1. [11 points] Pam the Plumber charges customers $P(t)$ dollars for a $t$ hour visit to their house. A graph of $C = P(t)$ is shown below.

\begin{center}
\begin{tikzpicture}
\begin{axis}[
    axis lines = center,
    xlabel = $t$,
    ylabel = $C$,
    xmin = 0,
    xmax = 8,
    ymin = 50,
    ymax = 400
]
\addplot coordinates {
    (2,130)
    (3,200)
    (5,250)
    (6,300)
}
\end{axis}
\end{tikzpicture}
\end{center}

a. [2 points] Find the value of $P(0)$ and explain what it means in context.

$$P(0) = \boxed{100}$$

**Meaning:** This is how much Pam charges to arrive at house, without having done any work yet.

b. [2 points] Find the slope of $P(t)$ and explain what it means in context.

**Slope:** $\boxed{\frac{100}{3}}$

**Meaning:** After her arrival cost, for every 3 hours Pam stays, she charges $100. Or, she charges $33.33$ per hour.

c. [2 points] Beth the Bathtub-fixer charges $50 for a home visit plus $40/hour spent there. Let $B(t)$ be the amount she charges for a $t$ hour visit. Add the graph of $C = B(t)$ for $0 \leq t \leq 8$ to axes above. **Clearly label at least two points on your graph with their** $(t, C)$ coordinates.

**Solution:** See graph above.

d. [5 points] Find the coordinates of the point where the two graphs intersect and explain what this means in context. **Show all work.** Give your final answer in exact form, or rounded to at least two decimal places.

**Solution:** We need to find where the two linear equations intersect. To do this we can solve the following equation for $t$:

$$50 + 40t = 100 + \frac{100t}{3}$$

By adding and subtracting terms from both sides, this simplifies to:

$$20t/3 = 50$$

which finally is equivalent to:

$$t = 150/20 = 7.5$$

To find the $C$-coordinate, we can plug $t = 7.5$ into either expression. In particular:

$$50 + 40 \times 7.5 = 350$$

**Point** $(t, C) = \boxed{(7.5, 350)}$
Meaning: This means that when Pam and Beth each work 7.5 hours, they earn the same amount of money for the visit.