The graphs below show two functions. One is \( f(x) = \cos(kx + b) \). The other is \( f'(x) \). Find \( k \).
2. Question Details

The table below gives the height of a rocket as a function time, \( h(t) \). Units are in the table.

<table>
<thead>
<tr>
<th>( t ) (s)</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>( h ) (m)</td>
<td>66</td>
<td>164</td>
<td>295</td>
<td>457</td>
<td>651</td>
<td>878</td>
<td>1138</td>
<td>1429</td>
<td>1753</td>
<td>2108</td>
<td></td>
</tr>
</tbody>
</table>

**Easy question.** Estimate the velocity at the instant \( t = 4 \) seconds.

**Medium question.** Suppose that a different rocket is launched exactly twice as fast. The height of the second rocket is given by \( h(2t) \). How fast is the second rocket moving at the instant \( t = 4 \) seconds. **Hint:** Graph the height of the second rocket.

**Hard question.** Air temperature is a function of height:

\[ T(h) = 300 - \frac{h}{200} \]

with \( T \) in kelvins and \( h \) as above. There is a temperature sensor on the rocket. How fast is the temperature, as measured by this sensor, changing at the instant when \( t = 6 \) seconds?

3. Question Details

The velocity of an object is given by

\[
\frac{dh}{dt} = 19.21\sin(1.7t + 0.3) - 16.32\cos(1.7t + 0.3) \text{ cm/min}
\]

Where \( h \) is the height of the object in centimeters and \( t \) is time in minutes. The initial height, at \( t = 0 \), of this object is 25 centimeters.

a. Find the formula for the height of this object. If you use decimals in your formulas you must be accurate to two decimal digits.

\[ h(t) = \]

b. Find the velocity of this object at the first instant \( t > 0 \) it reaches a height of 45 cm. Be accurate to one decimal digit.

\[ \]