c) $F'(x) = \left[2x \cdot (x+1)^{-\frac{1}{2}}\right]'$

$= (2x)' \cdot (x+1)^{-\frac{1}{2}} + 2x \cdot \left[(x+1)^{-\frac{1}{2}}\right]'$

$= 2 \cdot (x+1)^{-\frac{1}{2}} - 2x \cdot \frac{1}{2}(x+1)^{-\frac{1}{2}-1}$

$= 2(x+1)^{-\frac{1}{2}} - x(x+1)^{-\frac{3}{2}}$

$= \frac{2}{\sqrt{x+1}} - \frac{x}{\sqrt{(x+1)^3}}$

$= \frac{2\sqrt{(x+1)^2}}{\sqrt{x+1}\sqrt{(x+1)^2}} - \frac{x}{\sqrt{(x+1)^3}}$

$= \frac{2x+2-x}{\sqrt{(x+1)^3}} = \frac{x+2}{\sqrt{(x+1)^3}}$