Given $f(x) = \frac{x^2}{x^2+11}$ $f'(x) = \frac{22x}{(x^2+11)^2}$ $f''(x) = \frac{-22(3x^2-11)}{(x^2+11)^3}$

Find where $f(x)$ has local max and mins
where it is increasing, decreasing, concave up, concave down.

$f'(x) = 0$ when $x = 0$

$f'(x) > 0$ when $x > 0$

$f'(x) < 0$ when $x < 0$

$f''(x) = 0$ when $x = -\sqrt{\frac{11}{3}}$ and $x = \sqrt{\frac{11}{3}}$

$f''(x) > 0$ when $-\sqrt{\frac{11}{3}} < x < \sqrt{\frac{11}{3}}$

$f''(x) < 0$ when $x < -\sqrt{\frac{11}{3}}$ and when $x > \sqrt{\frac{11}{3}}$

So $f(x)$ has a min when $x = 0$

$f(x)$ is concave up $\left(-\sqrt{\frac{11}{3}}, \sqrt{\frac{11}{3}}\right)$

$f(x)$ is concave down $\left(-\infty, -\sqrt{\frac{11}{3}}\right), U\left(\sqrt{\frac{11}{3}}, \infty\right)$

$f(x)$ is increasing $(0, \infty)$

$f(x)$ is decreasing $(-\infty, 0)$