

Student prompts that accompany the related rates example:

1. **Concept Clarification:**
 - "Can you explain what related rates are and how they are used in calculus problems?"
2. **Problem Understanding:**
 - "I have a problem where a ladder is resting against a wall and being pushed towards it. Can you help me understand what quantities are changing and which are constant?"
3. **Identifying Relevant Equations:**
 - "What are the main equations I should consider for a problem about a ladder sliding against a wall, especially involving distances and speeds?"
4. **Setting up Derivatives:**
 - "How do I set up the derivative equations for a problem where a ladder's bottom is moving towards a wall and I need to find the rate at which the top moves up the wall?"
5. **Symbolic Differentiation:**
 - "Can you show me how to differentiate the equation $(x^2+y^2=152)$ using implicit differentiation?"
6. **Equation Solving Guidance:**
 - "I have the differentiated equation but I'm stuck. Can you guide me on how to solve for $\frac{dy}{dt}$ when $\frac{dx}{dt} = -14 \text{ ft/sec}$?"
7. **Analyzing Results:**
 - "I calculated $\frac{dy}{dt}$ but I'm not sure what this rate means physically in the context of the problem. Can you help me understand it?"
8. **Error Checking:**
 - "Can you check my calculations for any common mistakes in finding how fast the top of the ladder moves up the wall when the bottom is pushed towards it?"
9. **Drafting Problem Solutions:**
 - "I think I've solved the problem. Can you help me draft a complete step-by-step solution to explain how I got the rate at which the top of the ladder moves?"
10. **Complete Problem Solving:**
 - "I'm starting with the ladder's bottom 10 feet from the wall and it's being pushed at 14 ft/sec . Can you solve how fast the top of the ladder moves up the wall after 12 seconds?"

In LaTeX

```
\documentclass{article}
\usepackage{amsmath}
```

```
\begin{document}
```

```
\begin{enumerate}
```

`\item \textbf{Concept Clarification}`: ``Can you explain what related rates are and how they are used in calculus problems?"

`\item \textbf{Problem Understanding}`: ``I have a problem where a ladder is resting against a wall and being pushed towards it. Can you help me understand what quantities are changing and which are constant?"

`\item \textbf{Identifying Relevant Equations}`: ``What are the main equations I should consider for a problem about a ladder sliding against a wall, especially involving distances and speeds?"

`\item \textbf{Setting up Derivatives}`: ``How do I set up the derivative equations for a problem where a ladder's bottom is moving towards a wall and I need to find the rate at which the top moves up the wall?"

`\item \textbf{Symbolic Differentiation}`: ``Can you show me how to differentiate the equation $(x^2 + y^2 = 15^2)$ using implicit differentiation?"

`\item \textbf{Equation Solving Guidance}`: ``I have the differentiated equation but I'm stuck. Can you guide me on how to solve for $\frac{dy}{dt}$ when $\frac{dx}{dt} = -\frac{1}{4}$ `\text{ft/sec}`?"

`\item \textbf{Analyzing Results}`: ``I calculated $\frac{dy}{dt}$ but I'm not sure what this rate means physically in the context of the problem. Can you help me understand it?"

`\item \textbf{Error Checking}`: ``Can you check my calculations for any common mistakes in finding how fast the top of the ladder moves up the wall when the bottom is pushed towards it?"

`\item \textbf{Drafting Problem Solutions}`: ``I think I've solved the problem. Can you help me draft a complete step-by-step solution to explain how I got the rate at which the top of the ladder moves?"

`\item \textbf{Complete Problem Solving}`: ``I'm starting with the ladder's bottom 10 feet from the wall and it's being pushed at $\frac{1}{4}$ `\text{ft/sec}`. Can you solve how fast the top of the ladder moves up the wall after 12 seconds?"

`\end{enumerate}`

`\end{document}`