$B(x) = 8x^{1/2}$, $NB^{\circ} = 2$, $c = 1$

$$\max_{\{x\}} \pi = Px - cx$$

$$\text{s.t.} \quad 8x^{1/2} - Px = 2$$

$$Px = 8x^{1/2} - 2$$

$$\max_{\{x\}} \pi = 8x^{1/2} - 2 - x$$

$$\frac{d\pi}{dx} = 4x^{-1/2} - 1 = 0 \Rightarrow \boxed{x^* = 16}$$

$$P \cdot 16 = 8 \cdot 4 - 2$$

$$\boxed{P^* = \frac{15}{8}}$$

Patient

$$\max \; B(x) - Px$$

$$\max \; 8x^{1/2} - \underset{P}{P^*}x$$

$$\max \; 8x^{1/2} - \frac{15}{8}x$$

$$4x^{-1/2} = \frac{15}{8}$$

$$\boxed{x \approx 4.5}$$