Math 124 KAUST | Quiz 2 (20 minutes) | January 26, 2017

Name: Key

Answer the questions in the spaces provided. Show all necessary work. If you have any questions, raise your hand and I will come try to answer.

1. Find the points on the curve $y = x^4 - 6x^2 + 4$ where the tangent line is horizontal. What are the equations of the tangent lines?

$y' = 4x^3 - 12x$

set $= 0$

$4x^3 - 12x = 0$

$4x(x^2 - 3) = 0$

$x = 0$ or $x = \pm\sqrt{3}$

$x = 0 \Rightarrow y = 4$

$x = \pm\sqrt{3} \Rightarrow y = 9 - 6 \cdot 3 + 4$

$= -5$

$y = -5$

2. Does the curve $y = \frac{e^x}{1+x^2}$ have any horizontal tangent lines? If so where?

$y' = \frac{e^x(1+x^2) - e^x(2x)}{1+x^2} = \frac{e^x(x^2 - 2x + 1)}{1+x^2}$

$y' = 0 \iff x^2 - 2x + 1 = 0$

$(x-1)^2$

$\iff x = 1$

Pt is $\left(1, \frac{e}{2}\right)$