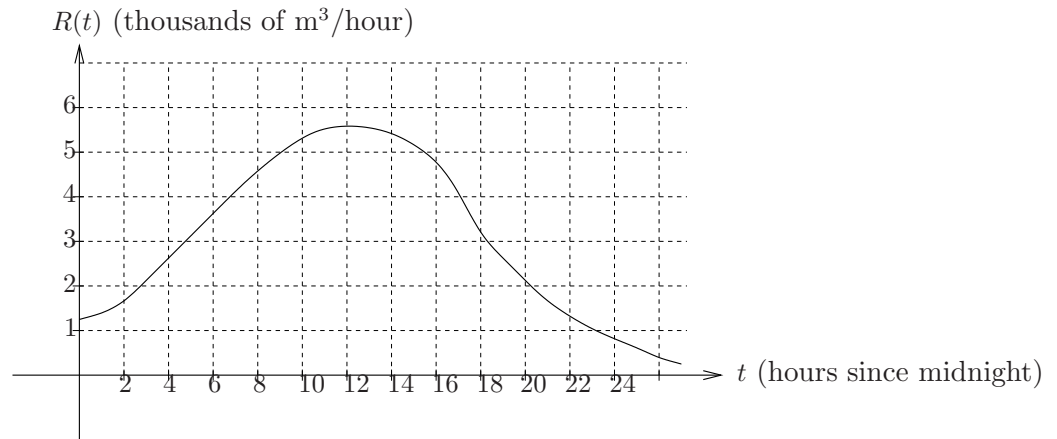


7. Marie is already tired of winter. She is dreaming of her grandparents' farm and days rafting on the river near the farm. Not all days on the river are beautiful, though. One summer a storm dumped about a year's worth of rainfall on the area in a couple of days. A man-made lake held back by a dam near the farm rose as the swollen rivers rushed toward the lake.

The graph below gives the rate R , in thousands of cubic meters per hour, that water was entering the lake during that day as a function of t , in hours since midnight. The volume of the lake at midnight was 400,000 cubic meters. The maximum volume that can be held by the dam is 460,000 cubic meters. Due to an oversight, the floodgates of the dam were kept closed until 6:00 a.m when they were opened to full capacity. The gates allowed water to leave the lake at a constant rate of 2000 cubic meters per hour.



- (a) (4 points) Approximate the volume of the lake when the floodgates were opened. Show your reasoning.
- (b) (4 points) When did the lake reach its highest volume? Explain.
- (c) (5 points) Approximately what was the highest volume of the lake on that day? Explain.
- (d) (3 points) At what rate was the volume of the lake changing at 6:00 pm?.