

## Problem Set #0

1. How many different outcomes are there if you toss 3 different 6-sided dice?
2. A chess tournament has 10 competitors, of which 4 are Russian, 3 are from the United States, 2 are from Mexico and 1 is from Brazil. If the tournament result lists just the nationalities of the players in the order in which they placed, how many outcomes are possible?
3. Find the following total derivatives.

a)  $y = 3x^2 - 12$ ,  $\frac{d^2y}{dx^2} =$

b)  $f(x) = \frac{1}{3x} - 2x$ ,  $\frac{df}{dx} =$

c)  $y = 8x \sin \pi x$ ,  $\frac{dy}{dx} =$

4. Find the following partial derivatives.

a)  $u(x, y) = 4xy + 3y^2$ ,  $\frac{\partial u}{\partial y} =$

b)  $u(x, y) = 4xy + 3y^2$ ,  $\frac{\partial u}{\partial x} =$

c)  $f(x, y, z) = e^{3yz} + 6zx$ ,  $\frac{\partial^2 f}{\partial z^2} =$

d)  $P(n, V, T) = \frac{nRT}{V-nb} - \frac{an^2}{V^2}$ ,  $\left(\frac{\partial P}{\partial V}\right)_{n,T} =$