Solutions to practice final.

(These are final solutions only, on the exam you should show full working.)

1. Yes, 1/2.

2. a) C (alt. or ratio) b) C (ratio) c) D (comp to $\sum 1/n$.)

3. $\sum_1^\infty (-1)^n 3^{2n+1} \frac{x^{2n+1}}{2n+1}$, $R = 1/3$.

4. a) $\sin y$, $x\cos y$, 0, $-x\sin y$, $\cos y$.
b) $(0, n\pi)$ for any integer n.
c) all saddles.
d) Max 1, Min -1.

5. a) $-\frac{3200}{\sqrt{5}}e^{-7}$. b) direction of$\vec{u} = \langle -\frac{2}{\sqrt{13}}, \frac{3}{\sqrt{13}}\rangle$. c) $400e^{-7}\sqrt{13}$.

6. a) $\nabla f = \langle -\frac{x}{\sqrt{4-x^2-2y^2}}, -\frac{2y}{\sqrt{4-x^2-2y^2}}\rangle$.
b) $(\vec{r} - \langle 1, -1, 1\rangle) \cdot \langle -1, 2, -1\rangle = 0$ or $-x + 2y - z = -4$.
c) 0.5.

7. a) $\frac{1}{2}(\sec\theta\tan\theta + \ln|\sec\theta + \tan\theta| + C$.
b) (uses a.) $\sqrt{2} + \ln(1+\sqrt{2})$. c) $\sqrt{2} + \ln(1+\sqrt{2})$. (reduces to b.)