Question

a) The demand function will be equal to: x . Then the price will be:

$$p(x)=420-\frac{x-1400}{(210/21)}=420-\frac{x-1400}{10}=420-\frac{x}{10}+140=560-\frac{x}{10}.$$

So, $p(x)=560-\frac{x}{10}$.

Answer: $p(x)=560-\frac{x}{10}$.

b) Revenue equal: $R(x)=p(x)\cdot x=560x-\frac{x^2}{10}$. We will find maximum revenue:

$$R'(x)=560-\frac{2x}{10}=560-\frac{x}{5}=0\Rightarrow x=2800\Rightarrow$$

$$\Rightarrow p(x)=560-\frac{2800}{10}=280\Rightarrow rebate=\$420-\$280=\$140$$

$\Rightarrow$ offer a \$140 rebate.

Answer: offer a \$140 rebate.

c) Profit equal:

$P(x)=R(x)-C(x)=560x-\frac{x^2}{10}-98000-140x=420x-\frac{x^2}{10}-98000$. We will find maximum profit:

$$P'(x)=420-\frac{x}{5}=0\Rightarrow x=2100\Rightarrow$$

$$\Rightarrow p(x)=560-\frac{2100}{10}=350\Rightarrow rebate=\$420-\$350=\$70$$

$\Rightarrow$ offer a \$70 rebate.

Answer: offer a \$70 rebate.