MATH 3A QUIZ 4 (TUESDAY)

NAME:_____ SECTION (CIRCLE) 1A 1B 1C 1D 1E 1F

1. Determine where the function $y = \frac{4}{3}x^3 - 2x^2 + x - 1$ is increasing, decreasing, concave up and concave down.

$y' = 4x^2 - 4x + 1 = (2x-1)^2 \geq 0$ everywhere.

$\Rightarrow$ y increases for all x.

$y'' = 8x - 4$

$y'' > 0$ for $x > 1/2$ - function concave up

$y'' < 0$ for $x < 1/2$ - function concave down.

2. Find all local and global extrema of the function $y = e^{x^2}$ on the interval $[-1, 2]$.

$y' = 2x \cdot e^{x^2}$

$y' = 0$ at $x = 0 \in [-1, 2]$.

At $x = 0$, the derivative changes sign from $-$ to $+$. Thus, $x = 0$ is a point of local minimum

$y(x = 0) = e^0 = 1$.

The endpoints: $y(-1) = e^{+1}$.

$y(2) = e^2$.

Since $\frac{1}{e^0} < e^2$, $\frac{1}{e^0} < e^1 < e$

$x = 2$ is the point of global maximum,

$x = 0$ is the point of global minimu