MTH 251Z Lab
Related Rates

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Prompts

1. A cylindrical tank with radius 18 inches is being filled with water at a rate of 0.25 cubic feet per minute. How fast is the height of the water increasing?

2. A darkroom enlarger casts a square light on a surface. The light source is moving away from the surface so that the sides of the square are increasing at a rate of 2 centimeters per second. At what rate is the area of the square light increasing when each side is 10 cm long? How about when each side is 15 cm long?

3. The area of a regular pentagon with side length s is $A = \frac{1}{4}\sqrt{25 + 10\sqrt{5}}s^2$. If s is increasing at a rate of $\frac{2}{3}$ mm/s, how fast is the area of the pentagon increasing when $s = 5$mm?

4. At 12pm, a ship is 150 km west of a sailboat. If the ship is moving east at 35 km/hr while the sailboat is traveling north at 15 km/hr, how fast is the distance between the boats changing at 3pm?

5. An ice cube (in the shape of a cube) is melting at a rate of 2 cubic cm per minute. How fast is the surface area of the ice cube decreasing when each side is 4 cm long?

6. Three cats are cuddling on a stool. Each cat has an automatic feeder that go off at the same time. When the feeders go off, the cats each wake and run in different directions towards their food. The white cat runs north at 3 feet per second. The brown cat runs west at 3.5 feet per second. The orange cat runs east at 4 feet per second. After 2 seconds, how fast is the distance between the each cat increasing?