Some hints to the homework

Section 2.6; 20 $\lim_{t\to\infty} \dfrac{t - t\sqrt{t}}{2t^{3/2} + 3t - 5}$ – *Divide by the highest power of* t *which in this case is* $t^{3/2}$ *and use the fact that in the limit as* $t \to \infty$ $\dfrac{1}{t^r} \to 0$ *for any power* r.

Section 2.6; 22 $\lim_{x\to\infty} \dfrac{x^2}{\sqrt{x^4+1}}$ - *In this case the highest power of* x *in the denominator is* x^2 *be-careful with your algebra. You should take the limit of:*

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

Section 2.6; 33 $\lim_{x\to\infty} \arctan e^x$ - *This is a little bit tricky!* $\cdots$ *BUT recall this FACT from class for compositions of continuous functions we can "move the limit inside" so that*

$$\lim_{x\to\infty} \arctan(e^x) = \arctan(\lim_{x\to\infty} e^x)$$

We know that $\lim_{x\to\infty} e^x = \infty$ *now think about what happens to* $\arctan x$ *as* $x \to \infty$*? Remember that* $\arctan x$ *is* $\tan^{-1}(x)$ *a graph can be found on page* 133 *in your book!*

Section 2.6; 38 *Same strategy as* #38!

$$\lim_{x\to 0^+} \tan^{-1}(\ln(x)) = \tan^{-1}(\lim_{x\to 0^+} (\ln x))$$

Now think about $\lim_{x\to 0^+} \ln x$ *What is this limit– again think about the graph of* $\ln x$*!*

Section 2.7; 7 *This is the last concept we have covered in class: – REMEMBER, the slope of the tangent line is the limit of the slopes of secant lines passing through* $P = (1,1)$ *and* $Q = (x, \sqrt{x})$ *as* $Q \to P$*. Now if you write down the slope of the secant line you should get:*

$$m_{PQ} = \frac{\Delta y}{\Delta x} = \frac{\sqrt{x} - 1}{x - 1}$$

Now formulate a limit to calculate the slope of the tangent line and then write down the equation of that line.