(3) $D(P) = Q = 158.7 \cdot P^{-0.3}$. Find the inverse demand function.

- This is just asking us to isolate P and write the demand function in terms of Q.

Step 1: Note that $x^{-a} = \frac{1}{x^a}$, and rewrite D(P) as:

$$Q = 158.7 \cdot \frac{1}{P^{0.3}}$$

Step 2: Isolate P in the LHS:

$$P^{0.3} = \frac{158.7}{Q}$$

Step 3: Raise both sides by $\frac{1}{0.3}$:

$$\left(P^{0.3}\right)^{\frac{1}{0.3}} = \left(\frac{158.7}{Q}\right)^{\frac{1}{0.3}}$$

Step 4: Using the rule $(x^a)^b = x^{a \cdot b}$, we get:

$$P^{(0.3)\left(\frac{1}{0.3}\right)} = \left(\frac{158.7}{Q}\right)^{\frac{1}{0.3}}$$

Step 5: $$P = \left(\frac{158.7}{Q}\right)^{\frac{1}{0.3}}$$

Step 6: If you want, note that $0.3 = \frac{3}{10}$, and using $\frac{\frac{a}{b}}{\frac{c}{d}} = \frac{a \cdot d}{b \cdot c}$, and noting $\frac{1}{0.3} = \frac{1}{0.3} = \frac{1}{\frac{3}{10}} = \frac{10}{3}$, we can rewrite P as:

$$\boxed{P = \left(\frac{158.7}{Q}\right)^{\frac{10}{3}}}$$