Q1

(a) See combined sketch below.

(b) $F(0) = \int_0^0 f(t)dt = 0$

(c) $F(x)$ has critical points at -2, 0, and 1, by properties of the derivative.

(d) By properties of the derivative, $F(x)$ is increasing on $(-2, 0)$ and for $x > 1$, and decreasing on $x < -2$ and $(0, 1)$.

(e) By the second derivative, $F(x)$ is concave down for $(\frac{-2-\sqrt{28}}{6}, \frac{-2+\sqrt{28}}{6})$ and concave up everywhere else.

(f)