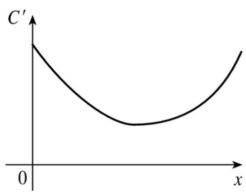
1. **(a)** $C(0)$ represents the fixed costs of production, such as rent, utilities, machinery etc., which are incurred even when nothing is produced.

(b) The inflection point is the point at which $C''(x)$ changes from negative to positive; that is, the marginal cost $C'(x)$ changes from decreasing to increasing. Thus, the marginal cost is minimized at the inflection point.

(c) The marginal cost function is $C'(x)$. We graph it as in Example 1 in Section 3.2.



11. $C(x)=680+4x+0.01x^2$, $p(x)=12 \Rightarrow R(x)=xp(x)=12x$. If the profit is maximum, then $R'(x)=C'(x)$ $\Rightarrow 12=4+0.02x \Rightarrow 0.02x=8 \Rightarrow x=400$. The profit is maximized if $P''(x)<0$, but since $P''(x)=R''(x)-C''(x)$, we can just check the condition $R''(x)<C''(x)$. Now $R''(x)=0<0.02=C''(x)$, so $x=400$ gives a maximum.

19. **(a)** We are given that the demand function p is linear and $p(27,000)=10$, $p(33,000)=8$, so the slope is $\dfrac{10-8}{27,000-33,000}=-\dfrac{1}{3000}$ and an equation of the line is $y-10=\left(-\dfrac{1}{3000}\right)(x-27,000) \Rightarrow$ $y=p(x)=-\dfrac{1}{3000}x+19=19-(x/3000)$.

(b) The revenue is $R(x)=xp(x)=19x-(x^2/3000) \Rightarrow R'(x)=19-(x/1500)=0$ when $x=28,500$. Since $R''(x)=-1/1500<0$, the maximum revenue occurs when $x=28,500 \Rightarrow$ the price is $p(28,500)=\$9.50$.