1. $u = (3, -4), v = (5, 0)$

   $P_u(v) = \frac{u \cdot v}{\|u\|^2} \cdot u = \frac{(3,-4)\cdot(5,0)}{\|(3,-4)\|^2} \cdot (3, -4) =$

   $\frac{15}{25} \cdot (3, -4) = (\frac{9}{5}, -\frac{12}{5})$

2. $u = (1, 2), v = (-4, 1)$

   $P_u(v) = \frac{u \cdot v}{\|u\|^2} \cdot u = \frac{(1,2)\cdot(-4,1)}{\|(1,2)\|^2} \cdot (1, 2) =$

   $-\frac{2}{5} \cdot (1, 2) = (-\frac{2}{5}, -\frac{4}{5})$

3. $u = (3, 6, 2), v = (1, 2, 3)$

   $P_u(v) = \frac{u \cdot v}{\|u\|^2} \cdot u = \frac{(3,6,2)\cdot(1,2,3)}{\|(3,6,2)\|^2} \cdot (3, 6, 2) =$

   $\frac{3}{7} \cdot (3, 6, 2) = (\frac{9}{7}, \frac{18}{7}, \frac{6}{7})$