Author 1 ———————————————

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17 – Related Rates

1. A 10 ft ladder rest against a vertical wall. If the bottom of the ladder is pulled away from the wall at a rate of 1.5 ft/s, how fast is the top of the ladder sliding down the wall at the moment when the bottom of the ladder is 6 ft from the wall?

(a) Picture

(c) Relating equation for the quantities

(d) Relating equation for the rates

(b) Known & Unknown Rates

- Rate(s) you know:

- Rate(s) you want:

(e) Solution

2. At a quarry, sand is being added to the top of a pile of sand at a rate of $12\,\text{ft}^3$ per minute. The pile stays in the shape of a cone, with the diameter of the base always equal to the height of the pile. When the pile has reached a height of 6 feet, how fast is the height of the pile continuing to grow?

(a) Picture

(c) Relating equation for the quantities

(d) Relating equation for the rates

(b) Known & Unknown Rates

- Rate(s) you know:

- Rate(s) you want:

(e) Solution

3. A spotlight located on the ground shines on a wall $12\,\mathrm{m}$ away. If a $2\,\mathrm{m}$ tall person walks from the spotlight toward the building a speed of $1.6\,\mathrm{m/s}$, how fast is the length of their shadow on the building changing at the moment when they are $4\,\mathrm{m}$ from the building?

4. A cat runs along a straight path at a speed of $4\,\mathrm{ft/s}$. A searchlight is located on the ground $20\,\mathrm{ft}$ from the path and is kept focused on the cat. At what rate is the searchlight rotating when the cat is $15\,\mathrm{ft}$ from the point on the path closest to the searchlight?