(a) Capitalist's Production Function is \( f(x) = F(x, 1) = x^{\frac{2}{3}} \).

He maximizes \( \pi(x) = f(x) - wx \):

Foc is \( f'(x) = w \), i.e., \( \frac{2}{3}x^{-\frac{1}{3}} = w \), i.e., \( x^{\frac{1}{3}} = \frac{2}{3w} \).

Equilibrium requires \( x = 8 \) (there are 8 workers for every capitalist), i.e., \( 2 = \frac{2}{3w} \), i.e., \( w = \frac{1}{3} \).

Thus, \( \pi = (8)^{\frac{2}{3}} - \frac{1}{3}(8) = 4 - \frac{8}{3} = \frac{8}{3} \). Each worker spends \( \frac{1}{3} \) dollar; each capitalist spends \( \frac{4}{3} \) dollar, for a total of \( \frac{1}{3} + \frac{4}{3} = 40 \), which is the total production: \( 10 \cdot F(8, 1) = 40 \).

(b) Worker's Production Function is \( g(y) = F(1, y) = y^{\frac{1}{3}} \).

He maximizes \( \pi(y) = g(y) - wy \):

Foc is \( g'(y) = w \), i.e., \( \frac{1}{3}y^{-\frac{2}{3}} = w \), i.e., \( y^{\frac{2}{3}} = \frac{1}{3w} \).

Equilibrium requires \( y = \frac{1}{8} \), i.e., \( (\frac{1}{8})^{\frac{2}{3}} = \frac{1}{3w} \), i.e., \( \frac{1}{4} = \frac{1}{3w} \), i.e., \( w = \frac{3}{4} \). Thus, \( \pi = (\frac{1}{8})^{\frac{2}{3}} - \frac{1}{3}(\frac{1}{8}) = \frac{1}{2} - \frac{1}{6} = \frac{1}{3} \).

Each capitalist spends \( \frac{4}{3} \), each worker spends \( \frac{1}{3} \), for a total of 40 dollars — just exactly as in (a).

(c) The Pareto Optimal Allocations are the ones in which the total number of dollars to spend is maximized and then distributed — in any way — to the 40 people. (They are price-takers in all markets, so the goods they consume will get allocated to them Pareto optimally.) Since both resources are fully employed \( (x = 80, y = 10) \), the number of dollars will indeed be maximized, at 40.