8.

$$C(t) = \frac{0.1t}{(t+3)^2}$$

$C(1) = 6.25 \times 10^{-3} \Rightarrow 0.00625$

$C(6) = 7.4 \times 10^{-3} \Rightarrow 0.0074$

$t \in [1, 6]$

$$C'(t) = \frac{0.1(t+3)^2 - 0.1t(2(t+3))}{(t+3)^4}$$

$t = -3$

$$0 = 0.1(t+3)^2 - 0.2t(t+3)$$

$$0 = (t+3)(0.1(t+3) - 0.2t)$$

$$= (t+3)(0.1t + 0.3 - 0.2t)$$

$$= (t+3)(-0.1t + 0.3)$$

$t + 3 = 0$

$t = -3$

$-0.1t + 0.3 = 0$

$0.3 = 0.1t$

$3 = t$

$C(3) = 0.0083$

There is a maximum value at $t = 3$

There is a minimum value at $t = 1$

7.

$$0 = \frac{1600(v^2+6400) - 1600v(2v)}{(v^2+6400)^2}$$

$$0 = 1600v^2 + 1600(6400) - 3200v^2$$

$$0 = -1600v^2 + 1600(6400)$$

$$= -1600(v^2 - 6400)$$

$$v^2 = 6400$$

$$v = \pm\sqrt{6400}$$

$$v = 80$$

$s'(t) > 0$

$$\frac{-1600(v^2-6400)}{(v^2-6400)^2} > 0$$

$$\frac{-1600}{v^2-6400} > 0$$

$\frac{x-2}{2x-3}$

$P(t) = 2t + (162t+1)^{-1}$

$P(t) = 2t + \frac{1}{162t+1}$ $\quad t \in [0,1]$

$P'(t) = 2t + (162t+1)^{-1}$

$= 2 + -1(162t+1)^{-2} \cdot 162$

$= 2 - 162(162t+1)^{-2}$

$0 = 2 \frac{-162}{(162t+1)^2}$

$\frac{162}{(162t+1)^2} = \frac{2}{1}$

$162 = 2(162t+1)^2$

$81 = (162t+1)^2$

$\pm 9 = 162t + 1$

$-1 \pm 9 = 162t$

$\frac{-1 \pm 9}{162} = t$ $\quad \frac{-10}{162}$ or $\frac{8}{162}$