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## Extra Practice—Related Rates

1) A conical water tank with vertex down has a radius of 10 ft at the top and is 24 ft high. If water flows into the tank at a rate of 20 cubic feet per minute, how fast is the depth of the water increasing when the water is 16 ft deep?
2) Sand pouring from a chute forms a conical pile whose height and diameter are always the same. If the height increases at a constant rate of $5 \mathrm{ft} / \mathrm{min}$, at what rate is sand pouring from the chute when the pile is 10 ft high?
1. Wheat is falling from a chute onto a level floor at a rate of $8 \pi \mathrm{ft}^{3} / \mathrm{min}$ to form a conical pile. If the height of the pile is always equal to the radius of its base, at what rate is the radius increasing when the pile is 8 feet deep?
2. The watering trough in the diagram below is being filled at a rate of 4 cubic feet of water per minute. How fast is the depth of the water, $h$, increasing when the trough is half-full by volume.

3. A conical-shaped paper cup is shown in the diagram below. If water is being poured into the cup at a rate of 1 cubic centimeter per second, how fast is the depth of the water increasing when the water is 4 centimeters deep?

