Problems

1. $x = 4$
2. $f'(x,y) = 9x^2 - 2y^2$ & $f'(x,y) = 4 - 4y$
3. A. No

   B. Rank = 3

   [-4,2,-6]
   [-1,-4,3]
   [14,9,3]

   [-1,½,-3/2]
   [-1,-4,3
   [14,9,3]

   [1,-½,3/2]
   [0,-9/2,9/2]
   [14,9,3]

   [14,-7,21]
   [0,-9/2,9/2]
   [14,9,3]

   [1,-½,3/2]
   [0,-9/2,9/2]
   [0,16,-18]

   [-4,2,-6]
   [0,-9/2,9/2]
   [0,16,-18]

   [-4,2,-6]
   [0,1,-1]
   [0,16,-18]

   [-4,2-6]
   [0,16,-16]
   [0,16,-18]

   [-4,2,-6]
   [0,1,-1]
   [0,0,-2]

   [-4,2,-6]
   [0,-9/2,9/2]

[0,0,-2]

[-4,2,-6]
[0,-9/2,9/2]
[0,0,-2]

C. (Graduate Students)

4. **Simple Gaussian:** $f(x) = ae^{\frac{(x-b)^2}{2x^2}}$

   Multivariate Gaussian: $f(x,y) = A\ exp\left(-\left(\frac{(x-x_0)^2}{2\sigma_x^2} + \frac{(y-y_0)^2}{2\sigma_y^2}\right)\right)$

   Bernoulli Distribution: P(n)=p^n(1-p)^(1-n)

   Binomial Distribution: $P_p(n \mid N) = \binom{N}{n} p^n q^{N-n}$

   $$= \frac{N!}{n!\,(N-n)!}\, p^n (1-p)^{N-n},$$

   Exponential Distribution: $P(x) = D'(x) = \lambda e^{-\lambda x}.$

5. (Graduate Students)
6.