\ \cancel{ft^2}} = \boxed{48\ \ bags}$

62. How many gallons of paint will be required to paint the walls of a 40 ft long x 65 ft wide x 20 ft high tank if the paint coverage is 150 sq. ft per gallon. Note: We are painting walls only. Disregard the floor and roof areas.
    Solution:



2 Walls W*H + 2 Walls L*H $= 2 * 65 * 20ft^2 + 2 * 45 * 20ft^2 = 2,600 + 1,800 = 4,400\cancel{ft^2} \implies$
@$150\frac{ft^2}{gal}$ *paint coverage* $\rightarrow$ $\frac{4,400\cancel{ft^2}}{150\frac{\cancel{ft^2}}{gal}} = \boxed{30\ gallons}$