Colonel Tom Barker is about to open his newest amusement park, Elvis World. Elvis World features a number of exciting attractions: you can ride the rapids in the Blue Suede Chutes, climb the Jailhouse Rock and eat dinner in the Heartburn Hotel. Colonel Tom figures that Elvis World will attract $1\,000$ people per day, and each person will take $x = 50 - 50p$ rides, where p is the price of a ride. Everyone who visits Elvis World is pretty much the same and negative rides are not allowed. The marginal cost of a ride is essentially zero.

(a) What is each person's inverse demand function for rides?

$$\text{each person's demand : } x(p) = 50 - 50p$$
$$\text{each person's inverse demand : } p(x) = 1 - \frac{x}{50}$$

(b) If Colonel Tom sets the price to maximize profit, how many rides will be taken per day by a typical visitor?

$$\max_x \quad p(x) \cdot x = (1 - \frac{x}{50}) \cdot x = x - \frac{x^2}{50}$$
$$\text{FOC:} \qquad 1 - \frac{2x}{50} = 0$$
$$x^* = 25$$

(c) What will the price of a ride be?

$$p^* = p(x^*) = 1 - \frac{25}{50} = 0.50$$

(d) What will Colonel Tom's profits be per person?

$$\Pi^* = p^* \cdot x^* = 0.50 \cdot 25 = 12.50$$

(e) What is the Pareto efficient price of a ride?

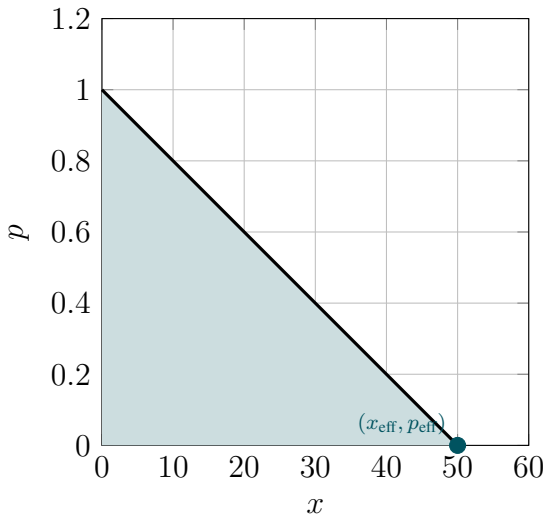
For Pareto efficiency, we must have that $p = MC(x)$. That is, $p_{\text{eff}} = 0$.

(f) If Colonel Tom charged the Pareto efficient price for a ride, how many rides would be purchased?

$$x_{\text{eff}} = x(p_{\text{eff}}) = 50 - 50 \cdot 0 = 50$$

(g) How much consumers' surplus would be generated at this price and quantity?

$$CS_{\text{eff}} = \frac{1}{2} \cdot 50 \cdot 1 = 25$$



(h) If Colonel Tom decided to use a two-part tariff, he would set an admission fee of 25 and charge a price per ride of 0.

Justification:

The usage price should be equal to the Pareto efficient price, and the admission fee should be equal to the consumers' surplus that the Pareto efficient price would generate.