

1. A lighthouse stands on an island three miles away from a perfectly straight, north-south shoreline. The lighthouse beacon makes one complete rotation every five seconds. How fast is the image from the lighthouse beam moving along the shore when it is three miles north of the point on the shore closest to the lighthouse? Remember to include units.
2. Concrete is being poured into a conical tank (vertex down) at the rate of 2 cubic feet per second. The tank is 10 feet deep and has a radius at the top of 5 feet. At what rate is the level of concrete in the tank rising when it has been filled to a depth of 6 feet? (The volume of a cone with radius  $r$  and height  $h$  is given by  $\frac{1}{3}\pi r^2 h$ ).