MTH 234 Quiz 2 Name _____

May 31, 2016 (20 points total)

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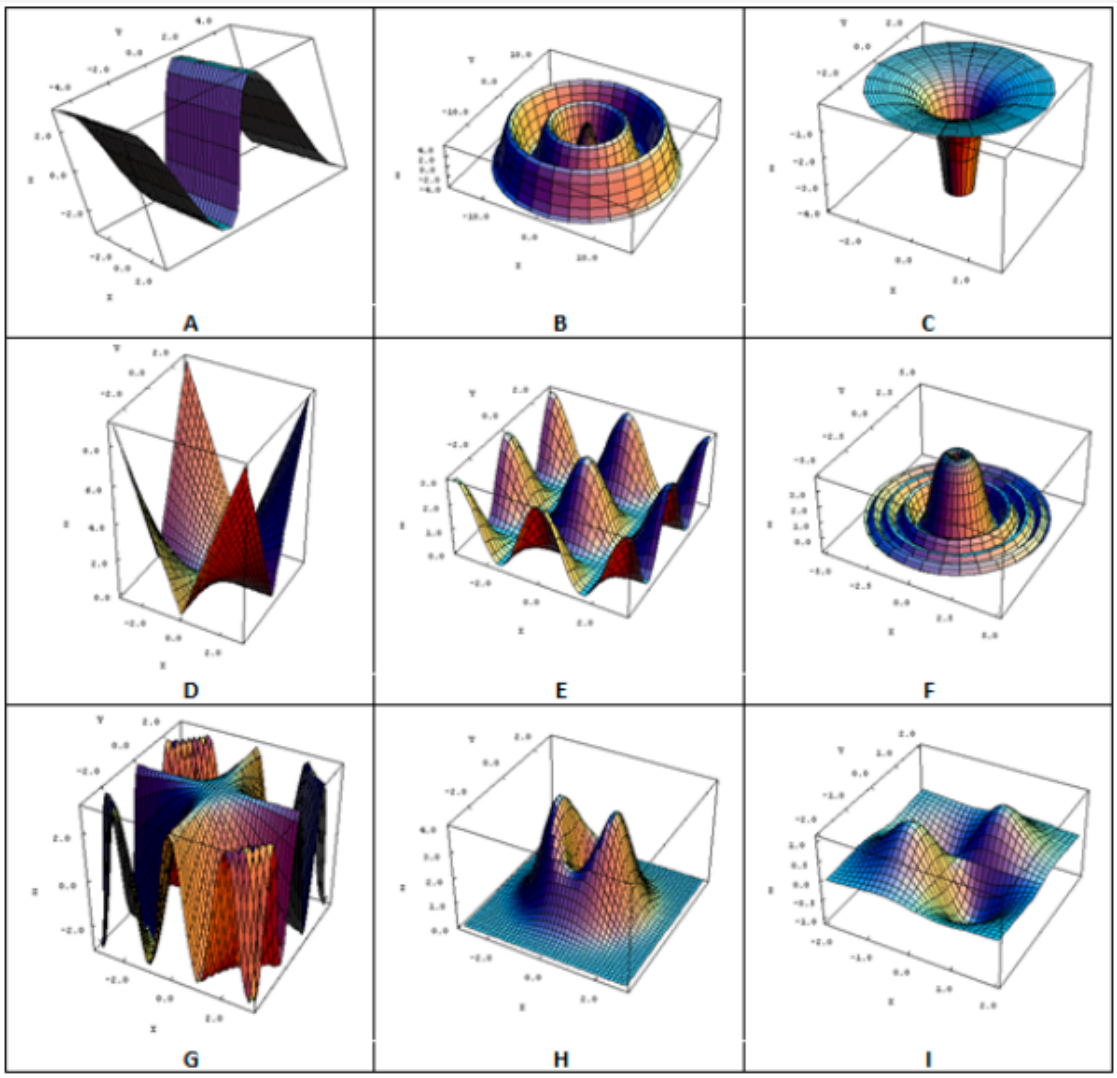
1. (1 point each) Match each function with its graph

_____ $z = 3\cos^2(x)\cos^2(y)$ $z = \frac{4\sin(x^2+y^2)}{x^2+y^2}$ _____

_____ $z = 4\cos\left(\sqrt{x^2+y^2}\right)$ $z = 3\sin y$ _____



2. (3 points) Compute the position function $\vec{r}(t)$ given $r(0) = \langle 1, 0, 1 \rangle$ and $v(1) = \langle 0, 1, 32 \rangle$ where $\vec{a}(t) = \left\langle e^t, 2t, 12(t+1)^2 \right\rangle$.

3. (5 points total) Consider the helix $\vec{\gamma}(t) = \langle \cos(t), \sin(t), t \rangle$.

(a) (3 points) Compute the curvature of $\vec{\gamma}$ at $t = \pi/3$.
(b) (2 points) Compute the tangential component of acceleration of $\vec{\gamma}$ at $t = \pi/3$.

4. (2 points each) Do the following limits exist? If so, give the value; if not, explain why the limit does not exist.

(a)

$$\lim_{(x,y)\to(0,0)} \frac{xy^2}{x^2y - y^2x}$$

(b)

$$\lim_{(x,y)\to(0,0)} \frac{x^2e^y}{y^2e^x}$$

5. (4 points) A particle's position at time t is given by $\mathbf{r}(t) = (1, t, \frac{2}{3}t^{3/2})$. How much time does it take for the particle to travel 1 unit?