1. (4 points) A cone-shaped basin with diameter 20 ft and height 10 ft contains water that is draining out through a hole in the bottom at a constant rate of 3 cubic feet per second. How quickly is the height of the water decreasing when its height is 2 ft?
2. (3 points) Suppose that $g$ and $g'$ are differentiable everywhere and satisfy the following conditions.

- $g(4) = 2$
- $g'(4) = -7$
- $g''(4) = 3$

Use a linear approximation to estimate the following quantities. Simplify and write your answers in decimal form.

(a) $g(4.2)$

(b) $g'(4.2)$

3. (3 points) Use a linear approximation to obtain a good estimate for $\sqrt{1003}$. Simplify and write your answer in decimal form.