Answers to Test 2, Spring 2001

1. (a) \(-\frac{56}{5}\)  
   (b) \(-13\)

2. \(36x\)

3. \((3x^2y)(4u^3) + (x^3 - 2y)(-v \sin(uv))\)

4. \(5x - 2y - 2z = 5\)

5. \(12\)

6. The critical points are \((0, 0)\) and all \((x, y)\) satisfying \(x^2 + y^2 = 9\).
   The maximum value is 48 and it occurs at the points \((2, \pm \sqrt{5})\).
   The minimum value is \(-48\) and it occurs at the points \((-2, \pm \sqrt{5})\).

7. The critical points are \(P = (1, -1)\) and \(R = (0, 0)\).
   The point \(P\) determines a local maximum.
   The point \(R\) determines a saddle point.