3. $f(x) = x\sqrt{x+2}$

$f(x) = \underbrace{x}_{P}\underbrace{(x+2)^{\frac{1}{2}}}_{Q}$

$P' = 1 \quad Q' = \frac{1}{2}(x+2)^{-\frac{1}{2}} \cdot \frac{d}{dx}(x+2)$

$Q' = \frac{1}{2(x+2)^{1/2}}$

DOMAIN: $x+2 \geq 0$

$x \geq -2$

ASYMPTOTES

NONE

L.C.T.

DOESN'T APPLY

X-INT: $0 = x\sqrt{x+2}$

$x = 0$

$\sqrt{x+2} = 0$

$(\sqrt{x+2})^2 = 0^2$

$x+2 = 0$

$x = -2$

y-INT: $y = 0$

$P'Q + PQ'$

$f'(x) = 1(x+2)^{\frac{1}{2}} + x\left(\frac{1}{2(x+2)^{1/2}}\right)$

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

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

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

$= \frac{2x+4+x}{2(x+2)^{1/2}}$

$= \frac{3x+4}{2(x+2)^{1/2}}$

$3x+4 = 0$

$3x = -4$

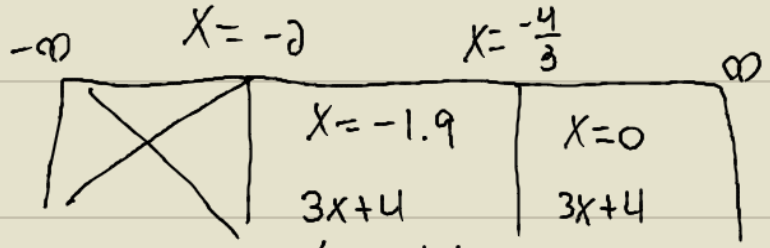
$x = \frac{-4}{3}$

$= -1\frac{1}{3}$

$2(x+2)^{1/2} = 0$

$x+2 = 0$

$x = -2$



MIN

DEC $(-2, -\frac{4}{3})$

INC $(-\frac{4}{3}, \infty)$

MIN $(-\frac{4}{3}, \frac{-4\sqrt{6}}{9})$

$(-1.3, -1.1)$

$x = \frac{-4}{3}$

$y = x\sqrt{x+2}$

$y = -\frac{4}{3}\sqrt{-\frac{4}{3}+2}$

$y = -\frac{4}{3}\sqrt{-\frac{4}{3}+\frac{6}{3}}$

$= -\frac{4}{3}\sqrt{\frac{2}{3}}$

$= -\frac{4}{3} \cdot \frac{\sqrt{2}}{\sqrt{3}}$

$= -\frac{4}{3} \cdot \frac{\sqrt{6}}{3} = \frac{-4\sqrt{6}}{9}$