A rope tied to the boat's bow slides through a pulley on top of a 6 foot post. If the boat is drifting away from the dock at 10 feet/min, how fast is the rope sliding through the pulley when the boat is 8 feet from the dock?

**Picture/Variables.**

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Drawing of a pulley with a rope sliding through it. The distance from the dock to the boat is labeled 'x', and the distance from the pulley to the dock is labeled '6'. The boat's movement is represented with an arrow labeled '10 ft/min'.
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**Want.**

Given. The given equations must exactly reflect the problem statements without simplifications. Two equations, one a given rate of change (checksum=1), one due to Pythagoras (checksum=12 not 13). \(x=8\) is not a given equation.

**Eq.** We have \(\frac{dx}{dt}\), we want \(\frac{dr}{dt}\). List the equation (simplified this time) which relates \(r\) and \(x\) and no other variable.

8 symbols, checksum=13

**Diff.** Differentiate the equation above in w.r.t. \(t\). Replace \(\frac{dx}{dt}\) by 10 and solve for \(\frac{dr}{dt}\). 5 symbols on right side, checksum=1

**Ans.** Use the equation to find \(r\) when \(x=8\). Substitute this \(r\) and \(x=8\) into the formula for \(\frac{dr}{dt}\). Answer is a single digit plus the units.