1. (a) Limit does not exists. (Hints. put $y = mx$.)
   (b) Limit does not exists. (Hints. put $y = mx$.)
   (c) Limit does not exists. (Hints. put $x = my^2$)
   (d) Limit does not exists. (Hints. put $y = mx^2$)
   (e) Limit does not exists. (Hints. put $y = mx^2$)
   (f) Limit does not exists. (Hints. put $y = mx$.)
   (g) Limit does not exists. (Hints. put $y = mx$.)
   (h) Limit exists and value is 1.(Hints. $x = r\cos\theta, y = r\sin\theta$.)
   (i) Limit exists and value is 0. ($\epsilon - \delta$ approach.)
   (j) Limit exists and value is 0.
   (k) Limit does not exists. (Hints. put $x = mz^2, y = nz^2$.)
2. $\epsilon - \delta$ approach.
3. $\epsilon - \delta$ approach.
4. (a) continuous (Hints. $x = r\cos\theta, y = r\sin\theta$.)
   (b) continuous (Hints. $x = r\cos\theta, y = r\sin\theta$.)
   (c) continuous (Hints. $\epsilon - \delta$ approach.)
   (d) not continuous (Hints. $\epsilon - \delta$ approach.)
   (e) not continuous (Hints. $x = r\cos\theta, y = r\sin\theta$.)
   (f) continuous (Hints. $x = r\cos\theta, y = r\sin\theta$.)
   (g) continuous (Hints. $\epsilon - \delta$ approach.)
   (h) continuous (Hints. $x = r\cos\theta, y = r\sin\theta$.)
   (i) continuous (Hints. $\epsilon - \delta$ approach.)
5. $n < 1$. (Hints. $x = r\cos\theta, y = r\sin\theta$.)
6. (a) 0 (Hints. $x = r\cos\theta, y = r\sin\theta$.)
   (b) 0 (Hints. $x = r\cos\theta, y = r\sin\theta$.)
   (c) 1 (Hints. $x = r\cos\theta, y = r\sin\theta$.)
   (d) 0 (Hints. $x = r\cos\theta, y = r\sin\theta$.)
   (e) 0 (Hints. $x = r\cos\theta, y = r\sin\theta$.)
   (f) -1 (Hints. $x = r\cos\theta, y = r\sin\theta$.)
   (g) 0 (Hints. $x = r\cos\theta, y = r\sin\theta$.)
7. (a) On the line $x + y + 1 = 0$.
   (b) No such points.
8. (a) $\{(n, m) : n, m \in \mathbb{Z}\}$
   (b) $\{(n, m) : \textit{either } \ n \in \mathbb{Z} \ \textit{ or } \ m \in \mathbb{Z}\}$