CAR B:
At \( t=0 \), \( x=0 \) and \( v=12 \text{ m/s} \) (from information given).

Therefore, at any \( t \) we have
\[
x_B(t) = 0 + (12 \text{ m/s}) \cdot t - \frac{1}{2} a_B t^2 \tag{1} \]
(acceleration is \(-a_B\)).

CAR A:
From the graph,
\[
x_A(t) = 20 + \left(\frac{2 \text{ m/s}}{s}\right) t \tag{2}
\]

\begin{align*} 
\text{a)} \quad & \text{Cars A and B are side by side at } t = 4s \\
\text{This implies,} & \quad x_A(t) = x_B(t) \tag{3} \\
\text{Since in (1) and (2) all} & \quad \text{the quantities are already} \\
\text{the quantities are already} & \quad \text{in MKS units we write} \\
\text{in MKS units we write} & \quad 20 + 2t = 12t - \frac{1}{2} a_B t^2 \\
\text{which is valid only at} & \quad t = 4s \\
\text{at } t = 4s & \quad 20 + 8 = 48 - \frac{1}{2} a_B \times 16 \\
& \quad 8 a_B = 20 \\
& \quad a_B = \frac{5}{2} \text{ m/s}^2
\end{align*}
To be sure, let's consider \( q_B \) is valid for an unknown \( q_B \)

\[
20 + 2t = 12t - \frac{1}{2} q_B t^2
\]

\[
\frac{x_A(t)}{x_B(t)}
\]

\[
a_B t^2 - 20t + 40 = 0
\]

That is, if the acceleration of car B were an unknown, what would be the time at which \( x_A(t) = x_B(t) \)

\[
t = \frac{20 \pm \sqrt{400 - 4 q_B \cdot 40}}{2 q_B}
\]

\[
t = \frac{20 \pm \sqrt{160 \left( q_B - \frac{160}{160} \right)}}{2 q_B}
\]

\[
t = \frac{20 \pm \sqrt{160 \left( \frac{5}{2} - q_B \right)}}{2 q_B}
\]

If \( q_B > \frac{5}{2} \text{ m/s}^2 \) no solution

\[
q_B < \frac{5}{2} \text{ m/s}^2 \text{ two solutions}
\]

Therefore graph above is correct.