Lesson 4 Calculating Area

Key Concepts

- Area is a way of describing a two dimensional object
- Units are usually ft^2 or acres
- Rectangles $A = L \times W$
- Triangles $A = \frac{1}{2} \times B \times H$
- Circles $A = \pi \times r^2$ or $A = 0.785 \times D^2$
- Cylinders $C = \pi \times D$ and $A = \pi \times r^2$
- Spheres $A = \pi \times D^2$

Example 1:

Find the surface area in acres of a pond measuring 100 ft by 350 ft.

Example 2:

Find the area of a triangle with a base that is 30 ft and a height of 40 ft.

Example 3:

Find the surface area of a clarifier with a 40 ft diameter.

Example 4:

Find the surface area of a round tank with a diameter of 30 ft. and a height of 15 ft. (do not include the top of the tank)

Example 5:

Find the surface area of a sphere that is 20 feet in diameter.

Find the area of the following rectangles:

A = L x W 1 Acre = 43, 560 square feet

1. A wall that is 5 feet tall and 20 feet long = _____ square feet

2. A wall that is 72 inches tall and 30 feet long = _____ square feet

3. A parking lot that measures 300 feet by 150 feet = _____ square feet

4. A facility that measures 600 ft. by 2,500 ft = _____ acres

5. A reservoir that is 500 ft by 500 ft = _____ acres

Find the area of the following triangles:

A = ½ B x H

6. A triangle with a base of 10 feet and a height of 12 feet = _____ ft^2

7. A triangle with a base of 20 feet and a height of 10 feet = _____ ft^2

8. A triangle with a base of 8 feet and a height of 4 feet = _____ ft^2

9. A triangle with a base of 19 feet and a height of 20 feet = _____ ft^2

10. A triangle with a base of 25 feet and a height of 18 feet = _____ ft^2

Find the area of the following circles:

$$A = \pi \times r^2 \quad (\pi = 3.14)$$

11. The surface area of a round clarifier that measures 50 feet across = _____sq ft

12. The top of a circular storage tank with a diameter of 30 feet = _____ sq ft

13. The cross sectional area of a pipe that is 3 feet in diameter = _____ sq ft

14. The cross sectional area of a pipe that has a 24 inch radius = _____ sq ft

15. The area of a circle that measures 60 feet across = _____ sq ft

Find the surface area of the following cylinders:

Circumference = π x D Area = π x D x H

16. A round tank that is 20 feet tall and 15 feet across = _____ sq ft

17. A round tank that is 10 feet tall and 20 feet across = _____ sq ft

18. A round tank that is 17 feet tall and 30 feet across = _____ sq ft

19. A round tank that is 25 feet tall and 15 feet across = _____ sq ft

20. A round tank that is 10 feet tall and 12 feet across = _____ sq ft

Find the surface area of the following spheres:

$$A = \pi \times D^2$$

21. A methane storage sphere that is 15 feet wide has a surface area of _____ sq ft

22. A propane storage sphere that is 25 feet wide has a surface area of _____ sq ft

23. A methane storage sphere that is 5 feet wide has a surface area of _____ sq ft

24. A sphere that is 12 feet wide has a surface area of _____ sq ft

25. A methane storage sphere that is 18 feet wide has a surface area of _____ sq ft

Review

26. Solve for Flow:
    lb/day = (Flow, MGD) (Dose, mg/L) (8.34)

27. Solve for MLSS:
    Aerator Solids lb = (Tank Volume, MG) (MLSS, mg/L) (8.34)