Practice – 1

Once you feel confident with Related Rates: Area and Volume, complete problems 1 to 5. Check your answers by going to the Solutions tab in Moodle.

Instructions: Answer each of the following practice questions on a separate piece of paper. Step by step solutions are provided under the Solutions tab. You will learn the material more thoroughly if you complete the questions before checking the answers.

1. The area of a circle is $9\pi \text{ cm}^2$, and it is increasing at a rate of $\frac{\pi}{2} \text{ cm}^2/\text{min}$. Find the rate at which the radius of the circle is increasing.

2. The area of a square is increasing at a rate of $10 \text{ cm}^2/\text{s}$. At what rate is the side length increasing when the side length is 200 cm?

3. A rectangular container is 3 m long, 2 m wide, and 2 m deep. Water is being pumped in at $\frac{3}{2} \text{ m}^3/\text{min}$. How fast is the surface of the water rising?

4. The radius of a spherical balloon is decreasing at a rate of 2 cm/s. At what rate is the surface area of the balloon decreasing when the radius is 14 cm?

5. A cylindrical vase has a height of 53 cm and a diameter of 24 cm. It is being filled with water such that the depth is increasing at a rate of 2 cm/s. Determine the rate at which the water is being poured into the vase.