PSSA Open Ended Prep – Systems #2

Please read the given situation carefully. Then, answer each question that follows. If you are asked to EXPLAIN something, please do so using COMPLETE SENTENCES!

Situation: James contacts two moving companies about relocating to a new house a few blocks down the street. Each company provides him with estimates that can be modeled by the following equations.

\[ y = 25x + 100 \]  \hspace{1cm} \text{(where } x = \text{number of man-hours, and)}
\[ y = 20x + 150 \]  \hspace{1cm} \text{y = total cost, and the constant represents the cost of the moving truck)}

Part A) Solve the equations as a system in order to determine at what point the cost of moving would be the same with either company.
Part B) Suppose that James' move took a total of 15 man-hours. How much money will he have saved if he chose the "right" moving company? **Show all work.**

\[
\begin{align*}
y &= 25x + 100 \\
y &= 25(15) + 100 \\
y &= 375 + 100 \\
y &= 475
\end{align*}
\[
\begin{align*}
y &= 20x + 150 \\
y &= 20(15) + 150 \\
y &= 300 + 150 \\
y &= 450
\end{align*}
\]

Part C) Before James decides on which moving company to use, he gets two more estimates from other companies. One company says it only charges $18 per man-hour in addition to a flat fee of $175 for use of a truck. The other company charges $32 per man-hour and does not have an extra charge for the use of a truck. Write two equations that can model these estimates in terms of the total cost.

1. \( y = 18x + 175 \)  \( x \to \text{# man-hours} \)
2. \( y = 32x \)  \( y \to \text{total cost} \)