

(d) Find $P(501) - P(500)$ and explain what this value represents.

$$\begin{aligned} P(501) &= 20(501) - 0.01(501)^2 - 1900 \\ &= 10020 - \overset{2510.01}{\cancel{10020}} - 1900 \\ &= \cancel{10020} \\ &= 5609.99 \end{aligned}$$

$$\begin{aligned} P(500) &= 20(500) - 0.01(500)^2 - 1900 \\ &= \textcircled{5600} \end{aligned}$$

$$\therefore P(501) - P(500) = \boxed{9.99} \$$$

~~the rate of the 501st~~

the profit from selling 501st unit is 9.99 \$

- Ex: Use the marginal analysis to estimate the profit from the 101st unit sold if $P(x) = 0.04x^2 + 27x - 1$

$$\begin{aligned} P'(x) &= -0.04(2)x + 27 \\ &= -0.08x + 27 \end{aligned}$$

$$\textcircled{x} = 101 -$$

$$\begin{aligned} P'(101) &= -0.08(101) + 27 \\ &= -8 + 27 \\ &= \boxed{19} \end{aligned}$$