Name: _____

# Quiz 3

MATH 200, Section 3

June 9, 2021

1. (14 points) An object moving on a straight line is $s(t) = t^3 - 3t^2$ feet from its starting point at time $t$. Find the object's acceleration at the instant its velocity is $-3$ feet per second.

2. (18 points) This problem concerns the equation $x^2 = y\cos(y)$.

   (a) Use implicit differentiation to find $y'$.

   (b) Use part (a) to find the slope of the tangent to the graph of $x^2 = y\cos(y)$ at the point $(\sqrt{\pi}, -\pi)$.

Please see other side.

3. (18 points) This problem concerns the function $f(x) = x^3 e^x$

(a) Find the critical points of $f$.

(b) State the interval on which $f$ increases, and on which it decreases.

(c) State the locations ($x$ coordinates) of any local minima of $f$.

(d) State the locations ($x$ coordinates) of any local maxima of $f$.

(e) Identify the locations of any global extrema of $f(x)$ on the *open* interval $(-8, -1)$.